

Energy Efficiency Financing, an Opportunity to Reduce Energy Poverty in the South-East Region of Romania

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Abstract

Increasingly pressing aspects of the energy transition underline the recurring question about a measure of equity in this process, referring to individuals and communities. The European countries' strategies to address energy poverty include energy efficiency policies, which, however, require significant funding support. We propose, therefore, to carry out a study on how the European funding from the 2014-2020 programming period for energy efficiency was accessed in the South-Eastern region of Romania. The research methods used are case study and comparative analysis. We used the open data published by the management authorities for the operational programs in Romania and those of the European Commission. The results reveal the imbalance between the urban and the rural environment in terms of accessing non-reimbursable financing for energy efficiency. The conclusions of this study could be used in order to support local authorities to enhance their capacity to access financing in the period 2021-2027 as well.

Key words: energy efficiency, energy poverty, energy transition, cohesion policy, sustainable development

J.E.L. classification: A14, D63, D78, F36, F63, F68, G28, I38, P18, R11

1. Introduction

The energy transition is a central topic of discussion in the context of climate changes accentuated from year to year by extreme natural phenomena. To all these concerns, the important economic challenges brought by the conflict in Ukraine are added. It has emphasized the EU's policies to reduce dependence on a main supplier and to increase investments for alternative solutions in the provision of energy. Beyond strategies and plans, the experiences of implementing energy policies in the last decades in Europe highlighted important costs and differentiated capacities of implementation for the Member States and worldwide.

The costs of switching to low-carbon energy determine the existence of a high segment of the population affected by energy poverty, especially in rural areas. In order to support its standard of living, European strategies speak of policy mixes, which combine social and economic measures, including those related to energy efficiency of public buildings and private homes.

The latest statistics show, in 2022, a steep increase in the percentage of citizens throughout the EU who could not heat their homes at a reasonable level, a ratio of 9,3%, i.e. more than 40 million Europeans (Commission Recommendation (EU) 2023/2407). In Romania, the percentage exceeded 21%, and about 75% of households affected by energy poverty are in rural areas (ORSE, 2023). The financial measures in the European area consisted of granting state aid to pay part of the energy bill or capping prices. But these have short-term effects and do not solve the situation sustainably. That is why one of the big problems of reducing energy poverty is the wrong orientation of the measures (Commission Recommendation (EU) 2023/2407; ORSE, 2023).

In this article, we have carried out a case study on the South-East region of Romania regarding the use of non-reimbursable funds dedicated to energy efficiency in the 2014-2020 programming period, that will end on December 31, 2023. Our working hypothesis is that there is a significant difference between the capabilities of attracting these financings in rural areas compared to urban areas of the South-East region, similar to the situation throughout Romania. Our study aims to emphasize the idea that mixed government policies should more closely monitor the needs of local authorities in rural areas, which require more social and economic support to tackle energy poverty through energy efficiency measures.

2. Literature review

Scholars' opinions converge on the fact that actions for energy efficiency are part of the category of structural measures, which address energy poverty in the long term from the perspective of its causes (Boemi, S.-N. et al, 2019, pp. 242; Gouveia, J.P. et al, 2019, pp. 187; Atanasiu, B. Et al, 2014, p. 58), which, in the following years, will positively impact the reduction of member states' dependence on energy imports (Hursthouse, F. et al, 2022).

Some authors argue that energy vulnerability is associated less with low income and more with the quality of construction and the low level of financial education of individuals (Pereira, D. S. et al, 2023, p. 173), and others consider that policies are very important of awareness towards a behavioral change of consumers (Streimikiene, D. et al, 2020, p. 3389; Conforto, G. et al, 2022). In fact, we are talking about the need for a mix of social and economic policies (EPAH, 2023; Bessa, S. et al., 2022; Bouzarovski, S. et al, 2016, p. 310; Thomson, H. et al, 2017, p. 879), so as to reduce the discrepancy between more developed and vulnerable areas in terms of the ability to implement financing opportunities (Henriques, C. et al, 2022, p. 5317; Economidou, M. Et al, 2020, p. 225).

In Romania, the percentage of thermal rehabilitation of buildings is still very low, being 3% for residential spaces in rural areas (Murafa, C. 2023) and 5% of apartments in blocks of flats (The Government of Romania, 2022). In view of fulfilling the obligation of Member States to review their national energy and climate plans by June 2024 based on European guidelines (Directive (UE) 2023/1791; European Council, Council of the European Union, 2023, The European Commission, 2022), Romania has the chance to achieve energy savings in the residential and public sector with the opportunity of financing within 2021-2027.

3. Research methodology

For this paper, we used the case study and the comparative analysis. The data relating specifically to the counties in the South-East development region of Romania are those communicated by the government through the *MySMIS 2014* reports (MIPE, 2023). In this sense, the "*Open data - list of operations*" platform was accessed, respectively the database with the projects contracted on Operational Programs for 2014-2020 programming period. First, the Thematic Objective "*Supporting the transition to a low-carbon economy in all sectors*" was selected in the database. Second, filters were successively applied on the following Theme Details (TD) criteria: 013 "*Energy efficiency renovation of public infrastructure*", 014 "*Energy efficiency renovation of housing stock*" and 068 "*Energy efficiency & projects in SMEs*". Further, within each TD, localities from the 6 counties that are part of the South-East development region of Romania were selected. Then, the data related to the localities in the *urban* environment and those in the *rural* environment were differentiated and the sum of the number of implemented projects was calculated. As for the financial aspects of the projects, the *Total Eligible Expenditures* and *EU Contribution* columns were taken into account from the database, the amounts being calculated in RON currency.

Also, the information available on the Cohesion Policy implementation progress reporting platform (European Commission, 2023a) was accessed for the data related to the member states of the European Union, the 2014-2020 programming period being selected. The databases were successively filtered by TD 013, 014 and 068, and then the information reported for each country was analyzed.

4. Findings

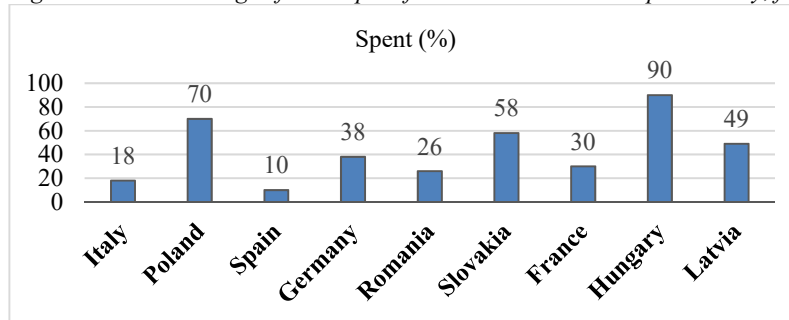
4.1. Financial allocations for energy efficiency within the Cohesion Policy in 2014-2020/2023

Concerns for the energy security include the affordability of energy costs, whether we are talking about the budgets of organizations, but especially whether we are referring to citizens' budgets.

For an overview of the EU's support measures for the energy efficiency of public and residential buildings, we analyzed how the amounts are allocated, as well as the degree of their use by the EU Member States, by comparison with Romania. Through the Cohesion Policy, the European Union has planned the amounts dedicated to energy efficiency to the greatest extent through the European Regional Development Fund (ERDF) and the Cohesion Fund (CF). The ERDF was implemented in Romania through the Regional Operational Program (POR/ Regio), and the CF through the Large Infrastructure Operational Program (POIM). Funds for energy efficiency were mainly allocated to Theme Details 013, 014 and 068, their purpose being the operationalization of themes such as "environment protection and resources efficiency", "low-carbon economy", "social inclusion", "efficient public administration", "energy infrastructure".

Regarding the EU allocations for the energy efficiency of the public infrastructure (TD 013), 736 mil. Euros were planned for Romania, of which approx. 26% was spent. In terms of allocation level, our country ranked 5th among the Member States, after Italy, Poland, Spain and Germany and being followed by Slovakia, France, Hungary.

Figure no. 1. Percentage of sums spent from the total allocated per country, for TD 013 (2014-2020/2023)

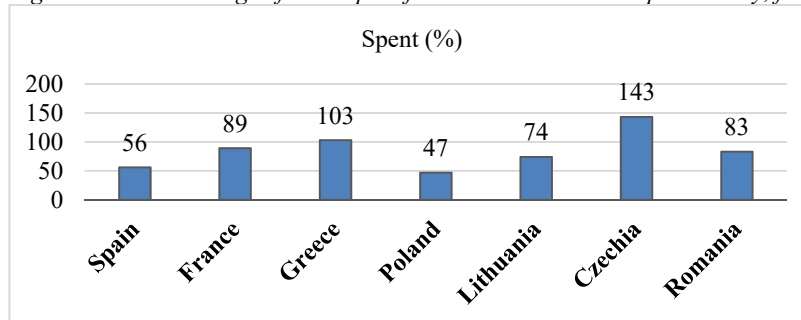


Source: European Commission, 2023, 2014-2020 Cohesion Policy Overview

We can see in the figure no. 1 that, among these Member States that had the highest allocations on TD 013, Hungary (90%) and Poland (70%) lead by far in the top of the utilization rate of the planned amounts. Romania used about a third of the amounts, and Italy and Spain are at the bottom of the list.

As for the EU allocations for the energy efficiency renovation of housing stock (TD 014), 306 mil. Euros were planned for Romania, of which approx. 83% was spent. In terms of allocation level, our country ranked 7th among the Member States, after Spain, France, Greece, Poland, Lithuania and Czechia and being followed by Slovakia, Hungary and Latvia.

Figure no. 2. Percentage of sums spent from the total allocated per country, for TD 014 (2014-2020/2023)



Source: European Commission, 2023, 2014-2020 Cohesion Policy Overview

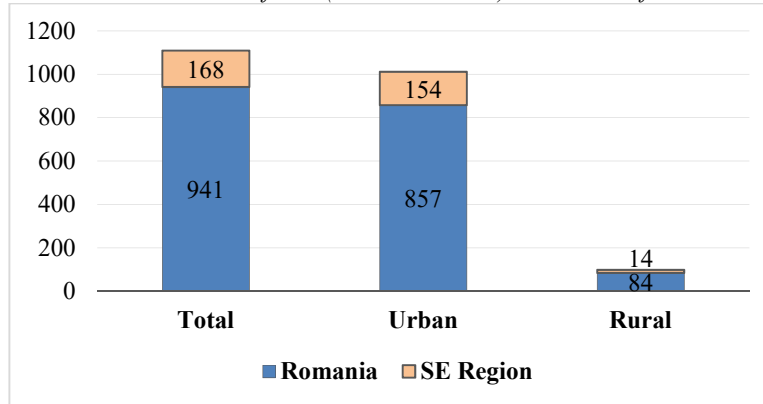
Figure no. 2 shows a more interesting situation regarding the spending rate of the money allocated to the Member States on TD 014. The Czech Republic and France have exceeded the amounts initially allocated, the percentage of spending of the amounts being over 100%. The Czech Republic used almost 50% more than the amounts planned by the EU for this country. Romania and France exceeded the percentage of 80%, the lowest rates being, this time, in Spain and Poland (around 50%).

Until the completion of this analysis, for TD 068 we have not identified any information related to Romania on the EU Cohesion Policy implementation stage reporting platform.

4.2. Aspects of European financing for energy efficiency in SE region of Romania

From the statistical data available until the completion of this study on non-reimbursable structural funds, it emerged that, compared to the total of projects implemented in Romania for energy efficiency, the percentage of projects implemented in the South-East region represents 17.85%. As for projects for urban areas, they add up to 17.97% of the total number per country, and projects for rural areas represent 16.67% (figure no. 3).

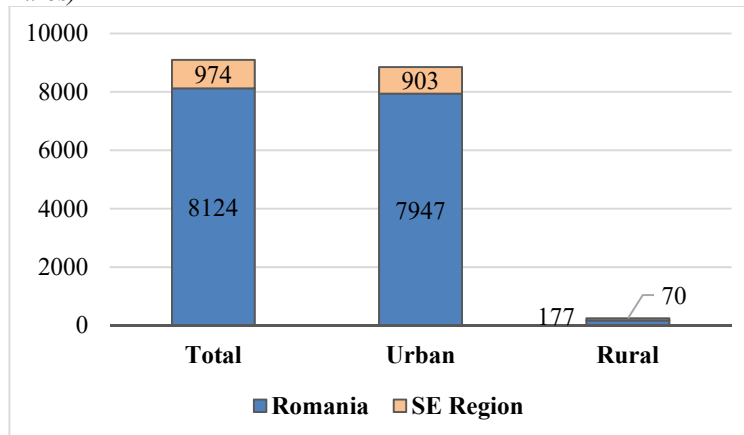
Figure no. 3. Comparative situation between the number of projects for energy efficiency implemented from non-reimbursable structural funds (2014-2020/2023) at the level of Romania and in the South-East region



Source: MIPE, 2023, MySMIS 2014 Open Data

Regarding the values of these projects mentioned above, the ratio is significantly different, so the total value of energy efficiency projects in the South-East region represents 12%. At the urban level, the ratio is 11.37%, and for rural areas the rate is 39.71% (figure no. 4).

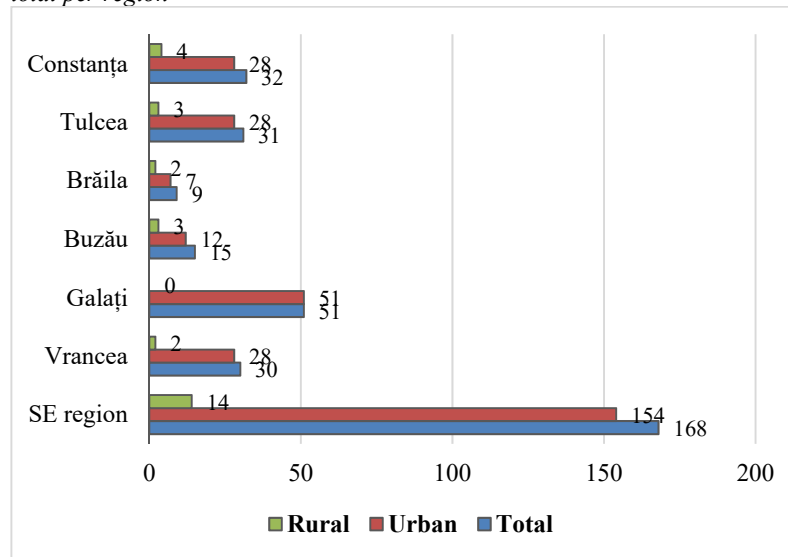
Figure no. 4. Comparative situation of projects' value for energy efficiency implemented from non-reimbursable structural funds (2014-2020/2023) at the level of Romania and in the South-East region (mil. Euros)



Source: MIPE, 2023, MySMIS 2014 Open Data

We observe that, on the SE region as a whole, the overwhelming majority of energy efficiency projects carried out with non-reimbursable structural funds addressed urban areas, only 8.3% of which were implemented in rural areas. Most projects were carried out in Galați county, all in urban areas and 0 in rural areas, followed by Constanța and Tulcea counties. Brăila county is in 6th place. Constanța County also has the most projects (4) for rural areas, in the amount of 11.1 million Euros (figure no. 5).

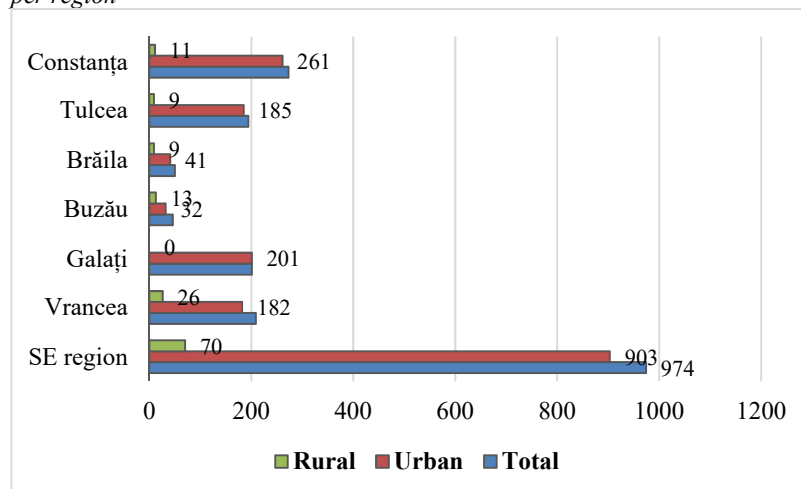
Figure no. 5. Comparative situation between the number of projects for energy efficiency financed from non-reimbursable structural funds (2014-2020/2023) carried out in each county of the SE region and the total per region



Source: MIPE, 2023, MySMIS 2014 Open Data

If we refer to the value of energy efficiency projects from non-reimbursable structural funds in the SE region, the largest amounts go to urban areas, and those for rural areas amount to a percentage of 7.2%. Constanța county is in first place in terms of the total value of the projects, followed by Tulcea and Brăila counties. The county of Buzău is in the 6th place. The largest amounts in rural areas for energy efficiency are in Vrancea county (2 projects worth 26.5 million Euros) (figure no. 6).

Figure no. 6. Comparative situation between the value of projects for energy efficiency financed from non-reimbursable structural funds (2014-2020/2023) carried out in each county of the SE region and the total per region



Source: MIPE, 2023, MySMIS 2014 Open Data

In support of what has been analyzed, we have extracted below the detailed data regarding the situation of projects financed from non-reimbursable structural funds during the 2014-2020/2023 programming period for the 6 counties in the SE development region of Romania. Values for Theme Detail 013, 014, 068 differentiated by urban and rural areas are included. We have also included the amount of EU co-financing from the total value of the implemented projects (Table no. 1-3).

Table no. 1. The number of projects for energy efficiency and their value, financed in the 2014-2020/2023 programming period from non-reimbursable structural funds in Vrancea and Galați counties

VRANCEA COUNTY				GALAȚI COUNTY		
Theme detail	Proje cts (no.)	Total eligible expenses (RON)	EU cofinancing (RON)	Proje cts (no.)	Total eligible expenses (RON)	EU cofinancing (RON)
013	26	183.292.929,66	155.798.990,39	37	162.474.109,99	138.102.993,63
Urban	24	156.761.796,45	133.247.527,15	37	162.474.109,99	138.102.993,63
Rural	2	26.531.133,21	22.551.463,24	0	0,00	0,00
014	4	25.717.722,07	14.666.747,83	13	37.568.514,07	19.159.942,23
Urban	4	25.717.722,07	14.666.747,83	13	37.568.514,07	19.159.942,23
Rural	0	0,00	0,00	0	0,00	0,00
068	0	0	0	1	973.140,00	827.169,00
Urban	0	0	0	1	973.140,00	827.169,00
Rural	0	0	0	0	0,00	0,00
TOTAL	30	209.010.651,73	170.465.738,22	51	201.015.764,06	158.090.104,86
Urban	28	182.479.518,52	147.914.274,98	51	201.015.764,06	158.090.104,86
Rural	2	26.531.133,21	22.551.463,24	0	0,00	0,00

Source: MIPE, 2023, MySMIS 2014 Open Data

Table no. 2. The number of projects for energy efficiency and their value, financed in the 2014-2020/2023 programming period from non-reimbursable structural funds in Buzău and Brăila counties

BUZĂU COUNTY				BRĂILA COUNTY		
Theme detail	Proje cts (no.)	Total eligible expenses (RON)	EU cofinancing (RON)	Proje cts (no.)	Total eligible expenses (RON)	EU cofinancing (RON)
013	10	30.408.940,69	25.847.600,65	8	49.612.393,38	42.170.534,44
Urban	7	16.854.711,18	14.326.505,56	6	40.042.571,63	34.036.185,94
Rural	3	13.554.229,51	11.521.095,09	2	9.569.821,75	8.134.348,50
014	4	12.590.396,74	6.421.102,36	0	0	0
Urban	4	12.590.396,74	6.421.102,36	0	0	0
Rural	0	0,00	0,00	0	0	0
068	1	3.196.764,90	1.766.212,61	1	783.479,96	665.957,97
Urban	1	3.196.764,90	1.766.212,61	1	783.479,96	665.957,97
Rural	0	0,00	0,00	0	0,00	0,00
TOTAL	15	46.196.102,33	34.034.915,62	9	50.395.873,34	42.836.492,41
Urban	12	32.641.872,82	22.513.820,53	7	40.826.051,59	34.702.143,91
Rural	3	13.554.229,51	11.521.095,09	2	9.569.821,75	8.134.348,50

Source: MIPE, 2023, MySMIS 2014 Open Data

Table no. 3. The number of projects for energy efficiency and their value, financed in the 2014-2020/2023 programming period from non-reimbursable structural funds in Tulcea and Constanța counties

TULCEA COUNTY				CONSTANȚA COUNTY		
Theme detail	Projects (no.)	Total eligible expenses (RON)	EU cofinancing (RON)	Projects (no.)	Total eligible expenses (RON)	EU cofinancing (RON)
013	20	150.904.747,40	128.269.035,40	27	187.383.440,70	159.275.924,70
Urban	18	145.843.951,80	123.967.359,10	23	176.234.369,21	149.799.213,90
Rural	2	5.060.795,58	4.301.676,24	4	11.149.071,49	9.476.710,80
014	7	32.864.564,62	16.760.927,97	2	78.775.156,93	66.484.713,56
Urban	7	32.864.564,62	16.760.927,97	2	78.775.156,93	66.484.713,56
Rural	0	0,00	0,00	0	0,00	0,00
068	4	10.658.902,90	5.195.537,11	3	6.651.984,25	352.945,08
Urban	3	6.235.539,26	3.127.614,61	3	6.651.984,25	352.945,08
Rural	1	4.423.363,64	2.067.922,50	0	0,00	0,00
TOTAL	31	194.428.214,92	150.225.500,48	32	272.810.581,88	226.113.583,34
Urban	28	184.944.055,68	143.855.901,68	28	261.661.510,39	216.636.872,54
Rural	3	9.484.159,22	6.369.598,74	4	11.149.071,49	9.476.710,80

Source: MIPE, 2023, MySMIS 2014 Open Data

The results confirm the working hypothesis according to which the differences between rural and urban areas are significant in the South-East development region of Romania when we talk about the capabilities of attracting non-reimbursable external financing dedicated to energy efficiency. Moreover, even in urban areas, the projects are mainly carried out by municipalities or large cities. Therefore, in the period 2014-2020/2023, energy efficiency measures could be financially supported with greater difficulty in areas where the need to reduce energy poverty is, in fact, important.

By comparison with the total number of projects in Romania dedicated to energy efficiency and financed from structural funds, in the South-East was implemented a percentage of approx. 18%, and in value they represent approx. 12%. Almost a quarter of the total in Romania of projects for the energy efficiency of public buildings (TD 013) were implemented in the South-East region. The differences between urban and rural are, however, obvious, the situation in the South-East region being similar to the trend throughout the country. Thus, in the SE region, the ratio between the projects implemented in rural areas and those in urban areas is 9%, and in value 8%, at national level these percentages are 10% and 2%.

It is worth pointing out that, for the period 2014-2020/2023, a positive fact is that the projects for energy efficiency in rural areas implemented in the SE region amount 39,7% of the total value of similar projects carried out in Romania. Financing from non-reimbursable external funds supported the energy efficiency of public buildings (of institutions, schools, kindergartens) (TD 013) in rural areas and did not cover residential buildings (houses) (TD 014).

Analyzing the situation of spending the amounts allocated for energy efficiency projects at the European level, we notice that Romania is on a similar trend to that of the Member States, the stage of capitalization of investments being better for projects dedicated to the energy efficiency of residential buildings (TD 014).

5. Conclusions

Our analysis presented a case study on the south-east development region of Romania and referred to the 2014-2020 programming period, which will be completed in December 2023. The financial allocations analyzed are those from non-reimbursable structural funds, for the implementation of the Policy of EU Cohesion, respectively through the European Regional Development Fund (Regional Operational Program - POR/ Regio) and the Cohesion Fund (Large Infrastructure Operational Program - POIM). The data from other financing programs, such as the national program "Casa

verde" ("The Green House"), were not included in our paper. The analyzed data are the officially communicated by the Romanian Government and the European Commission, a fact that attests to the credibility and validity of the information.

This analysis can be extended to the level of all the development regions of Romania, to provide support for a socially equitable implementation of European funding from 2021-2027, which could significantly contribute to the reduction of energy poverty through energy efficiency measures of buildings and homes.

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