Life ReHABITA

Project 101120713 LIFE22-CET-LIFE ReHABITA

D2.1 Energy poverty assessment of the municipalities

Deliverable: D2.1

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1. Introduction

Energy poverty

Energy poverty is a problem affecting around 50 million households in Europe. It is usually defined as a set of conditions where "individuals or households are not able to adequately heat, cool, or provide other required energy services in their homes at affordable cost",[1] alternatively, as "the inability to realise essential capabilities as a direct or indirect result of insufficient access to affordable, reliable and safe energy services, and taking into account available reasonable alternative means of realising these capabilities".[2] It is a persistent problem, and in recent years, following geopolitical events and the energy crisis, the levels of energy poverty across the European Union have continued to rise.

Energy poverty is mainly a result of three factors: low household income, high energy costs and energy-inefficient homes. It has serious negative effects on people's health and wellbeing: from respiratory and circulatory problems to mental problems and social exclusion. The level of energy poverty is measured and monitored by a set of indicators, which can be broadly placed into two categories: those that concern housing conditions (e.g., cooling and heating degree days, final energy consumption in a household by energy use etc.) and those that are concern with socioeconomic aspects (arrears on utility bills, energy prices, inability to keep home adequately warm etc.).

The report

This report assesses the local-level state of energy poverty in pre-mapped neighbourhoods of the five pilot sites of the LIFE ReHABITA project. The assessment should serve as a basis for developing and implementing several aspects of the activities in the subsequent stages of the project.

First, by grouping questions into four categories (residential building & housing conditions; energy poverty & energy efficiency of households; health & well-being; general information), and thus encompassing most of the indicators of energy poverty, the assessment offers an overview of the level of energy poverty of the population living in the pilot sites of the project. The report helps partners of the LIFE ReHABITA project understand the state of buildings and appliances, previous use or lack of energy renovation measures, reasons for not implementing such measures, and financial costs of living for people living in the pilot sites. Second, it offers partners various socioeconomic insights of the population in pilot sites. Hence, these findings are the basis for the development of effective citizen engagement strategies by technical partners and

[1] Thomson, H., & Bouzarovski, S. (2018). *Addressing energy poverty in the European union: State of play and action.* EU Energy Poverty Observatory, Manchester.
[2] Day, G. Walker, Simcock, N. (2016). *Conceptualising energy use and energy poverty using a capabilities framework,* EP93

municipalities (as these have been presented in the deliverable D2.4) and other in-person or online engagement activities since these should be shaped by the needs and various factors of the population revealed in this assessment.

Furthermore, the findings of this report should be of value to five local authorities of the project in understanding the peculiarities of energy poverty in their municipalities and the development of criteria for recognition of citizens in energy poverty or at risk of energy poverty and for accordingly adjusting, if needed, their social service activities. This report, therefore, is not only an important document for activities, tasks and deliverables of the LIFE ReHABITA project to follow but could be of great value to municipalities and their social service offices, non-government organisations, charity organisations and similar organisations which focus their work in the targeted areas.

2. Methodology

This explorative quantitative research aimed to estimate the scope and intensity of energy poverty of the population living within the administrative areas of the five pilot sites established within the project LIFE ReHABITA. This research aimed to conduct a local-level energy poverty assessment through baseline characterisation of energy poverty and housing conditions in all participating municipalities. The purpose of this task was to contribute to the overall understanding of energy poverty and, thus, energy poverty alleviation efforts within these areas through greater levels of participation of vulnerable populations in project activities and in the subsequent energy renovations of their respective dwellings and households.

To carry out this task, a questionnaire has been developed by the lead beneficiary of the task (DOOR) and disseminated to technical partners at the project pilot sites. The technical partners translated the questionnaire into their respective national languages. To estimate the local intensity and scope of energy poverty in these areas, the questionnaire included a wide variety of questions that could be broadly grouped into the following four themes: residential building & housing conditions; energy poverty & energy efficiency of households; health & wellbeing; and general information. For data collection, a total of 129 variables have been operationalised through the four above-mentioned themes and in the form of closed-ended and open-ended questions. The survey was administered through the *EUSurvey* platform and via the CAPI technique (*Computer-assisted personal interviewing*) by the staff of the local ReHABITA offices. The administered questionnaire can be found in the Annex 1 of this report.

To ensure a well-balanced and representative sample that is within the project capabilities and defined outputs, the total planned sample of this activity was set to N=500, corresponding to a minimum of N=100 in each pilot site. Non-probabilistic sampling was conducted by the staff of the local REHABITA offices centres who contacted and administered the questionnaire to inhabitants of pre-mapped neighbourhoods as well as beneficiaries of local social service centres of the project's pilot sites who were willing to participate in the survey. All data collection was conducted between February and May 2024. Table 1 shows the distribution of the sample and their main socio-demographic characteristics according to each pilot site of the project.

Table 1. Socio-demographic characteristics of the sample (N = 513).

		Gospic (HR)	Lorca (ES)	Ploiesti (RO)	Plovdiv (BG)	Saldus (LV)	TOTAL
Gender	*Female*	47,6%	63,4%	32,7%	60%	28,3%	46,4%
	Male	52,4%	36,6%	67,3%	40%	71,1%	53,6%
Age	*18 - 30*	0,0%	0,0%	14,4%	0,0%	11,1%	4,4%
	31 - 50	52,8%	46,6%	35,1%	3,3%	57,9%	40,2%
	51 - 70	38,3%	45,5%	40,6%	36,3%	24,7%	37,2%
	70+	6,9%	6,5%	9,1%	60,2%	7,1%	18,1%
Education	*(w/o) Elementary*	11,5%	72,9%	8,1%	11,3%	10,9%	23,6%
	Secondary	52,1%	25,3%	23,2%	75,3%	32,7%	39,6%
	Higher	45,8%	2%	68,7%	13,4%	56,5%	36,7%
Work Status	*Employed*	68,1%	57,2%	66,3%	7,0%	78,6%	55,1%
	Unemployed	1,1%	18,4%	6,1%	1,0%	11,2%	7,7%
	Retired	27,5%	14,6%	21,4%	77,0%	8,2%	29,8%
	*Other**	3,3%	7,8%	6,1%	16,0%	2,0%	6,1%
	N	**104**	**103**	**106**	**100**	**100**	**513**

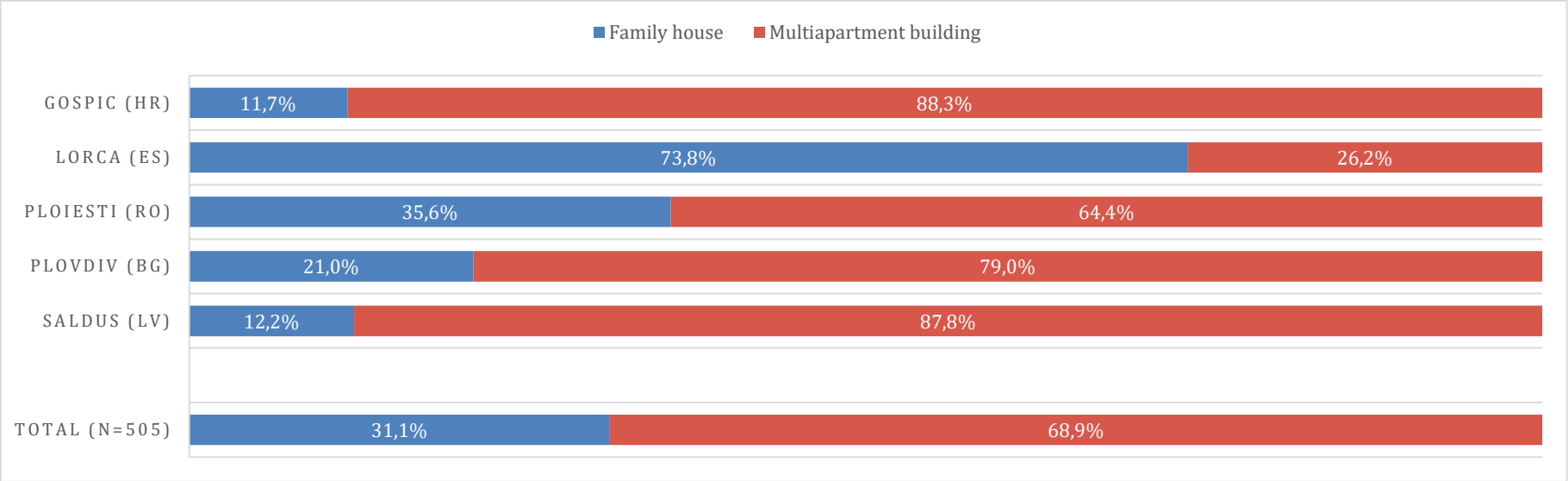
*Represents the sum of the following categories: "trainee/intern"; "permanently unable to work"; "housework"; "other".

3. Results

Residential building & housing conditions

When considering energy renovations, it is important to describe the basic characteristics of the survey participants' dwellings. The analysis results indicate that most of the total surveyed sample lives in multiapartment buildings (MABs), as opposed to another type of dwelling defined within this research, which are family houses. Graph 1 shows that most of the surveyed participants who live in family houses are from the pilot site Lorca, and Ploiesti displays above-average levels of respondents living in these types of buildings. In turn, pilot sites with the most participants living in MABs are Gospic and Saldus.

Graph 1. Distribution of the share (%) of respondents living in different types of buildings by pilot sites.



Other characteristics that determine the basic energy consumption of households, and thus the estimated energy poverty scope and intensity in the analysed pilot sites, are described in Table 2. These characteristics primarily influence households' actual and potential energy efficiency and provide a more comprehensive understanding of the building stock, determining the requirements for basic energy services and thus influencing costs of living and energy expenses for households in these buildings. The results indicate that a large proportion of all respondents live in buildings

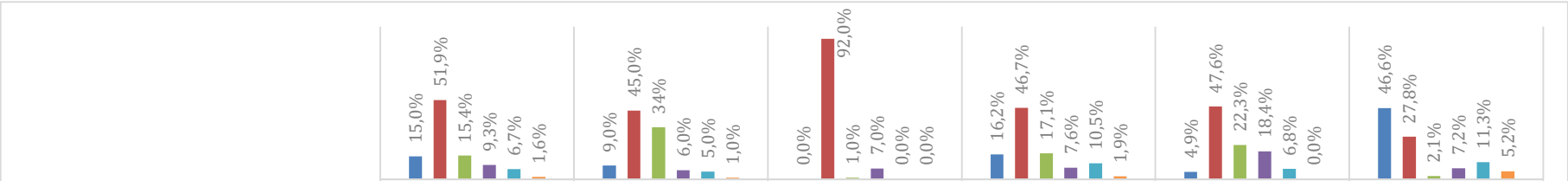
that are **detached or within a row**, with detached buildings being a more common situation in Ploiesti, Plovdiv, and especially Gospic, where almost all respondents live in these kinds of buildings. This is not the case with Lorca, where most respondents are living in family houses within a row. The buildings where the respondents live are also relatively old. Apart from Lorca, where a third of the sample lives in buildings built **before 1960**, large proportions of respondents from different pilot sites are living in buildings built in the period **1961 – 1980**, except Saldus, where these residential buildings were built more recently, with lower, but still significant levels of residential buildings built **post-1980** in Ploiesti. Lastly, we can see that when our respondents come from MABs, as is the case in Saldus, Ploiesti and Plovdiv, a large proportion of them come from large MABs with **more than 20 apartments**. In this case, the exception is Gospic, where more than two-thirds of all survey participants live in MABs containing **six to ten apartments**.

Table 2. Distribution of the share (%) of respondents living in buildings with different characteristics by pilot-site.

		Gospic (HR)	Lorca (ES)	Ploiesti (RO)	Plovdiv (BG)	Saldus (LV)	TOTAL
Position of building	*Detached*	99,0%	15,5%	41,6%	59,0%	48,0%	52,5%
	Within a row	1,0%	70,9%	40,6%	21,0%	48,0%	36,4%
	End of the row	0,0%	13,6%	17,8%	20,0%	4,0%	11,1%
Period of construction	*< 1945*	1,0%	21,4%	3,8%	0,0%	6,0%	6,4%
	1945 - 1960	0,0%	15,5%	3,8%	1,0%	4,0%	4,9%
	1961 - 1980	84,6%	38,9%	45,3%	86,0%	18,0%	54,6%
	1981 - 2000	5,8%	18,5%	37,7%	13,0%	70,0%	28,9%
	> 2000	8,7%	5,8%	9,4%	0,0%	2,0%	5,4%
Number of apartments	*1 - 2*	12,6%	75,7%	23,6%	11,1%	10,1%	26,9%
	3 - 5	6,8%	18,4%	2,8%	0,0%	5,1%	6,7%
	6 - 10	69,9%	2,9%	3,8%	0,0%	8,1%	17,1%
	11 - 20	8,7%	2,9%	39,6%	10,1%	32,3%	18,8%
	> 20	1,9%	0,0%	44,4%	78,8%	44,4%	30,6%

The owner status regarding their residential objects will also determine the total living expenses of our respondents and influence their vulnerability to energy poverty. Graph 2 shows that the largest proportion of our respondents in all pilot sites are **owners without any mortgage or housing loan**, except in Gospic, where they are owners but with a mortgage or housing loan. Also, a significant proportion of respondents in Lorca, Ploiesti, and Saldus are renting as tenants **in an apartment owned by someone else**.

Graph 2. Distribution of the respondents share (%) regarding different owner statuses for their residential objects by the pilot site.

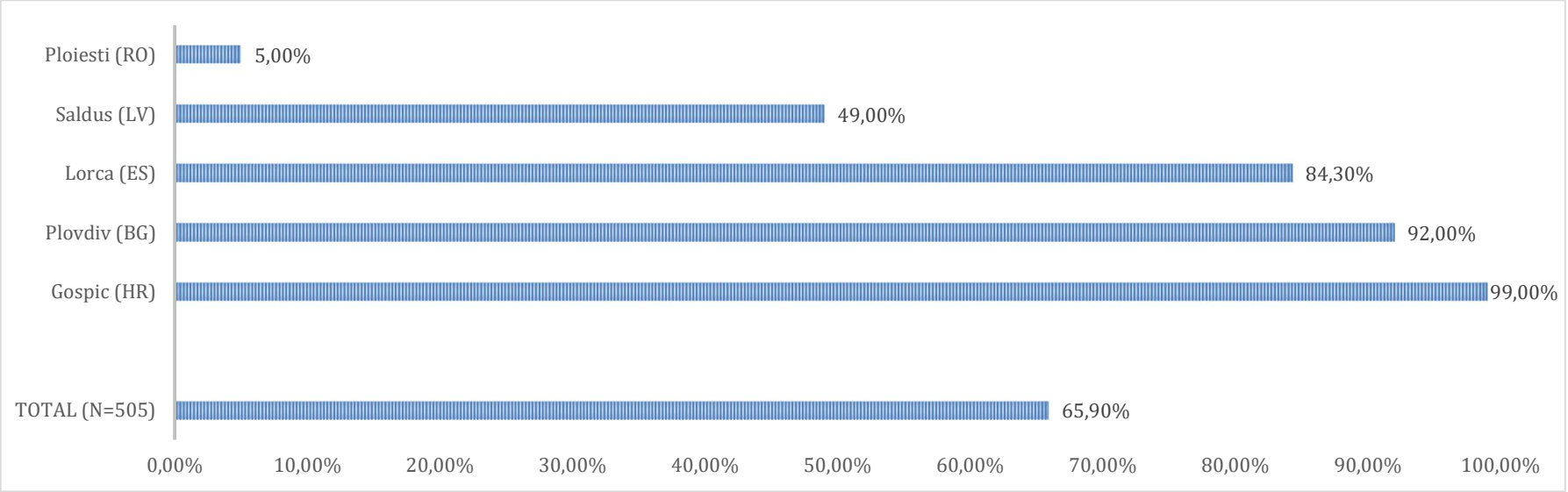


	TOTAL (N=505)	Saldus (LV)	Plovdiv (BG)	Ploiesti (RO)	Lorca (ES)	Gospic (HR)
Owner with mortgage/ housing loan	15,0%	9,0%	0,0%	16,2%	4,9%	46,6%
Owner, no mortgage/ housing loan	51,9%	45,0%	92,0%	46,7%	47,6%	27,8%
Paying rent	15,4%	34%	1,0%	17,1%	22,3%	2,1%
Not an owner, not paying	9,3%	6,0%	7,0%	7,6%	18,4%	7,2%
Social housing	6,7%	5,0%	0,0%	10,5%	6,8%	11,3%
Other	1,6%	1,0%	0,0%	1,9%	0,0%	5,2%

We were also interested in specific types of installations concerning household energy consumption, specifically, whether the dwellings of respondents had a connection to the electricity grid, gas network, water supply network, and sewerage network. Almost all respondents had a connection to the **electricity grid**, except two respondents from Gospic. Similar levels were detected regarding water supply, with one respondent from Saldus and Ploiesti, respectively, and three from Gospic without a connection to the **water supply** network. In Gospic, a large proportion of respondents (88,3%) reported not having a connection to the **sewerage system**, while this was a marginal occurrence in Ploiesti (3,9%), Saldus (3%) and Lorca (1%). A most interesting finding in this group of responses, from the perspective of energy poverty mapping and energy transition, is those concerning the gas network, with 65,9% of all 505 respondents reporting their household is not connected to a gas network. Graph 3 shows the difference in the referred data between pilot sites, with respondents from Gospic, Plovdiv and Lorca representing households with almost a complete absence of energy consumption obtained from a **central gas system**.[3]

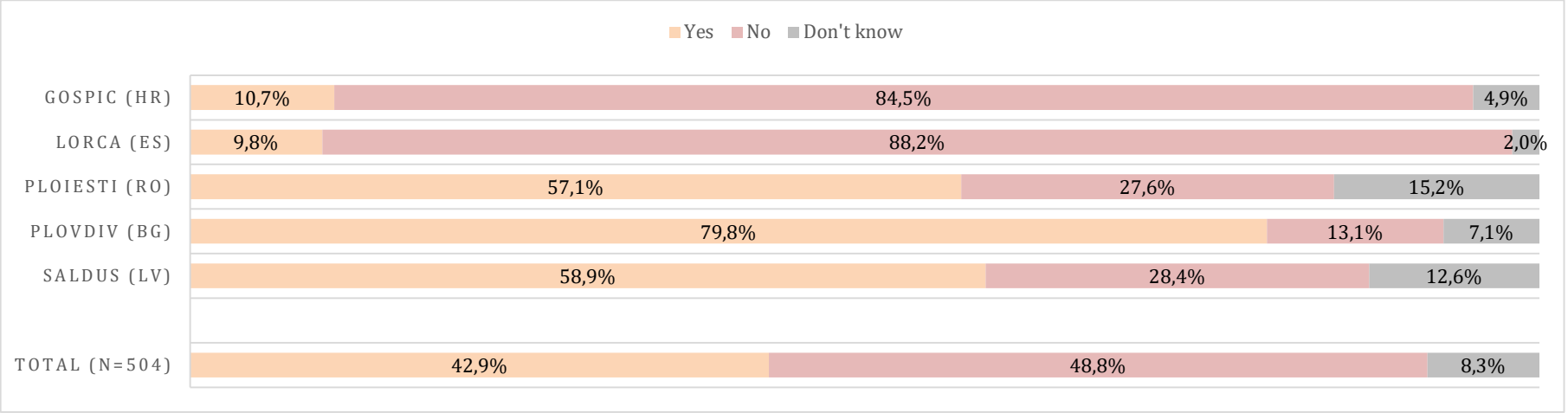
Graph 3. Distribution of the share (%) of respondents living in households WITHOUT a connection to the GAS network.

[3] It should be mentioned here that these numbers in Gospic are due to the lack of the gas network itself in Gospic and Lika region of Croatia. Concerning the numbers in Plovdiv, however, the reasons are mostly socioecomonimc (the high price of gas and the energy crisis) and cultural (many households consider it dangerous to use gas in their homes).



Energy characteristics of dwellings are also determined by **energy efficiency measures** that are or are not implemented within a certain household. When asked about whether any energy efficiency measures have ever been implemented in their house or building since it was built, the largest proportion of the total sample (48,8%) answered that **it has not been implemented**. However, most respondents in Plovdiv answered affirmatively, with Ploiesti and Saldus also showing above-average levels of confirmation that their households implemented some type of energy efficiency measure. A meaningful finding is also a non-negligible share of respondents in Ploiesti and Saldus who **don't know** if an energy efficiency measure has been implemented.

Graph 4. Distribution of the share (%) of respondents' answers regarding the implementation of energy efficiency measures in their house or building by pilot sites.

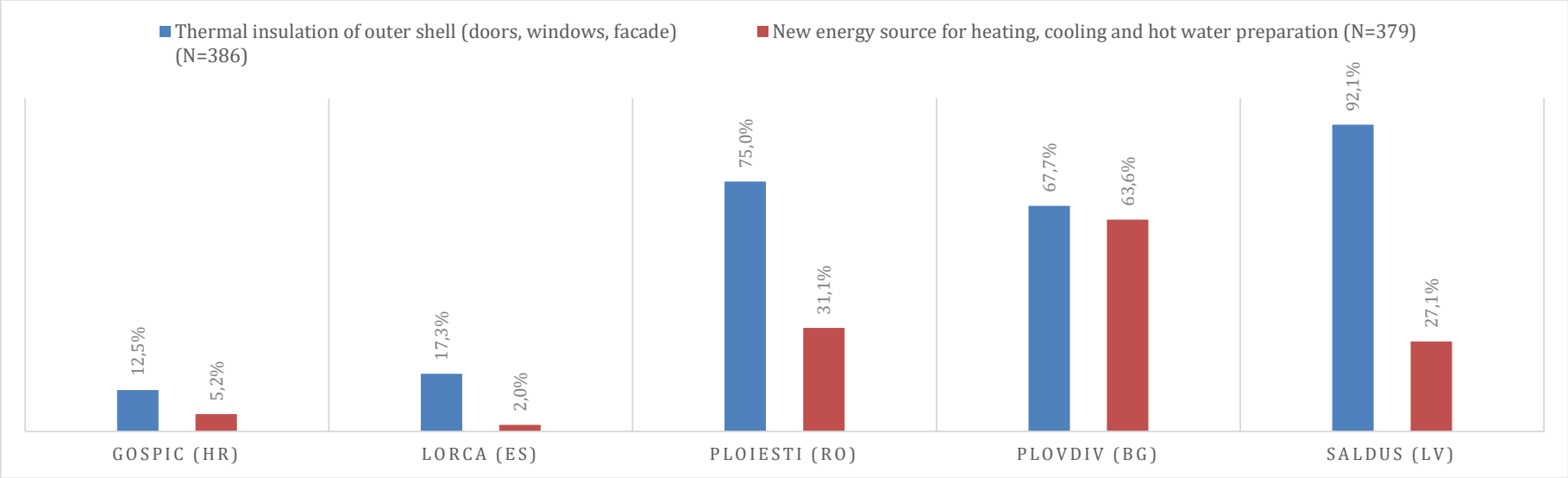


Those respondents who answered the question about whether they have applied any energy efficiency measures with “no” were then asked to describe the main reasons why they have not implemented any energy efficiency measures since their house or building was built. The most common reason for not implementing any energy efficiency measure in all pilot sites is the respondents' financial situation. In Bulgaria, Romania and Croatia, lack of personal financial resources to finance energy renovation measures was the predominant or, as it was the case in Bulgaria, exclusive answer. Other common reasons stated by respondents in all pilot sites can be related to not owning the property (those that answered that they are renting) and that lack of interest in investing in property not owned by a respondent or lack of owners’ interest, and lack of interest from other tenants in the multiapartment building. Another answer which should be mentioned is the lack of information and knowledge about energy renovation measures (whether it is the lack of possible financing opportunities or lack of information on what energy renovation is and how they can increase the quality of living cannot be claimed with any certainty). This is the most frequent answer of respondents in Spain.

Those respondents who answered the question about whether they have applied any energy efficiency measures with “yes” were then asked to identify which measures they have applied. This selection was made from a close-ended list that refers to a list of energy renovation measures most often applied to residential objects. Graph 5 shows the difference in the extent of application of the two most applied measures, which in this survey was some kind of **thermal insulation of the outer shell**, with a total of 203 respondents implementing this measure of energy efficiency. To a smaller but still significant extent (f=108), respondents were selecting the **installation of a new energy source for heating, cooling and hot water preparation,** and this measure was the second most frequent type of energy efficiency measure applied. This refers to furnaces, boilers or connections to a district heating system (heating plant). The three remaining measures were almost non-existent within the sub-samples, with the

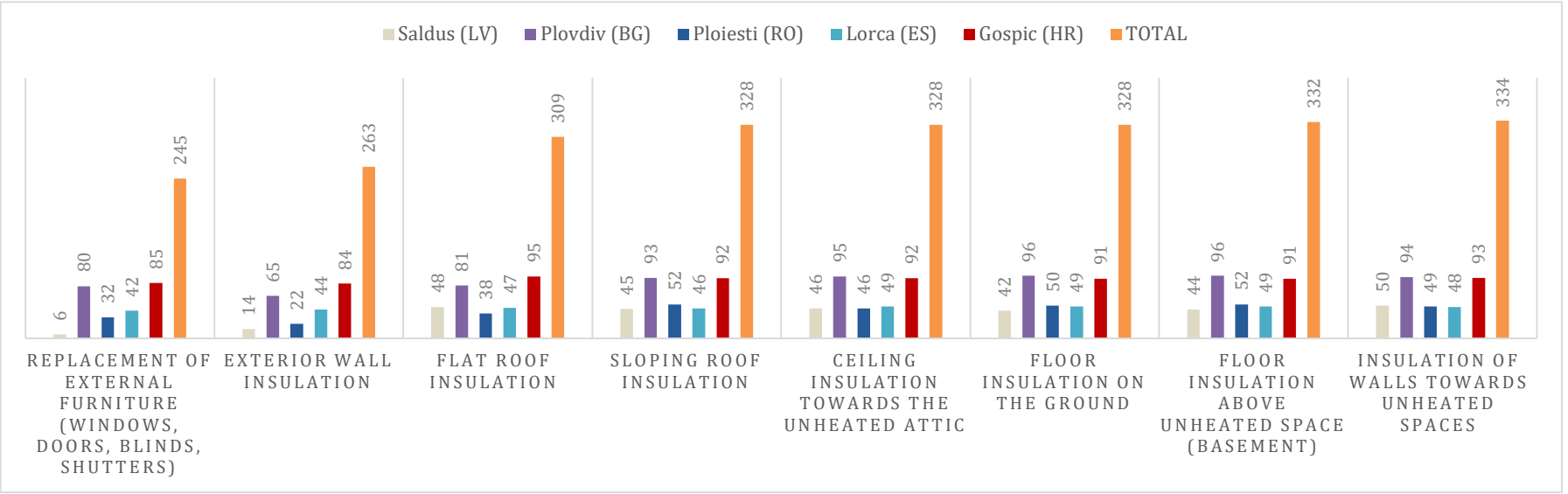
replacement or installation of solar collectors for DHW being reported by five respondents (f=5), **replacement or installation of new photovoltaic systems** by four (f=4), and the installation of electricity storage tanks by a total of six respondents (f=6) in all pilot-sites.

Graph 5. Energy efficiency measures applied in households in % of responses to the response category “yes”.



Considering that the measure of thermal insulation of the outer shell has been reported as the most frequent measure implemented in all pilot sites, we looked at the distribution of frequencies of specific measures of thermal insulation of the outer shell in the surveyed pilot sites to extract more information on the applied measures for energy efficiency in buildings. Graph 6 shows the distribution of frequencies, by pilot site, of respondents who **have not implemented** the measures specified by the survey. By focusing on those who have not implemented these measures, we are looking to look into those proportions and segments in the surveyed population living in preconditions related to risks of vulnerability to energy poverty. Because of this, the graph shows the most frequently applied measures reported on the left side of the graph, with the far-right side of the graph displaying the **least frequent measure reported to have been applied by the respondents**.

Graph 6. Distribution of frequencies to the response category “NO” to the question “If you answered "measures on the outer shell" to the previous question, what measures did you use? “, by pilot-site.


Saldus (LV)
Plovdiv (BG)
Ploiesti (RO)
Lorca (ES)
Gospic (HR)
TOTAL
6
80
32
42
85
245
14
65
22
44
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263
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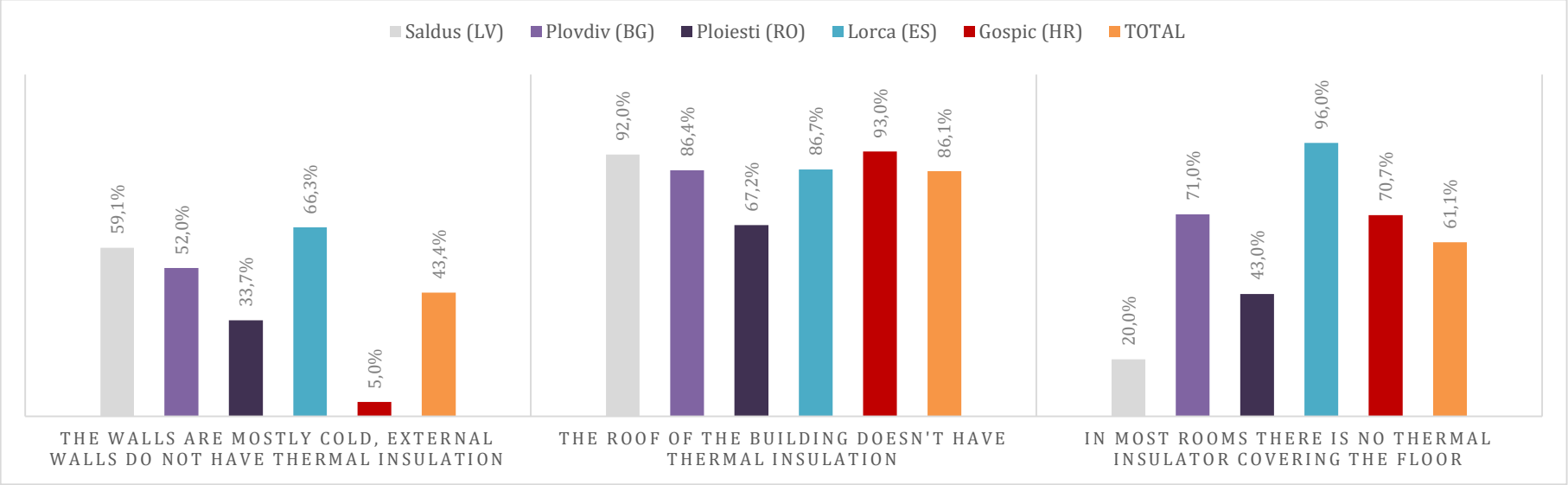
REPLACEMENT OF EXTERNAL FURNITURE (WINDOWS, DOORS, BLINDS, SHUTTERS)
EXTERIOR WALL INSULATION
FLAT ROOF INSULATION
SLOPING ROOF INSULATION
CEILING INSULATION TOWARDS THE UNHEATED ATTIC
FLOOR INSULATION ON THE GROUND
FLOOR INSULATION ABOVE UNHEATED SPACE (BASEMENT)
INSULATION OF WALLS TOWARDS UNHEATED SPACES

Energy poverty and energy consumption of households

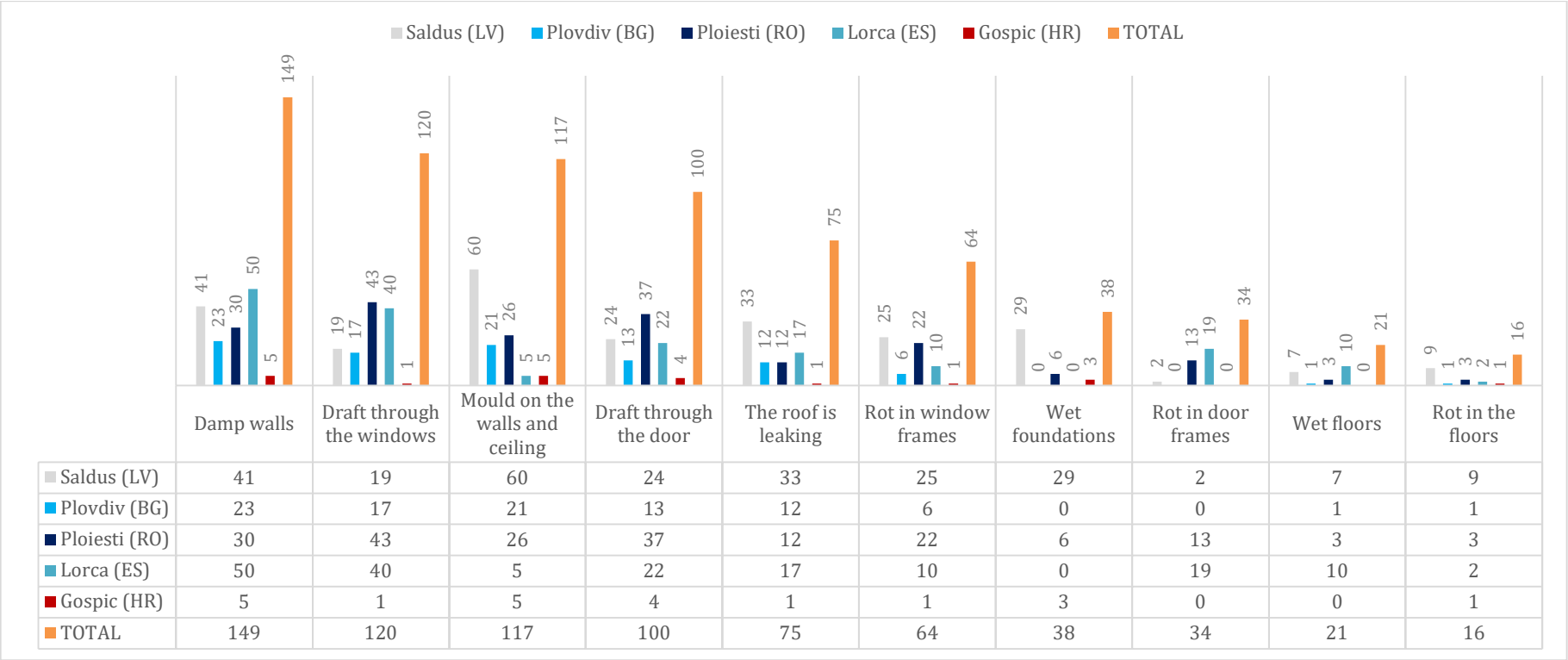
An important aspect of household energy consumption and energy poverty connected to the previous characteristics of residential buildings and housing conditions of households is whether the residential object of a household is thermally insulated. In the questionnaire, the participants were asked to identify which statement is true about their household concerning the **thermal insulation of the residential object** and, similarly, to the previous graph, graph 7 shows the presence or absence of aspects of thermal insulation of the residential object, in percentages of the response category in all responses within the sub-sample (pilot-site). What is important to note along with the data presented in the graph is that even though these aspects could be regarded as some of the more significant indicators of vulnerability to energy poverty in this research, other results within this instrument that are not displayed in the graph further support the detected vulnerabilities in certain cases. For instance, when it comes to roofing insulation, in Saldus, 37,1% of the sample answered that the building has an open attic and that there is intense draft occurring. Furthermore, regarding floor insulation, in Lorca 67,3% out of 98 respondents claim that the entire household is tiled or has no covering at all, only a concrete slab, while 24% of respondents from Plovdiv claim the same situation.

Graph 7. Distribution of shares (%) for the response category “YES” to the question “We are interested if your residential object (family house or apartment) is thermally insulated. Please select those statements that apply “, by pilot site.



We have also asked the survey participants about the presence of problems in their dwellings and households that are heavily associated with energy poverty of households. Specifically, this refers to the presence of various construction elements of the dwellings (e.g. walls, doors, windows, etc.). All pilot sites, except Gospic, display significant problems with **damp walls** and, to an extent, with **drafts through the windows**. **Mould on the ceiling and walls** is evidently a more prominent issue in Saldus, and somewhat less of a problem in Plovdiv and Ploiesti. A **leaking roof**, which is certainly one of the more problematic issues out of all presented within the instruments is especially represented in Saldus and it is not to be disregarded in other pilot sites. Overall, it can be stated that Lorca, Saldus and Ploiesti display most problematic situations regarding this, with Plovdiv a less, and Gospic the least problematic situation.

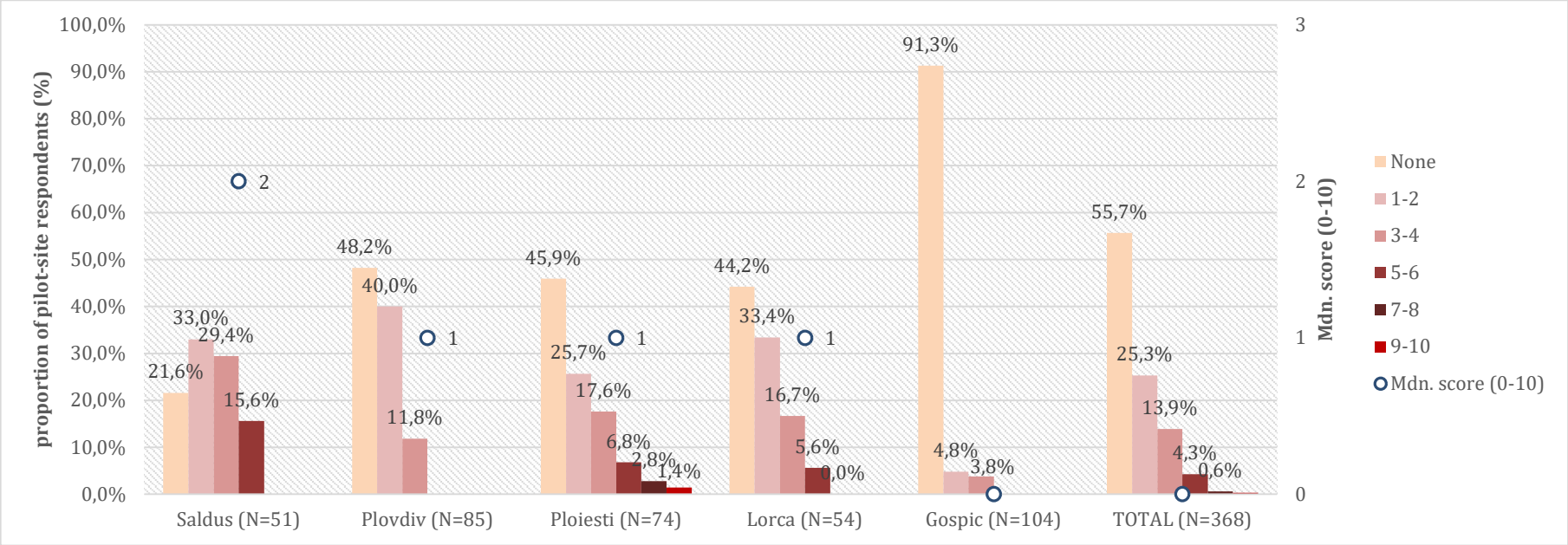
Graph 8. Distribution of frequencies to the response category "YES" to the question of whether the specific issue related to poor energy characteristics of the dwelling is present in the participant's household, by pilot sites.



	Damp walls	Draft through the windows	Mould on the walls and ceiling	Draft through the door	The roof is leaking	Rot in window frames	Wet foundations	Rot in door frames	Wet floors	Rot in the floors
Saldus (LV)	41	19	60	24	33	25	29	2	7	9
Plovdiv (BG)	23	17	21	13	12	6	0	0	1	1
Ploiesti (RO)	30	43	26	37	12	22	6	13	3	3
Lorca (ES)	50	40	5	22	17	10	0	19	10	2
Gospic (HR)	5	1	5	4	1	1	3	0	0	1
TOTAL	149	120	117	100	75	64	38	34	21	16

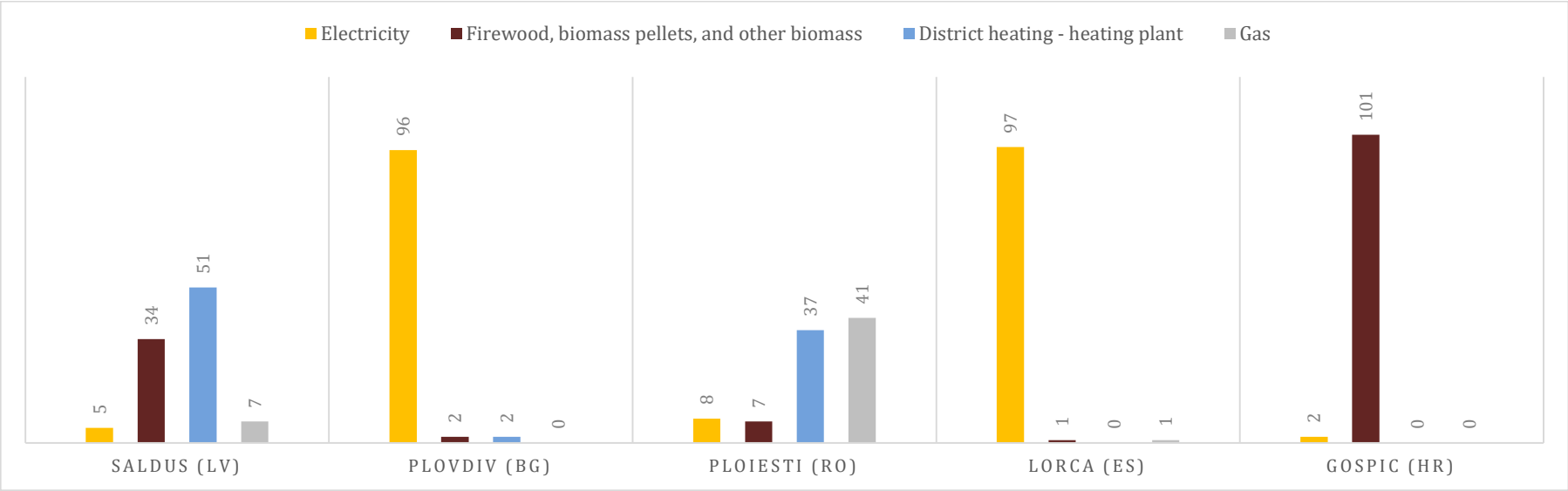
Additional descriptive statistics of responses to this set of questions provide further insight into the scope and intensity of energy poverty vulnerability within the derived sample. Graph 8 displays the distribution of frequencies of respondents who chose none or multiple problems associated with energy poverty discussed within the previous data analysis displayed in Graph 7. These results indicate that even though most of the respondents (55,7%) who provided a response (excluding respondents who answered "I don't know") to these questions report no occurrence of any of the above-mentioned problems, a **certain proportion of the sample reports a combination of multiple problems**. It is important to note, however, that some of these specific issues (e.g., a roof that is leaking as opposed to a draft through the doors), or their specific combinations may pose a greater problem than others to inhabitants living within such dwellings. Nevertheless, the graph below summarizes these results and provides visualizations of these problems by pilot-sites, where responses were grouped into sets of two identified problems at a time, regardless of the specific combination of issues. The results clearly show that, out of those who report specific issues (red bars), in all pilot sites, the most prominent number of these issues are either one or two, which could correlate to lower risks to energy poverty overall. However, in some pilot sites, like Ploiesti, Saldus, and Lorca, there are considerable shares of participants reporting up to 6 problems, and in Ploiesti some are reporting a situation where all 10 issues identified in this research are present. A somewhat opposite situation can be found in Gospic, where less than 10% of the sample lives in conditions where specific issues are present.

Graph 8. Distribution of proportions (%) of respondents living in dwellings with identified problems related to energy inefficient households (left vertical axis), by pilot-sites (horizontal axis), and median score on the cumulative scale of counted cases of problems within the dwellings (right vertical axis).



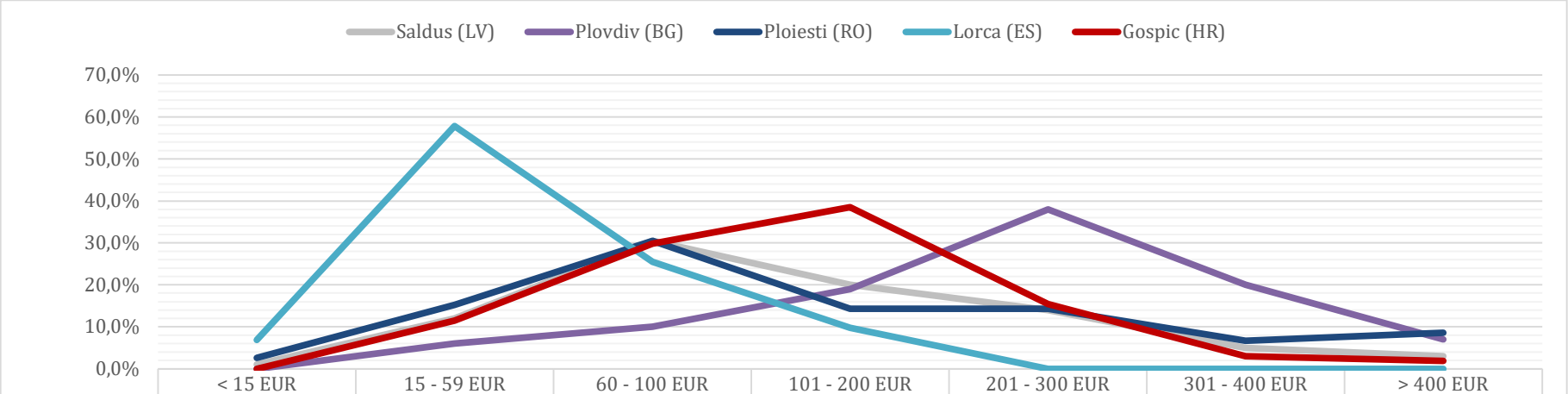
Another energy characteristic of households that determines the quality of energy consumption and the quantity of consumed energy within a household is the type of energy source households primarily use for heating. The differences shown in Graph 9 reflect the differences in available and preferred energy sources used only for heating within these localities. Out of ten possible energy sources defined within this research (and excluding the category "I don't know"), none of the survey participants use two, relatively speaking and from an energy transition aspect opposing energy sources – **coal** and **solar energy** (through solar thermal systems) for heating. Furthermore, only one (f=1) participant in Ploiesti claims their household consumes **fuel oil** to heat their apartment. Results for other more frequently represented categories are presented in the Graph 9, with the categories **"firewood and other biomass"** and **"biomass pellet"** summarized into a single distinct category. Regarding this category, it is important to note that out of 101 total respondents from Gospic who claim to utilize this kind of heating source, a total of 92 respondents claim to utilize "firewood and other biomass" for heating. Such overrepresentation of this category is not evident in Saldus, the only pilot-site comparable to Gospic in this regard and where there are only 23 households burning firewood and other biomass to heat their apartments. Overall, the use of **electricity** for heating dominates in Plovdiv and Lorca, with **district heating** through a heating plant especially prominent in Saldus and Ploiesti where **gas** is the most frequently used source for heating, and which is not especially represented in the rest of the pilot sites.

Graph 9. Distribution of frequencies of respondents utilizing different energy sources for heating by pilot site.



One of the more crucial aspects of vulnerability to energy poverty is household energy cost. In this sense, to estimate these dimensions of energy poverty, we focused on the estimation of respondents regarding the **monthly average costs of energy used for heating**. Since previous experience shows the difficulties of obtaining precise levels of the specified expenses, we have collected these data on a scale of predefined categories of expense in either EUR or national currencies, which was then converted to EUR for more meaningful comparisons. If we are to concern ourselves only with extreme cases, the data in Graph 10 shows how the largest proportion of respondents that pay the lowest (categories of) heating costs are to be found in Lorca. At the same time, an above-average levels share of respondents who pay high costs in the range from 201 to 300 EUR is to be found in Plovdiv. In fact, in Plovdiv 20% of all respondents pay between 300 and 400 EUR for heating and even 7% of those who pay more. Nevertheless, except for Plovdiv, the relatively high proportion of the sub-samples fall under the category of up to 100 EUR.

Graph 10. Distribution of share (%) of respondents within defined groups of the average monthly cost for energy used for heating in the winter of 2023 by pilot sites.



	< 15 EUR	15 - 59 EUR	60 - 100 EUR	101 - 200 EUR	201 - 300 EUR	301 - 400 EUR	> 400 EUR
Saldus (LV)	1,0%	12,0%	30,5%	20,0%	14,0%	5,0%	3,0%
Plovdiv (BG)	0,0%	6,0%	10,0%	19,0%	38,0%	20,0%	7,0%
Ploiesti (RO)	2,6%	15,2%	30,5%	14,3%	14,3%	6,7%	8,6%
Lorca (ES)	6,9%	57,8%	25,5%	9,8%	0,0%	0,0%	0,0%
Gospic (HR)	0,0%	11,5%	29,8%	38,5%	15,4%	3,0%	1,9%

Building upon these results, we have also asked the participants to estimate average **monthly electricity costs in the summer and winter months** of 2023. The descriptive statistics displayed in Table 3 correspond to the previously displayed data for heating costs in winter, and this is evident for pilot sites that primarily use electricity for heating, especially Plovdiv.

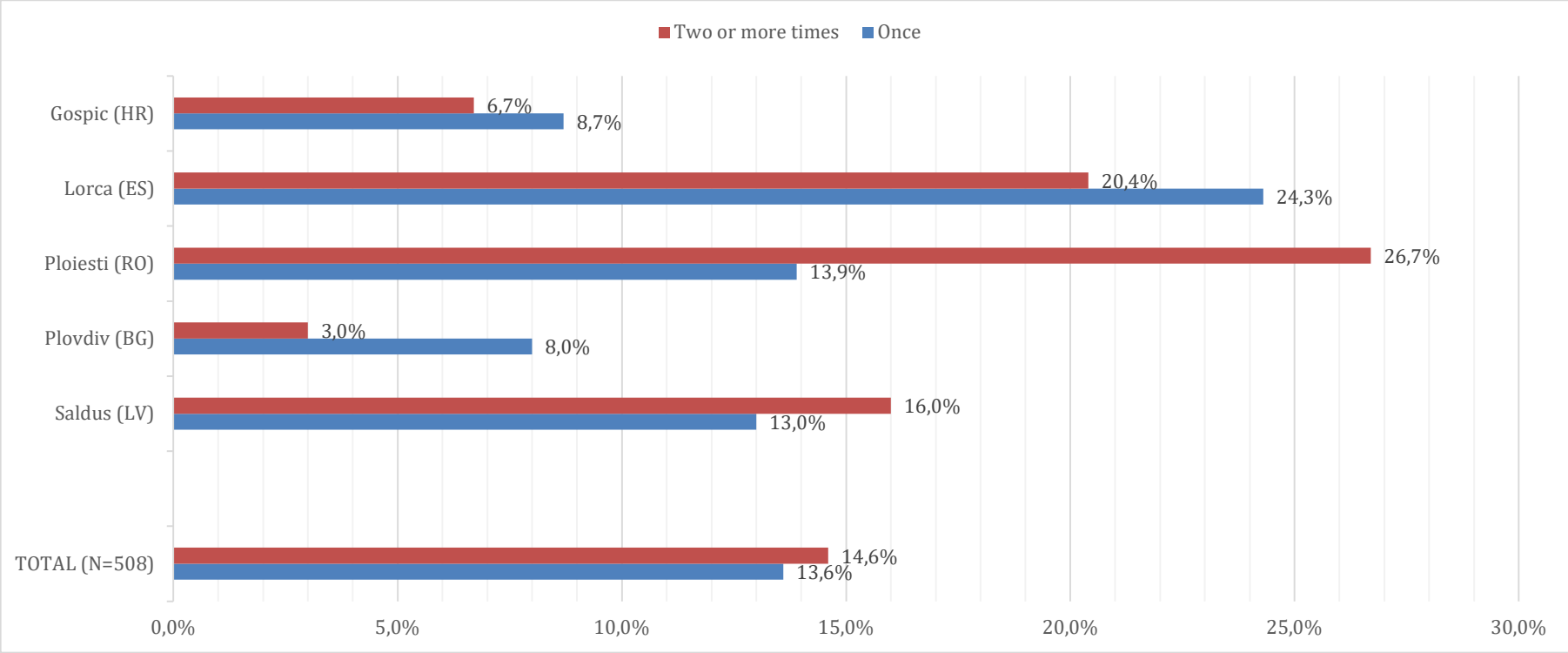
Table 3. Descriptive statistics on average summer and winter (2023) monthly electricity costs in euros.

	SUMMER					WINTER				
EUR	***Min***	***Q1***	***Mdn***	***Q3***	***Max***	***Min***	***Q1***	***Mdn***	***Q3***	***Max***
Gospic (HR)	10	40	**50**	63,7	250	15	45	**50**	65	350
Lorca (ES)	0	20	**45**	80	750	10	30	**50**	65	750
Ploiesti (RO)	5	20	**30**	38,7	200	10	20	**35**	50	320
Plovdiv (BG)	8	21	**29,4**	35,8	77	13	140,6	**255,6**	329,8	562
Saldus (LV)	0	25	**45**	60	600	6	30	**50**	80	700

TOTAL	0	25	**40**	54,3	750	6	35	**50**	110	750

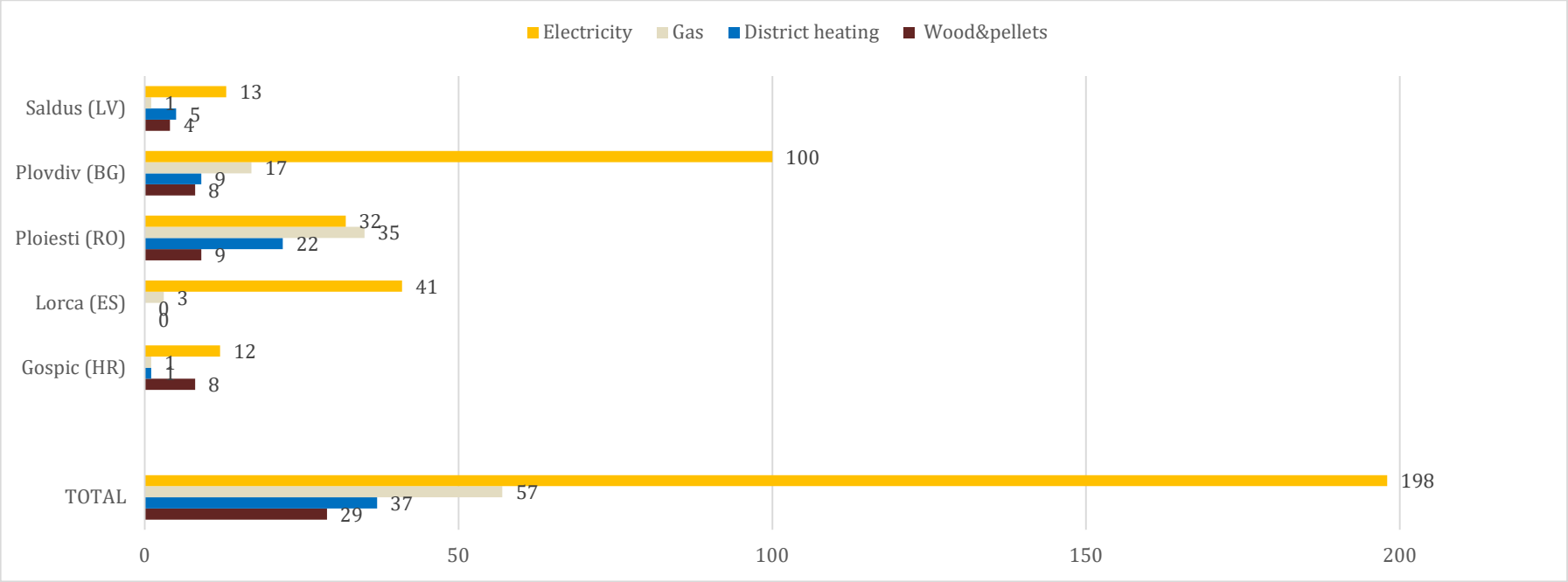
When considering the above-described cost of electricity and heating, it is important to keep track of **arrears on utility bills**, one of the more commonly used indicators of energy poverty. Graph 11 compares the pilot sites regarding being late with paying the utility bills in the last 12 months solely for financial reasons. The data shows the most problematic situation in Ploiesti and Lorca and, to an extent, in Saldus. A more surprising finding is the low levels of arrears on utility bills in Gospic, and especially in Plovdiv, which has a significantly higher share of pensioners and older population who pay considerably higher electricity bills.

Graph 11. Distribution of share (%) of respondents being late in paying any utility bill solely for financial reasons (electricity, gas, water, heating...) in the last 12 months, by pilot-site.



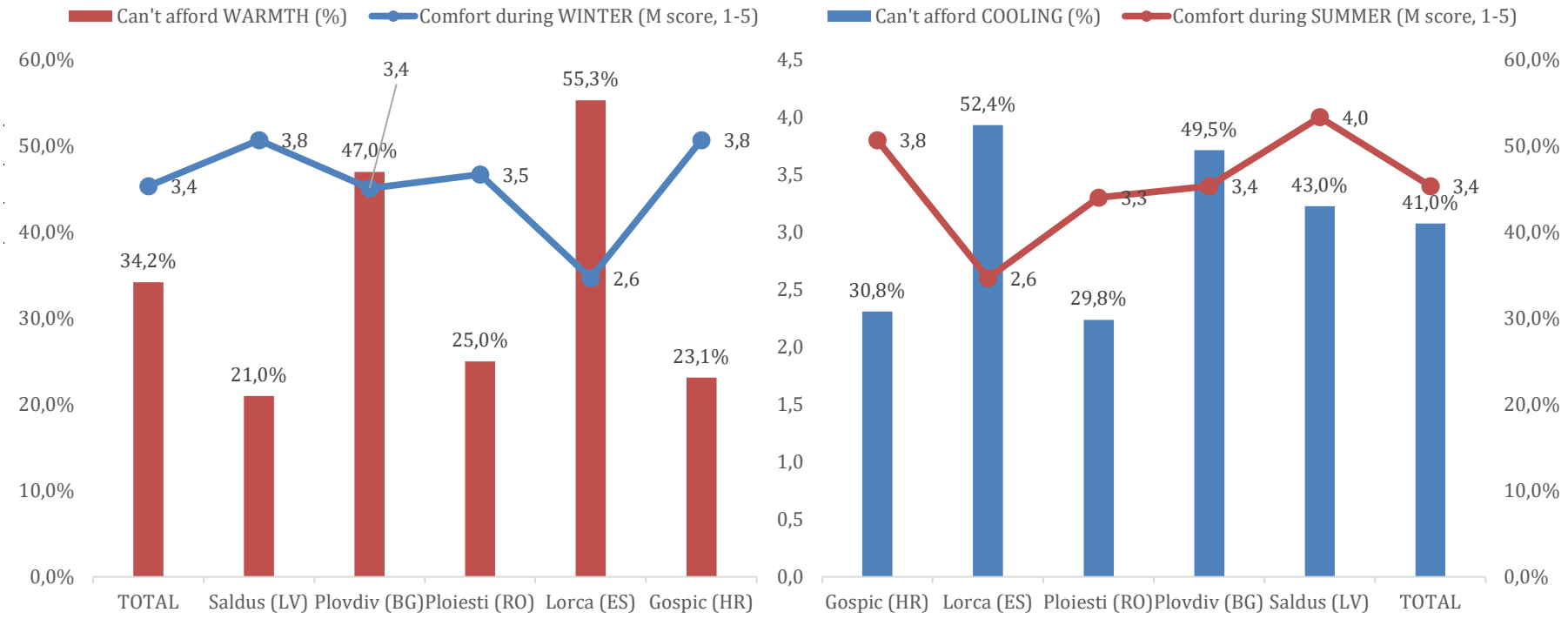
If we were to look at with which services the respondents have had problems with regular monthly payments over the past 12 months since the survey was administered, we conclude that the largest proportion of respondents have the most trouble with paying their **electricity bills** (except in Ploiesti, where the largest share of respondents has trouble with paying their gas bills). The discrepancy between the number or the share of the respondents who claim that they were late in paying their utility bills and those selecting with which of the specific aspect of these utilities they had problems (e.g. the finding that 100 participants, that is, 100% of the sub-sample, who claim to have **troubles with paying electricity**, but cumulatively just around 11% of the same respondents claiming to have been late with paying their utility bills) can be understood in two ways. The first relates to a distinction between "having problems with regular payments" (which is shown in the graph below) and actually "being late with paying" (the results described in the above-displayed graph), where the participants could have had some or substantial difficulties with paying their utility bills, but still managed to pay them regularly. The other is that the respondents in certain pilot sites identify "utility bills" and "utility charges" as being the same category, which, when comparing the data on both instruments for Plovdiv could prove to be true (i.e. 11% of the above-mentioned respondents claiming no arrears on their utility bills vs. the 13% of respondents claiming to not have problems with paying for "utility charges"). Nevertheless, the data in Graph 12 sheds some light on some of the most problematic aspects of regular monthly payments of households when looking at only the categories which proved to be significant in the analysis above (specifically Graph 9) regarding the primary energy source used for heating. Other categories, such as the above-mentioned utility charges, but waste collection charges, water and "other" are also a significant problem in some pilot sites. This is most prominent in Plovdiv, which is perhaps burdened by the extremely high electricity costs, as shown in Graph 10 and Table 3.

Graph 12. Distribution of the number of respondents who have problems with regular monthly payments of the following utilities by pilot-sites.



Energy poverty within the analysed sample could further be assessed through the subjective perception of the levels of comfort in their living spaces during the summer and winter. These two separate questions can be examined with an additional set of two questions that asked the respondents whether they could afford to keep their homes pleasantly cool and warm during the summer and winter months, respectively. Graph 13 provides a comparison for the winter and summer months and pilot sites, with the question on the feeling of comfort analysed on a 5-point scale (central vertical axis) where the lowest score (1- “Extremely unpleasant”) representing the lowest level of comfort, and the highest score (5- “Extremely comfortable”) representing the highest level of comfort. The values within the coloured bars represent the shares of respondents within the analysed pilot sites that are unable to afford to keep their homes pleasantly cool or warm. Immediately, it is evident that Lorca attains the worst scores on both thermal comfort scales and that its sample contains the highest shares of respondents who are unable to warm or cool their dwellings, with the respondents from Plovdiv attaining similar results. Also, there is some difference between these results when comparing the left and right side of the graph, with the results on the right side indicating significantly greater risks to energy poverty, meaning there is a greater risk to summer energy poverty for almost all pilot sites, except Lorca which displays somewhat greater vulnerability to winter energy poverty.

Graph 13. Comparison of the distribution of the share (%) of respondents that can't afford to keep their homes adequately warm in winter (left side of the butterfly chart) or cool in the summer (right side of the butterfly chart), with a parallel comparison of the mean scores obtained on the thermal comfort scale in both months, by pilot-sites.



The above-described dimensions of energy poverty, especially those regarding living and utility costs, should be examined within the context of the total income of households and the size and structure of these households. For this purpose, we asked the respondents to provide the household's total income (respondent + other household members), when all incomes are considered. Specifically, the respondents were asked to provide a specific income category of the households, and table 4 shows the results of the provided categories of income through the share of respondents falling within these income categories by pilot sites. These results were coupled with data on the size of the household, again, with the share of respondents falling within certain categories of households of different sizes. The results show how pilot sites differ in these aspects of the monetary resources available to households to fulfil the basic energy and other needs of household members relevant to (energy) poverty

assessments. The obtained results were then coupled with other indicators of poverty and material deprivation which also help to identify which shares of the populations within the analysed pilot sites are most vulnerable to certain aspects of energy poverty through lowered financial capabilities.

Table 4. Distribution of the share (%) of respondents within total household income category (EUR), household size categories, perception of difficulty in making ends meet and utilization of the social welfare system benefits by pilot sites.

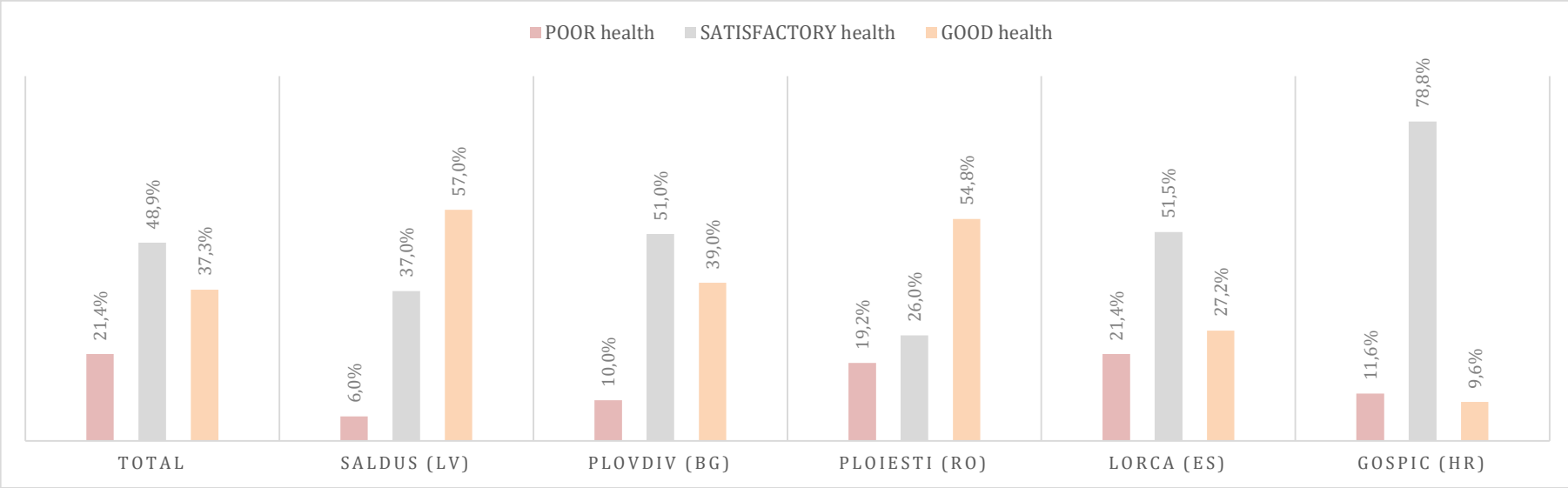
		Saldus (LV)	Plovdiv (BG)	Ploiesti (RO)	Lorca (ES)	Gospic (HR)	TOTAL
Total household income (EUR)	*No income*	0%	0,0%	0,0%	1,1%	0,0%	0,2%
	< 400	8,9%	28,7%	20,2%	14,6%	15,8%	17,5%
	401 - 950	22,2%	36,8%	24,1%	31,5%	10,5%	24,8%
	951 - 1200	8,9%	13,8%	12,7%	22,5%	12,6%	14,1%
	1201 - 1700	21,1%	16,1%	17,7%	22,5%	37,9%	23,4%
	1701 - 2000	12,2%	3,4%	15,2%	7,8%	11,6%	10,0%
	> 2001	26,6%	1,1%	10,1%	0,0%	11,6%	10,0%
Household size	*1*	28,9%	24,4%	30,5%	19,4%	3,8%	21,6%
	2	27,8%	34,1%	36,6%	30,6%	38,0%	33,2%
	3	14,4%	17,1%	13,4%	29,6%	22,8%	19,7%
	4	15,6%	19,5%	14,6%	15,3%	29,1%	18,6%
	> 5	13,3%	4,8%	4,9%	5,1%	6,3%	7,0%
Beneficiary of welfare system	*"Yes"*	26,8%	32,0%	18,8%	50,5%	18,8%	29,5%
Difficulty in making ends meet	*Verry difficult*	7,1%	29,3%	15,8%	6,8%	18,6%	15,5%
	Somewhat difficult	40,8%	29,3%	19,8%	63,1%	4,9%	31,6%
	Neither difficult, nor easy	30,6%	29,3%	39,6%	27,2%	47,1%	34,8%
	Somewhat easy	14,3%	12,1%	19,8%	2,9%	25,5%	14,9%
	Very easy	7,1%	0,0%	5,0%	0,0%	3,9%	3,2%

Health & well-being

Energy poverty negatively affects the health and wellbeing of households and their members. To explore this dimension of households at risk of energy poverty, we asked the respondents several questions about their physical and mental well-being. The results of these self-assessments of the general state of their health (refers to physical and mental health) are displayed in Graph 14. The 5-point scale was recorded and reduced to three basic categories indicating poor, satisfactory and good health. In certain cases, the results point to relatively low levels of respondents in

good health, and this is more prominent in Plovdiv and Lorca, two localities with perhaps the most indication of energy poverty and vulnerability to energy poverty when considering the results on energy poverty indicators in previous segments. In other words, most respondents within these pilot sites mark their physical and mental health as either poor or satisfactory. It is important to note that such self-assessments usually depend on various social and cultural factors, which makes comparisons across different socio-cultural contexts difficult and affect individual understandings of the "good", "bad", or "satisfactory" health of individuals. Nevertheless, these statements can be indicative of the link between various, more "objective" aspects of energy poverty in terms of expenditure and housing characteristics and their effects on the daily lives and quality of life of people living in these conditions.

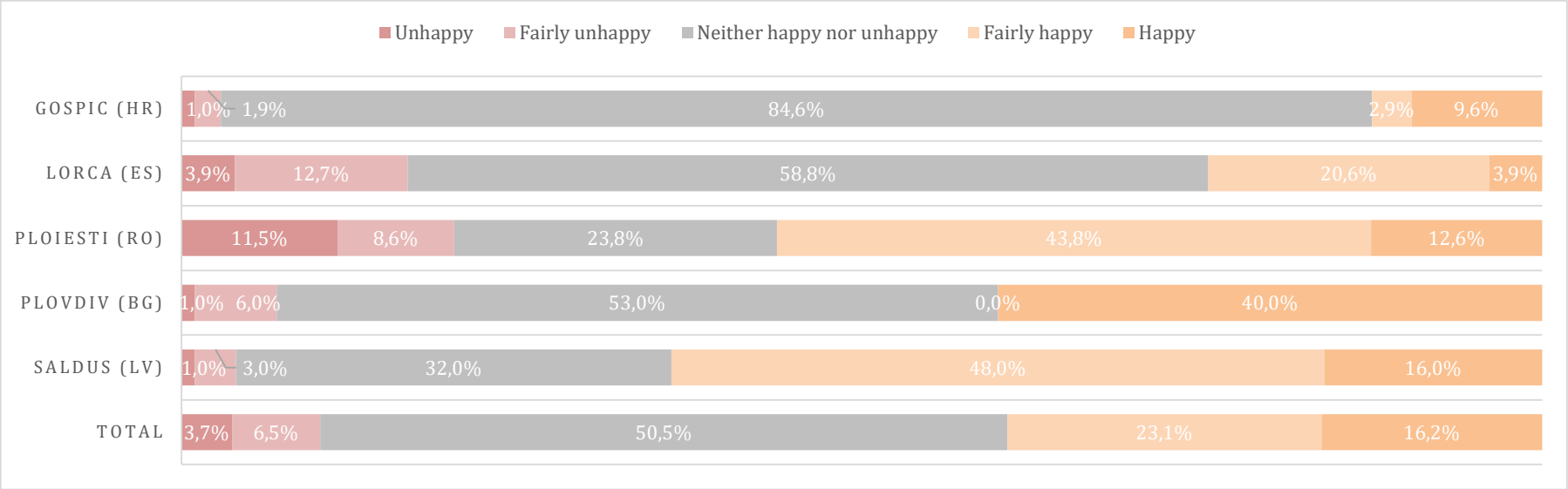
Graph 14. Distribution of share (%) of respondents falling within the response categories on the general health self-assessment scale, by pilot-sites.



Additionally, wellbeing was separately assessed through a question that asked the respondents to rate their overall happiness level. The responses were collected on a 7-point scale, with 1 marking the lowest level of happiness ("Completely unhappy") and 7 the highest level of happiness ("Completely happy"). For pragmatic reasons, 4 of the 7 categories of happiness were summarized in cases where those categories were

conceptually similar enough. This refers to the four most extreme categories of happiness (1-“Completely unhappy” and 2-“Very unhappy”) and unhappiness (6-“Very happy” and 7-“Completely happy”), where the former categories were recoded into a category labelled “Unhappy” and then later into a category “Happy”, as displayed in the graph 15, where the distribution of proportions of respondents who fall within these categories in each pilot-site can be seen. In terms of average values on the original 7-point scale, all respondents attain above average values (M=4,4), with Ploiesti achieving this exact value on the scale and slight differences between certain pilot sites. In this sense, the lowest average happiness is found in Lorca (M=4) and Gospic (M=4,2), with the highest being in Plovdiv (M=4,8) and Saldus (M=4,8). However, if we look at the distribution of proportions in the graph below, we can see how the neutral category “neither happy nor unhappy” affects these averages and how estimations of the wellbeing of these residents can depend on how we understand such categories and scales of measurements.

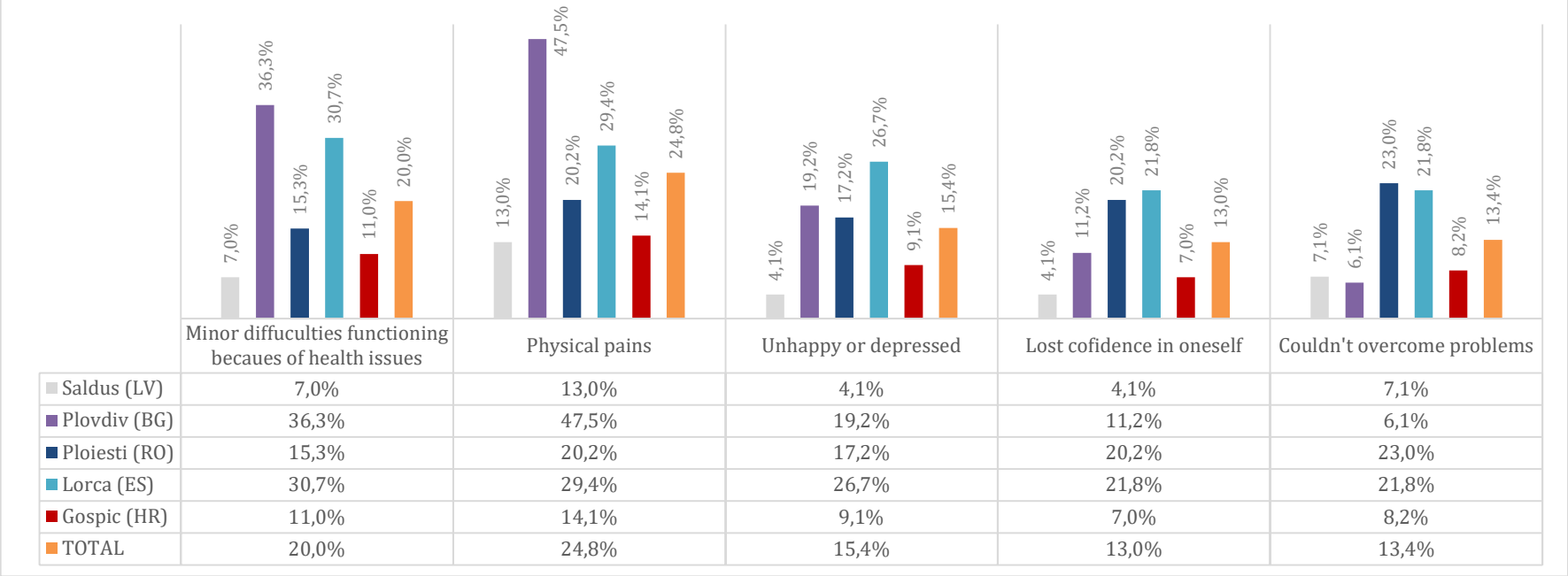
Graph 15. Distribution of the share (%) of respondents falling within the response categories on the recoded happiness scale by pilot sites.



To expand on previous considerations regarding the ambiguity of discussed results, we looked at another set of questions that could further identify the state of well-being and health of our survey participants. Specifically, we asked them a series of questions that relate to their health and well-being status in more recent times, that is, **in the past 4 weeks** (from the moment of participation in the survey). More precisely, we asked

them how often these situations occurred in their everyday lives on a 5-point scale in the following ordinality of response categories: 1-“Never”; 2-“Sledom”; 3-“Sometimes”; 4-“Often”; 5-“Very often”. Graph 16 shows the distribution of percentages of the most extreme cases, that is, those respondents who provided the highest scores on the described scale (4-“Often” and 5-“Very often”) and who are experiencing the following situations most frequently. The results indicate that the survey participants from Saldus have less frequently experienced major health issues in recent times, while participants from Lorca, Plovdiv, and Ploiesti have experienced above-average or close-to-average levels of negative physical and mental health aspects.

Graph 16. Distribution of share (%) of respondents experiencing defined negative physical and mental health aspects “often” and “very often” by pilot sites.

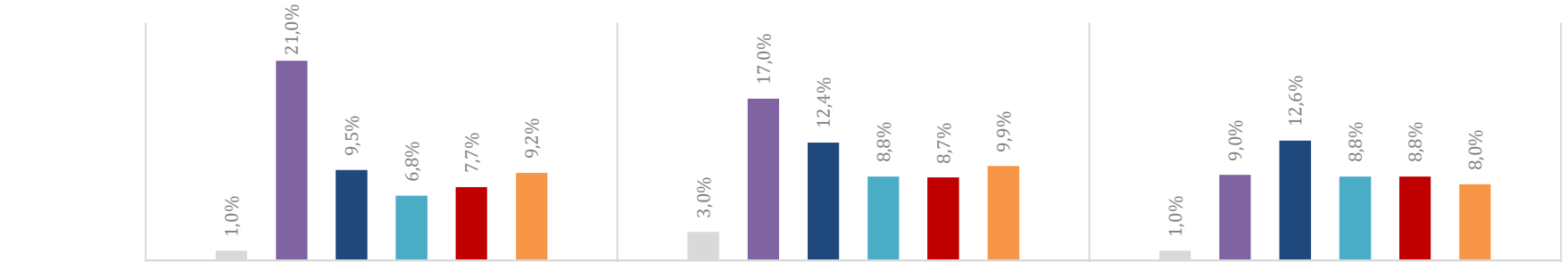


	Minor diffuculties functioning becaues of health issues	Physical pains	Unhappy or depressed	Lost cofidence in oneself	Couldn't overcome problems
Saldus (LV)	7,0%	13,0%	4,1%	4,1%	7,1%
Plovdiv (BG)	36,3%	47,5%	19,2%	11,2%	6,1%
Ploiesti (RO)	15,3%	20,2%	17,2%	20,2%	23,0%
Lorca (ES)	30,7%	29,4%	26,7%	21,8%	21,8%
Gospic (HR)	11,0%	14,1%	9,1%	7,0%	8,2%
TOTAL	20,0%	24,8%	15,4%	13,0%	13,4%

The last key aspect of well-being assessment within this segment relating to energy poverty is the social marginalisation and social exclusion often experienced by people living in poverty and under poor living conditions associated with energy poverty. We strived to explore this aspect through

three questions. The results were obtained on an identical scale as the previously discussed questions and the data displayed within the graph 17 represents the percentage of respondents within pilot-sites that claimed to have experienced some aspects pf social marginalisation often and very often. The results show significantly larger shares of social marginalisation and exclusion in Plovdiv, for two out of three questions, while these aspects are substantially less experienced in Saldus. A relatively similar shares of these respondents are identified in other pilot-sites for all three questions.

Graph 17. Distribution of share (%) of respondents experiencing defined aspects of social marginalisation “often” and “very often”, by pilot-sites.



	Miss company	Isolated from others	Excluded
Saldus (LV)	1,0%	3,0%	1,0%
Plovdiv (BG)	21,0%	17,0%	9,0%
Ploiesti (RO)	9,5%	12,4%	12,6%
Lorca (ES)	6,8%	8,8%	8,8%
Gospic (HR)	7,7%	8,7%	8,8%
TOTAL	9,2%	9,9%	8,0%

4. Conclusion

As expected, the analysis of collected responses to the questionnaire confirms highly divergent situations and factors of energy poverty between project municipalities. Considering the differences in geography, climate, sociopolitical heritage and socioeconomic characteristics of the population living in five areas of the pilot sites selected to be the focus of the LIFE ReHABITA project, this is not surprising. Even though pilot areas in Bulgaria, Croatia, Latvia, and Romania share many similarities that can be ascribed to their socialistic past, there are important differences in the building stock of the areas and their demographic and socioeconomic characteristics. These differences will determine the approach each technical partner, the municipality, and its ReHABITA office will use to implement most of the activities in the project, which will be implemented in the next three years.

The results of the survey responses show that over 17% of respondents across the pilot areas have an average monthly income lower than 400 euros, which is well below the EU average monthly income or even the national one. At the same time, 30% of respondents across pilot areas benefit from the welfare system, the most in Lorca (50,5%) and the least in Ploiesti and Gospić (18,8%). Considering the similarities across the pilot sites, we can see that 37,9% of respondents in Gospić have their monthly incomes around the national median (between 1201 and 1700 euros), as well as 21,1% of respondents in Saldus and 16% and 17,7% of respondents in Plovdiv and Ploiesti respectively. Most of the respondents in all pilot sites are owners (with or without a mortgage). Namely, 92% of respondents in Plovdiv own homes without a mortgage. In Saldus (45%), Ploiesti (46,7%) and Lorca (47,6%) own their homes without needing to pay the mortgage. In Gospić, the number is lower; only 27% do not pay the mortgage, while 46,6% pay for the mortgage.

In comparison to average monthly energy costs, we can see that in Plovdiv where the majority of respondents (36,8%) answered that their average monthly income is between 401-950 euros, average monthly energy costs are between 201 and 300 euros (38%) and 20% of respondents spend even more, between 301 and 400 euros, which would indicate that parts of the respondents spend almost one-third to all of their monthly income on energy costs. In Ploiesti, 24,1% of respondents have an average monthly income between 401-950 euros, but when asked about average monthly energy costs, the majority spend between 60 and 100 euros, but 14,3% of them spend between 101 and 200 euros and the same share spend even more between 201 and 300 euros for their monthly energy consumption. In Gospić, most of the sample (37,9%) earn between 1201 and 1700 euros and spend between 101 and 200 euros on energy. Regarding the energy mix, 96% of respondents from Plovdiv use electricity as their main energy source, while in Ploiesti, they mainly use district heating (40%) and gas (44%). In Gospić, biomass is the main energy source for heating (98%).

So, it is not surprising that when asked to assess whether they are late in paying any utility bill solely for financial reasons (electricity, gas, water, heating...) in the last 12 months, 26,7% of respondents from Ploiesti answered that they were delayed two or more times, followed by responders from Lorca, 20,4% of whom have been delayed two or more times, and respondents from Saldus, 16% of whom have been delayed two or more times. Across all pilot sites, 14,6% of respondents are delayed in paying their utility bills on time. Additionally, the most difficulties in keeping their

homes warmed during winter have respondents from Lorca – 55,3% of them, and respondents from Plovdiv– 47%; the situation is almost the same for the summer months: 52,4% of Lorca's respondents are not able to keep their homes cool, and 49,5% of respondents from Plovdiv. These results should be viewed in the context of reported issues that respondents are living within their homes, such as damp walls, draft through windows or doors, mould on the walls and ceilings, leaky roofs, rotten windows or door frames and other issues. The results suggest that some pilot sites are more vulnerable to energy poverty (Lorca and Plovdiv) than others and that different aspects contribute to the vulnerability level. Romanian (19,2%) and Spanish (21,4%) respondents report that their overall health is poorer than respondents' health in other pilot sites. However, when asked to assess different aspects of physical and psychological health, Bulgarian respondents reported the most difficulties in physical health – 47,5% of respondents are experiencing physical pain, and 36,3% have minor difficulties in functioning due to health issues, but only 19,2% report that they are feeling unhappy or depressed. On the other hand, 26,7% of Spanish respondents reported that they feel unhappy and depressed, and 30,7% experienced minor difficulties in functioning due to health issues. It should be noted that self-assessments and self-perceptions usually depend on various social and cultural factors, and these differences should also be taken into consideration in all future work in these pilot areas. These results are important guidelines for developing communication and informative campaigns and various engagement activities in the project's second year.

In conclusion, from the perspective of the project's main goals and ambitions, it is important to further examine the reasons contributing to the increased risk of energy poverty, especially living costs, social exclusion, and marginalisation of vulnerable groups. Focus should be put on the differences among men and women, the elderly, and the general population. Considering differences in average monthly income and energy costs, further examination of targeted measures implemented at the national and regional levels and their impact on reducing the energy poverty risk should be explored. Results also show that in Saldus a third of respondents are paying rent, while in Lorca, the share of tenants paying rent amounts to almost a quarter, indicating a potential problem of split incentives[4] which, consequently, could halter citizens' engagement in those pilot sites.

Relatedly, regarding the energy efficiency measures, the majority of respondents in Gospić and Lorca answered that they haven't implemented any measure so far. From the perspective of the project's activities, this could be a great opportunity to go further into the reasons behind it. This could also be used as opportunity to increase communication and information campaigns on energy efficiency measures and financial instruments by ReHABITA offices in those pilot sites. Where these measures were implemented, however, they are almost exclusively thermal insulation of the outer shell (most likely doors and windows) and a new energy source for heating and cooling DHW. Graphs 6 and 7 indicate which energy efficiency measures will most likely be implemented in the years to come in each pilot site.

[4] Split incentive refers to any situation where the actor paying for a transaction does not get the benefits of a transaction. In the context of energy efficiency in buildings, split incentives are associated with cost recovery issues for energy efficiency upgrades, due to the ineffective distribution of financial responsibilities and rewards among the involved parties. In a nutshell, homeowners do not have an incentive to invest since they are not living in the apartment, while tenants (as many of the respondents wrote in question 9.1) do not have an incentive to invest in the property they do not own.

Annex I

Energy poverty survey

This research is conducted within the project LIFE: ReHABITA and the questionnaire was conceived by the Society for the Sustainable Development Design (DOOR).

Your answers to the survey questions will be processed in such a way that it is not possible to discover which person gave which answer. Anonymized data will be securely stored in the protected archives and databases of the Society for the Sustainable Development Design (DOOR). As part of our research activities, this data will be used for research purposes, which includes statistical analysis and publication of aggregated results in studies and publications. We will make every effort to ensure that no participant can be identified in the research results or in any publication.

Please answer the questions honestly, because this is the only way to ensure the success, objectivity, and scientific character of the research.

A Residential building and housing conditions

A1 Please mark the type of building you are living in?

INSTRUCTIONS FOR THE INTERVIEWERS: DO NOT READ TO RESPONDENT

Residential buildings are buildings in which 50% or more of the total usable floor area of the building is intended for residential purposes.
Residential buildings with one apartment. THIS SUBCATEGORY INCLUDES detached houses that are used for permanent residence or for occasional stays (for vacations, etc.) such as family houses, residential buildings on country estates, villas, summer houses, mountain huts, hunting lodges and similar, houses in a row connected by a wall or a row of connected houses on a slope (terraces) in which each apartment has its own roof and its own entrance directly from the ground level. THIS SUBCATEGORY EXCLUDES: agricultural outbuildings.
A residential building with two apartments includes detached houses and houses in a row connected by a wall or a row of connected houses on a slope (terraces), **with two apartments** used for permanent residence or occasional stay (for vacations, etc.). THIS SUBCLASS EXCLUDES: houses in a row connected by a wall or a series of connected houses on a slope (terraces) **with one apartment**, in which each apartment has its own roof and its own entrance directly from the ground level.
Residential buildings with three or more apartments. THIS SUBCATEGORY INCLUDES: detached and other residential buildings with three or more apartments, such as apartment blocks, houses with apartments, etc., in which the apartments are intended for permanent residence or for temporary residence (for vacation, etc.). THIS SUBCATEGORY EXCLUDES: buildings for communities housing (dormitories, etc.), hotel buildings, motels, restaurants, bars, etc., youth hostels, camps, and vacation bungalows.

PLEASE SELECT ONLY ONE RESPONSE

1. Family house (Residential buildings with one apartment)
2. Multiapartment building

A2 Where is your household located in the house or building?

INSTRUCTIONS FOR THE INTERVIEWERS: READ TO THE RESPONDENT

"IF IT IS A FAMILY HOME, AS YOU ANSWERED IN THE PREVIOUS QUESTION, TELL US WHERE YOU SPEND MOST OF YOUR ACTIVE TIME DURING THE DAY."

DO NOT READ TO RESPONDENT

The ground floor (the same as a ground-floor apartment) is a part of the property where the space is located directly on the surface of the surrounding terrain, and it can be above the basement (under the ground of the floor or the roof) or up to 1 meter above the ground, if it is located above the basement; the apartment is located at ground level, i.e. the floor of the apartment is at the level of the surrounding terrain.

A semi basement (and semi basement apartment) is a part of a building where the space is located below the ground floor and is buried up to 50% of its volume in the finally arranged and levelled terrain next to the front of the building (ground around the building), i.e. that at least one of its fronts is outside the terrain; it usually has normal windows, only the floor of the basement apartment is below the level of the surrounding terrain around the building.

A basement (as well as a basement apartment) is a completely buried part of a building where the space is located below the floor of the ground floor, i.e. the semi basement, and over 50% of its volume is buried in the ground around the building; it usually has small windows at the top of the walls, along the ceiling, and the surrounding terrain around the building is immediately around the lower level of those small windows

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No
1. In the basement	1	2
2. In the semi basement	1	2
3. On the ground floor	1	2
4. On the floor (from first to second last)	1	2
5. Last floor (under the roof)	1	2

A3 What kind of building do you live in?

PLEASE SELECT ONLY ONE RESPONSE

INSTRUCTIONS FOR THE INTERVIEWERS: READ TO THE RESPONDENT

A detached building: a building that does not share a single exterior wall with a neighbouring building.
Building at the end of the row / semi-detached building: shares only one wall with the neighbouring building.
Building in a row: two walls of the building are shared with neighbouring buildings.

1. Detached building
2. Semi-detached building (the building at the end of the row)
3. Building in a row

A4 Please select or estimate the period in which the building in which you live in was built.

PLEASE SELECT ONLY ONE RESPONSE

1. Earlier than 1945
2. 1945-1960
3. 1961-1970
4. 1971-1980
5. 1981-1990
6. 1991-2000
7. 2001-2005
8. 2006-2010
9. 2011-2019
10. 2020 and later

A5 Please state the number of apartments in the residential building in which you live.

PLEASE SELECT ONLY ONE RESPONSE

1. 1-2
2. 3-5
3. 6-10
4. 11-20
5. More than 20

A6 Which of the following housing statuses best describes your status?

PLEASE SELECT ONLY ONE RESPONSE

INSTRUCTION FOR THE INTERVIEWER: READ TO THE RESPONDENT
The category "I live in a property that is not owned by me, without paying a rent" refers to the category of extended families or, for example, a situation where two or more generations of the same family live in the same family house, but in separate rooms or on different floors, although they might share some rooms.

1. Owner with mortgage / housing loan
2. Owner without mortgage / housing loan
3. I am renting (I am a tenant in an apartment owned by someone else)
4. I live in a property that is not owned by me, without paying a rent
5. Social housing
6. Other

A7 Is your household connected to the…

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No
1. … electricity grid?	1	2
2. … water supply network?	1	2
3. … sewerage network?	1	2
4. … gas network?	1	2

A8 Please state or approximate the usable area of the apartment in m^2.

INSTRUCTION FOR INTERVIEWERS:
The usable area of the apartment is the floor area measured inside the exterior walls of the apartment. THIS EXCLUDES areas of basements and attics that are not arranged as an apartment or part of an apartment, areas of garages, boiler rooms, woodsheds, etc., as well as staircases and other common areas in multi-apartment buildings.

_____ m^2

A9 Have any energy efficiency measures ever been implemented in your house or building since it has been built?

1. Yes
2. No

88 Don’t know

A9.1 Please describe the main reasons why you have not implemented any energy efficiency measures in your house or building since it has been built.

_____
_____
_____
_____
_____

Ask A9.1 only if the respondent answered that energy efficiency measures weren’t applied in their home or building (A9 = 2)

A10 Which energy efficiency measure was implemented?

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No	Don’t know
a. Measures to increase thermal insulation on the outer shell (doors and windows / new thermal facade)	1	2	88

b. Replacement or installation of a new energy source for heating, cooling, and hot water preparation (furnaces, boilers or connection to a district heating system (heating plant))	1	2	88
c. Replacement or installation of solar collectors for hot water preparation	1	2	88
d. Replacement or installation of new systems that use renewable energy sources - photovoltaic system	1	2	88
e. Installation of electricity storage tanks	1	2	88

Ask A10 only if the respondent answered that some energy efficiency measures were applied in their building (A9 = 1)

A11 If you answered "measures on the outer shell" to the previous question, what measures did you use?

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No	Don't know
a. Exterior wall insulation	1	2	88
b. Flat roof insulation	1	2	88
c. Sloping roof insulation	1	2	88
d. Ceiling insulation towards the unheated attic	1	2	88
e. Floor insulation above unheated space (basement)	1	2	88
f. Floor insulation on the ground (for ground floor spaces without basement)	1	2	88
g. Insulation of walls towards unheated spaces (interior walls towards unheated spaces such as garage)	1	2	88
h. Replacement of external furniture (with insolation protection included - windows, doors, blinds, shutters)	1	2	88

*Ask A11 only if the respondent answered that the energy efficiency measures applied in their building were **measures to increase thermal insulation on the external shell (doors and windows / new thermal facade)** (A12.a = 1)*

A12 Do you have any of the following problems in your household?

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No	Don't know
1. The roof is leaking	1	2	88
2. Damp walls	1	2	88
3. Wet floors	1	2	88
4. Wet foundations	1	2	88
5. Rot in window frames	1	2	88
6. Rot in door frames	1	2	88
7. Rot in the floors	1	2	88
8. Draft through the door	1	2	88
9. Draft through the windows	1	2	88
10. Mould on the walls and ceiling	1	2	88

A13 We are interested if your residential object (family house or apartment) is thermally insulated. Please select those statements that apply.

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No	Don't know
1. All external walls have a thermal facade (e.g., Styrofoam, mineral wool)	1	2	88
2. Some external walls have a thermal facade, some do not. e.g., the ground floor has a thermal facade, the first floor has none.	1	2	88
3. The walls are mostly cold, and external walls do not have thermal insulation	1	2	88
4. The roof of the building has thermal insulation	1	2	88
5. The roof of the building does not have thermal insulation, but there is no draft	1	2	88

6. The building has an open attic, intense draft	1	2	88
7. In most rooms there is floor covering that acts as a thermal insulator (wooden floors, parquet, or laminate)	1	2	88
8. In fewer rooms there is floor covering that acts as a thermal insulator (wooden floors, parquet, or laminate)	1	2	88
9. The entire household is tiled or has no covering at all, only a concrete slab	1	2	88

A14 Which energy source do you primarily use to heat your house or apartment?

INSTRUCTION FOR THE INTERVIEWER: DO NOT READ TO RESPONDENT
Households that use gas (8) and are connected to the gas network use Liquefied natural gas - LNG. Households that use gas and are not connected to the gas network use Liquefied petroleum gas - LPG.

PLEASE SELECT ONLY ONE RESPONSE

1. Fuel oil
2. Firewood and other biomass (wood chips, crops, agricultural residues etc.)
3. Biomass pellet
4. District heating - heating plant
5. Heat pumps
6. Electricity (air conditioning, calorifier, thermal furnace, etc.)
7. Solar thermal system
8. Gas
9. Coal
10. I do not use any energy source for heating

88 Don’t know

A15 Please estimate the average monthly cost of energy you used for heating last winter.

INSTRUCTION FOR THE INTERVIEWER:
Last winter refers to the months from December 2022 to April 2023.

PLEASE SELECT ONLY ONE RESPONSE

1. Less than 15 EUR
2. From 15 to 59 EUR
3. From 60 to 100 EUR
4. From 101 to 200 EUR
5. From 201 to 300 EUR
6. From 301 to 400 euro

7. More than 401 euro

A16.a Please estimate the average monthly cost of electricity during last summer.

INSTRUCTION FOR THE INTERVIEWER:
Last summer refers to the months from May 2023 to September 2023.

PLEASE SELECT ONLY ONE RESPONSE

1. Approximate amount: _____
2. Cannot answer

A16.b Please estimate the average monthly cost of electricity during last winter.

INSTRUCTION FOR THE INTERVIEWER:
Last winter refers to the months from December 2022 to April 2023.

PLEASE SELECT ONLY ONE RESPONSE

1. Approximate amount: _____
2. Cannot answer

A17 In the last 12 months, have you been late in paying any utility bill solely for financial reasons? (electricity, gas, water, heating...)

PLEASE SELECT ONLY ONE RESPONSE

1. Yes, once
2. Yes, two or more times
3. No

A17 **Please state with which of the following services you have had problems with regular monthly payments over the past 12 months.**

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Yes	No	Don't know
1. Electricity costs	1	2	88
2. Water costs	1	2	88
3. Gas costs	1	2	88
4. Utility charges	1	2	88
5. Waste collection costs	1	2	88
6. Costs for the purchase of wood, pellets	1	2	88
7. District heating costs	1	2	88
8. Other	1	2	88

Ask A17 only if the respondent answered that in the last 12 months ***they have been late paying a utility bill solely for financial reasons? (electricity, gas, water, heating...)*** *(A.16 = 1, 2)*

A18 How would you describe the feeling of comfort in your living space during the winter period?

PLEASE SELECT ONLY ONE RESPONSE

1. Extremely unpleasant
2. Unpleasant
3. Neither pleasant nor unpleasant
4. Pleasant
5. Extremely comfortable

A19 Can you afford to keep your home pleasantly warm during winter?

PLEASE SELECT ONLY ONE RESPONSE

1. Yes
2. No

A20 How would you describe the feeling of comfort in your living space during the summer period?

PLEASE SELECT ONLY ONE RESPONSE

1. Extremely unpleasant
2. Unpleasant
3. Neither pleasant nor unpleasant
4. Pleasant
5. Extremely comfortable

A21 Can you afford to keep your home pleasantly cool in the summer?

PLEASE SELECT ONLY ONE RESPONSE

1. Yes
2. No

C Health

C1 How would you rate your general state of health? (Refers to physical and mental health)

PLEASE SELECT ONLY ONE RESPONSE

1. Very poor
2. Poor
3. Satisfactory
4. Good
5. Very good

C2 If you were to consider your life in general these days, how happy or unhappy would you say you are, overall?

PLEASE SELECT ONLY ONE RESPONSE

EXPLAIN THE CATEGORIES

1. Completely unhappy
2. Very unhappy
3. Fairly unhappy
4. Neither happy nor unhappy
5. Fairly happy
6. Very happy
7. Completely happy

C3 Over the past 4 weeks how often…

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Never	Seldom	Sometimes	Often	Very often	Don't know
1. … have you had minor difficulties with performing work or household activities because of health problems?	1	2	3	4	5	88
2. … have you had physical pains?	1	2	3	4	5	88
3. … have you felt unhappy or depressed?	1	2	3	4	5	88
4. … have you lost confidence in yourself?	1	2	3	4	5	88

5. … have you felt you could not overcome your problems?	1	2	3	4	5	88

C4 For each of the following statements, please choose the option that best describes how you felt over the last two weeks.

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Never	Rarely	Less than half the time	More than half the time	Most of the time	All the time	Don't know
1. I was cheerful and in good mood.	1	2	3	4	5	6	88
2. I was calm and relaxed.	1	2	3	4	5	6	88
3. I was active and full of energy.	1	2	3	4	5	6	88
4. I woke up fresh and rested.	1	2	3	4	5	6	88
5. My day was filled with what interested me.	1	2	3	4	5	6	88

C5 Over the course of the last four months, how often have you felt…

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

	Never	Rarely	Sometimes	Often	Very often
1. … that you miss company?	1	2	3	4	5
2. … isolated from others?	1	2	3	4	5
3. … excluded?	1	2	3	4	5

D General information

D1 Gender

PLEASE SELECT ONLY ONE RESPONSE

1. Female
2. Male
3. Other

77 Don’t want to respond

D2 Age

Please insert your age: !___!___! ___!

77 Don’t want to respond

D3 How many people live in your household?

INSTRUCTION FOR THE INTERVIEWER:
If the respondent lives alone, enter one.

Please write in the number: _____

77 Don’t want to respond

Please provide some information about them, from oldest to the youngest.

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

Member of household	D.17. 1 How old are they:	D.17. 2 What is your family relation to that member of household (do not speak, mark according to statement) To you, that member is:	D.17. 3 Gender of the household member (mark on the basis of expressed kinship, ask only when the statement of kinship is indefinite e.g. child)	D.17. 5 What is the working status of this member of the household? (Ask if age is between 18 and 64) INSTRUCTION FOR THE INTERVIEWER: do not read the response categories, but, if necessary, remind about the categories when we talked about their employment status
Household member 1	Write in the answer: _____	1. Spouse (husband/wife) 2. Daughter/son 3. Daughter/son in law 4. Mother/father 5. Mother/father-in-law 6. Grandmother/grandfather 7. Sister/brother 8. Other relatives	1. Female 2. Male	1. Retired 2. Employed 3. Unemployed 4. Pupil or student 5. I work in the household, and do household chores, take care of children and/or other people 6. Permanently incapable of working (due to long term illness or disability)

		9. Other (not relatives)		97. Something else, write in what_____ INSTRUCTION FOR THE INTERVIEWER: do not read 97, read and enter only if previous categories aren't applicable 98. Doesn't know / Refuses to answer
Household member 2				
Household member 3				
Household member 4				
Household member 5				
Household member 6				
Household member 7				

D4 Highest level of education completed (regular or part-time school)

INSTRUCTION FOR THE INTERVIEWER:
Education completed regularly or part-time. For the respondents who are currently studying, mark the highest level of education that is completed.

PLEASE SELECT ONLY ONE RESPONSE

1. Without completed elementary school

2. Completed elementary school

3. Completed three-year vocational school (school for industrial, craft, craft occupations, etc.)

4. Completed four-year vocational school (technical, economic, medical, artistic, etc.)

5. Finished gymnasium

6. Completed five-year vocational high school education, master's exam

7. Completed two-year higher school, completed two-year professional study (high school, college, polytechnic) (vocational bachelor's degree)

8. Completed first level of higher education (university studies, college, polytechnic) (bachelor's degree)

9. Completed second level of higher education or undergraduate four-year study or integrated undergraduate and graduate study (university study, college, polytechnic) (master of profession, expert specialist) or completed postgraduate specialist study (university specialist)

10. Completed scientific master's degree (academic degree Master of Science - M.Sc.)

11. Completed postgraduate doctoral studies (academic degree Doctor of Science - Ph.D.)

77 Don’t want to respond

D5 Which of the following best describes your current situation?

INSTRUCTION FOR THE INTERVIEWER:
If the respondent - due to illness, maternity leave, vacation, strike… - currently does not work, indicate his status in relation to the usual situation.

PLEASE SELECT ONLY ONE RESPONSE

1. Employed/self-employed, full-time
2. Employed/self-employed, part-time (less than 40 hours per week)
5. Unemployed, but I used to have a paid job
6. Unemployed and have never had a paid job
7. In the system of formal education (not financed by the employer)
8. Trainee or intern
9. Permanently unable to work
10. Pensioner
11. I work in the household and on household chores, take care of children and/or other people
12. Other

77 Don’t want to respond

D6 What is the total family monthly income (your income + income of all the other household members, IF THERE ARE ANY) – including personal income, pension, child allowances, unemployment benefits, social benefits, insurance benefits, rent, royalties, money given to you personally, and all other sources of income (after deduction of taxes)?

A	**Up to 150 EUR**	1
B	150 – 400 EUR	2
C	401 – 650 EUR	3
D	651 – 950 EUR	4
E	951 – 1.200 EUR	5
F	1.201 – 1.500 EUR	6
G	1.501 – 1.700 EUR	7
H	1.701 – 2.000 EUR	8
I	2.001 – 2.600 EUR	9
J	**Over 2.600 EUR**	10
K	**No** personal income	11
	Refuses to answer	-77
	Does not know	-88
	No response	-99

D7 If you consider total monthly income of your household, including all sources of income of all income generating household members, how difficult or easy is four your household to make ends meet?

PLEASE SELECT ONLY ONE RESPONSE IN EACH ROW

EXPLAIN THE CATEGORIES

1. Very difficult
2. Somewhat difficult
3. Neither difficult, nor easy
4. Somewhat easy
5. Very easy

88 Don't know

D8 Are you a beneficiary of any of the rights of the social welfare system?

PLEASE SELECT ONLY ONE RESPONSE

1. Yes
2. No

77 Don't want to respond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