

# POSSIBILITY OF EFFICIENT UTILIZATION OF RENEWABLE ENERGY – A CASE STUDY: VILLAGE TEMSKA, STARA PLANINA MOUNTAIN (EASTERN SERBIA)

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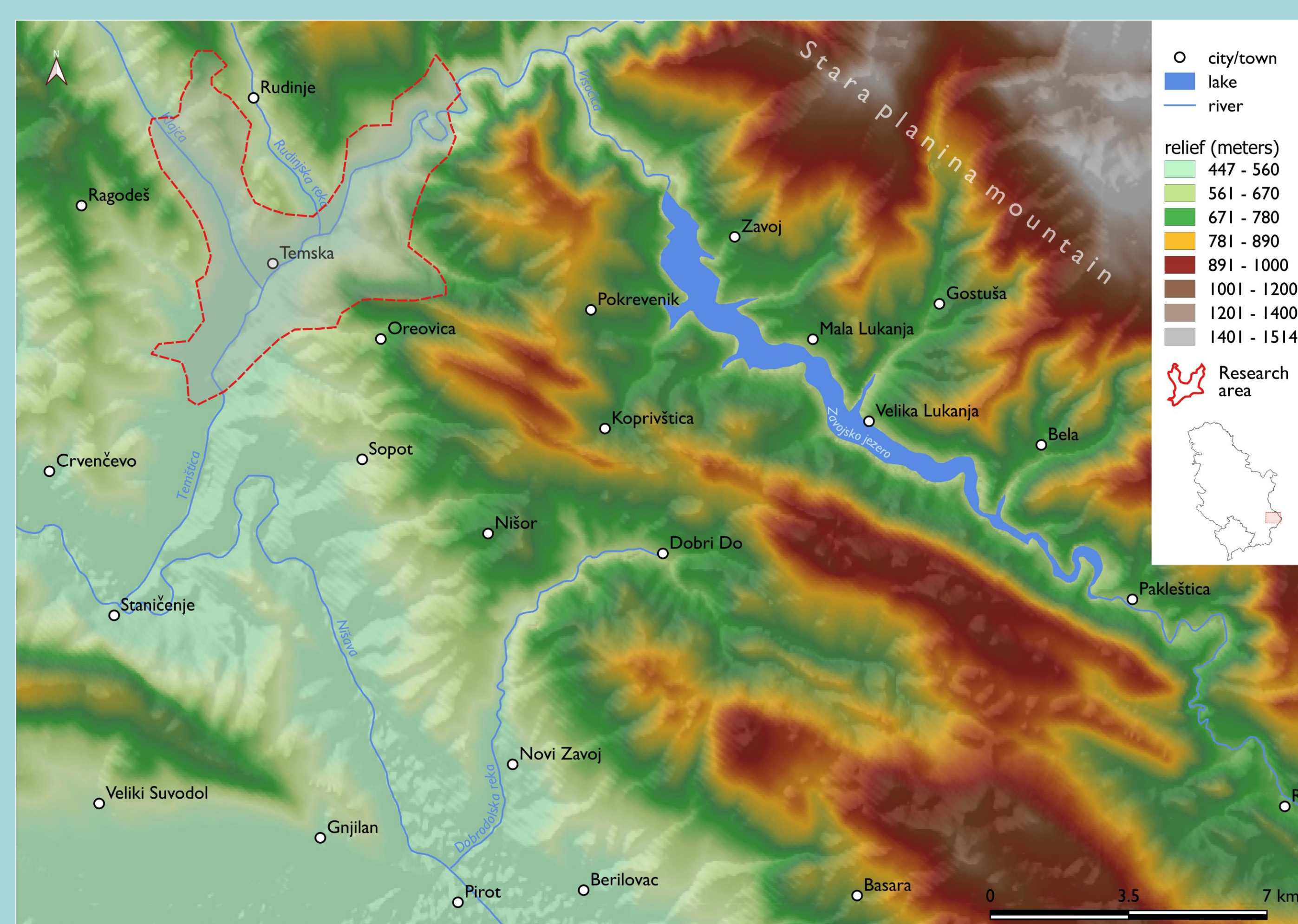
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## INTRODUCTION

The possibility of using renewable energy in Serbia include energy source such as solar energy, hydropower energy, geothermal energy, wind energy, energy from biomass and biofuel. The main potential of RES in the Republic of Serbia is the energy from biomass and it is estimated at 3,405 Mtoe, where 60,3% of the potential is used through biomass. The most used is hydropower energy. The Republic of Serbia is specified to have the target of 27% share of renewable energy sources in gross final energy consumption in 2020 [1]. Of the total available technical potential of RES, which is estimated at ≈ 5.6 Mtoe per year, 35% of the potential is used through hydropower (0.9 Mtoe per year), biomass and geothermal energy (1.06 Mtoe per year) [2].

## RESEARCH AREA

The village Temska is located in the Eastern Serbia, in the Municipality of Pirot, at the foot of the Stara planina mountain. Through village flows the Temštica river, tributary of the Nišava river.



Map 1. Research area

## METHODOLOGY

The research was conducted in July 2016 as a part of the scientific research expedition “Stara planina – Temska” funded by the Society of Young Researchers “Branislav Bukurov” from Department of Geography, Tourism and Hotel Management, Faculty of Sciences, University of Novi Sad. The survey was conducted along the lines of India Renewable Energy Awareness Survey [3]. The survey included a sample of 167 respondents who lives in village Temska, Municipality of Pirot on Stara planina mountain. A cartographic representation of the research area is provided using the QGIS 3.4.6. open source software (ESRI).

## CONCLUSION

The investigated area has a great potential which is only partly used by hydropower's. The greatest potential has the energy produced from woody biomass which is environmentally friendly fuel that is produced from renewable sources. However, results of surveyed households on the question of what fuel are they using to heat their homes show dominant use of wood/timber (91%). This result is coincided with the information that in Serbia wood is the most used source. However, it is a detriment that industrial remains are not more used as a renewable source of energy. The contradiction of gained data indicates on insufficiently informed population about renewable sources of energy, especially about biomass energy. Maybe if we pay attention on the results of only one survey question about the electricity rates, we can predict answers of the rest of them. For example, most of the respondents wouldn't consider buying electricity produced from a renewable source even if it was more expensive. Reasons for this we can find in the electricity rates and monthly income. To conclude, these facts affect people's opinion about renewable energy and their plans for using it in the future. Despite that, a lot of people answered positive on that question which can be considered as a step forward in accepting new ways of energy.

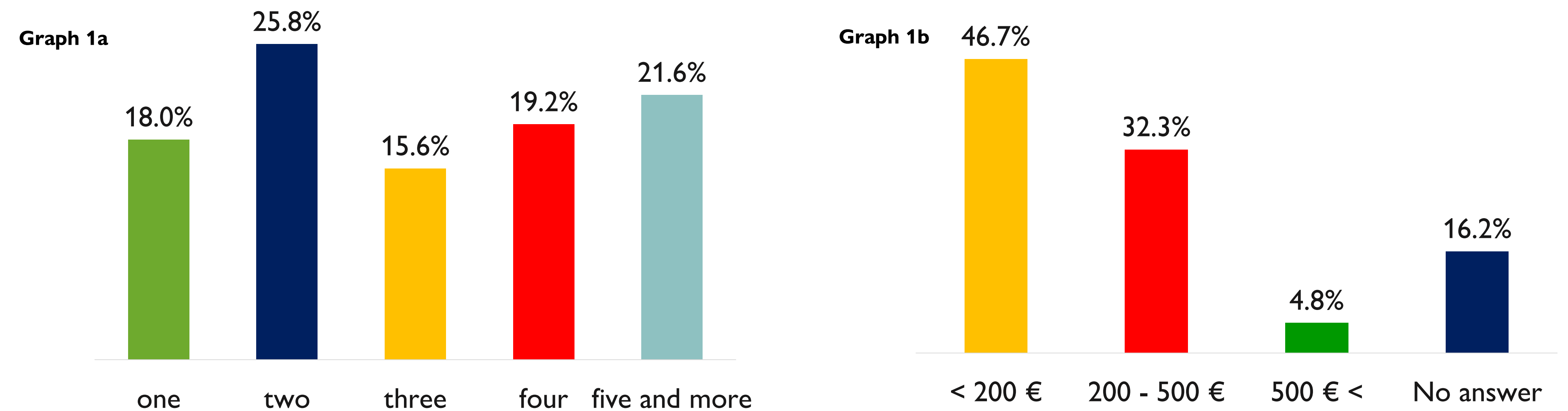
## References

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- [2] Progress Report on Implementation of the National Renewable Energy Action Plan of the Republic of Serbia, Ministry of Mining and Energy, Republic of Serbia, Belgrade 2014, 3-23
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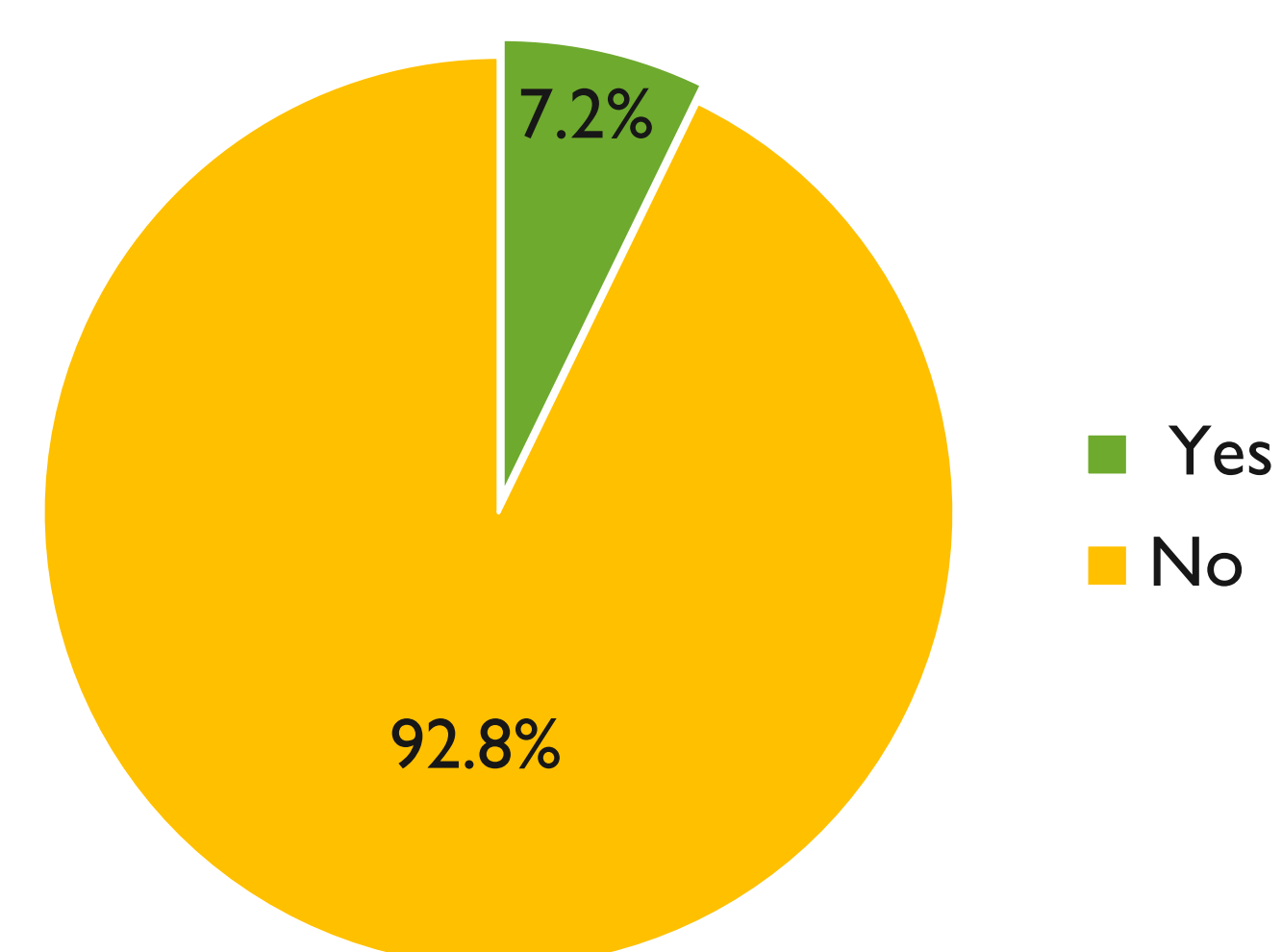
## BACKGROUND



The sample shows that in the village Temska most households are of the agricultural type (50.3%), large number of households declared as non-agricultural (43.1%), while 6.6% of respondents answered to belong to both types. The extremely small amount of monthly household income (Graph 1b) and the number of household members (Graph 1a) indicate the evident socio-economic underdevelopment of the village and the presence of many elderly people.

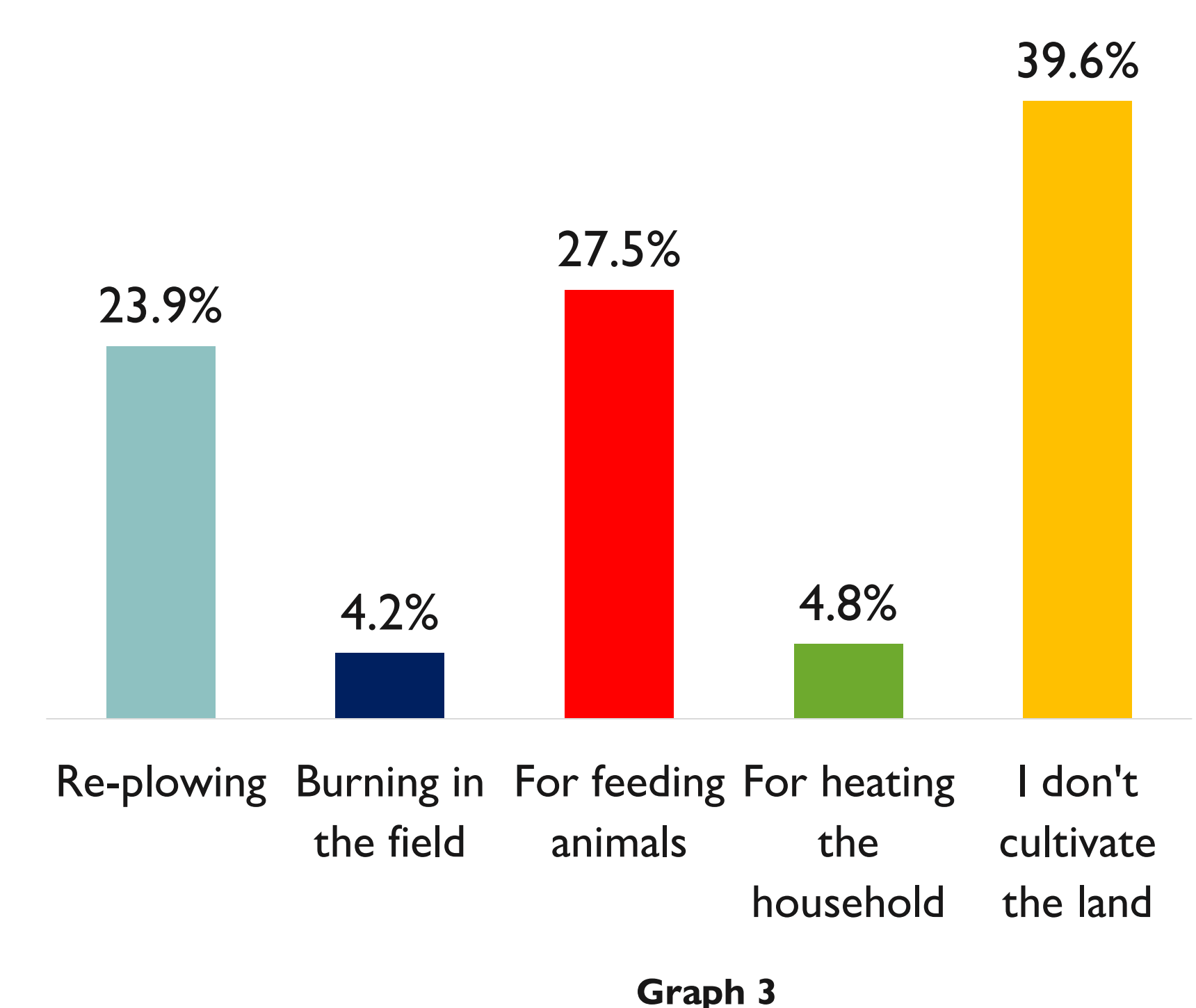
Most of the respondents (70.1%) answered positive about their level of awareness about term “renewable sources of energy”, while 29.9% answered that they are not familiar with it. However, a small level of awareness about term “CO2 emissions” is recorded, 64.9% positive and 34.1% negative answers. As the main source of information, they cited television and newspapers.

## UTILIZATION



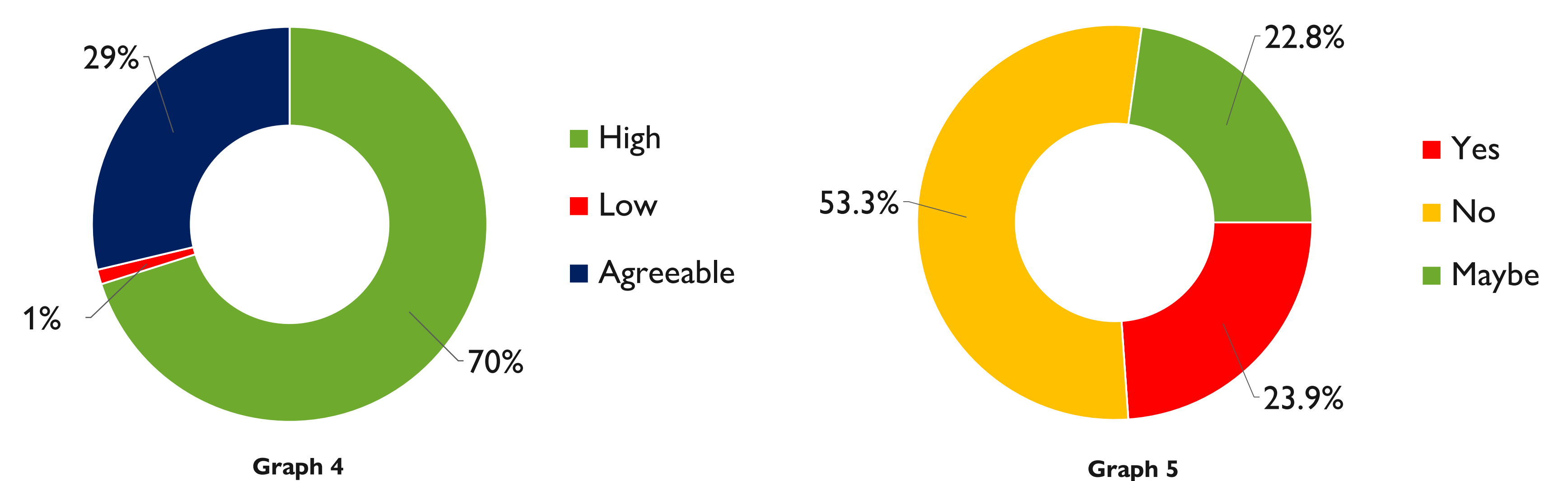
The second part of the research was related to the current situation regarding the RES on the surveyed sample of households. When asked whether their households use some form of RES (Graph 2), only 7.2% of the respondents replied positively. They are mostly young people who see benefits from rural tourism and tend to develop such idea in this area.

On the surveyed question what they do with plant remains in the field after harvest (Graph 3), most of the respondents replied that they do not cultivate it. This result is surprising considering that most households are engaged in agriculture. They are not sufficiently familiar with the possibilities of using these remains nor with mentioned terms. Those whose answers were “re-plowing” and “using it for feeding animals” are aware of possibilities of using plant remains in the field in many other ways.



## PLANS FOR THE FUTURE

As a basis for this part of the last part of the research was used the level of satisfaction with the electricity rates (Graph 4). Results are showing that 70% of surveyed households consider electricity rates high. Taking into consideration the previously presented monthly household income, these results were expected. The level of satisfaction about the electricity rates served as the basis for the question about the potential use of electricity from RES if it was slightly expensive (Graph 5). A half of the respondents replied negative (53.3%). The reason for this situation can be found in the previous question, where most of the respondents stated dissatisfaction with current prices of electricity, hence their budget couldn't bear further increase of the price. The rest of them, whose answers were positive, are aware of environmental pollution and they would rather pay slightly more if it means that it can help in prevention.



The last question was related to plans for the use of RES in the near future. It can be seen that even 47.3% of respondents answered negatively because there is a large number of elder populations which doesn't understand new technologies nor the financial opportunities for investing in that type of business. Also, we cannot skip the share of those who hesitate (31.1%) as well as those who are interested in (21.6%). Representatives of this critical mass are mostly young people, the elder population with foreign country pension, and the owners of accommodation facilities.

