CLIMATE CHANGE: HUNGARY'S PERCEPTION AND HOW TO ADOPT RENEWABLES AGAINST IT

VIKTOR MÁRK LÉNÁRT*

Doctoral School of Earth Sciences, University of Debrecen, Debrecen, Hungary
*Email: lvmark.2010@gmail.com

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Abstract
The aim of the research is to present the effects of climate change in Hungary, the public opinion on climate change and the related social acceptance of renewable energy sources and the reasons for their adaptation. Previous surveys have shown that the Hungarian population is aware of the dangers of climate change, yet they are less willing to act against either climate change or pollution. Global climate change threatens peripheral regions more than central regions, as several studies have shown. Hungary has so far successfully met its climate targets but is still far from reaching the 2050 climate neutrality target. The financial and economic situation of the Hungarian population does not currently allow them to widely adopt the opportunities offered by renewable energy sources, but those who can afford to invest in the technologies do so primarily for the financial savings, not to fight climate change.

Keywords: climate change, Hungary, renewable energy

1. Introduction

Climate change is one of, if not the greatest threat currently facing humanity. The climate change has a global scale, which means that it is having some form of impact everywhere, and Hungary is no exception. Hungary must also play its part in the fight against climate change, be it through EU efforts (such as the 20-20-20 commitments) or through people's everyday habits. A useful tool in this fight could be the use of renewable energy sources, an area in which Hungary is not performing particularly well. This study is based on a literature review. The aim of the study is to shed light on the attitude of Hungarian society towards climate change and the use of renewable energy sources as a powerful weapon in the fight against it.

2. Methodology

The study is based entirely on literature review, with a main focus on Eurobarometer surveys and other attitude surveys and articles. In preparing it, I did not use my own database or a survey I had prepared myself, but only articles from the references.

3. Results

Climate change and Hungary

Several studies have been published on the subject, but the so called "VAHAVA Report" (which is an acronym for the Hungarian word combination change-impact-response) titled: Climate change and Hungary: mitigating

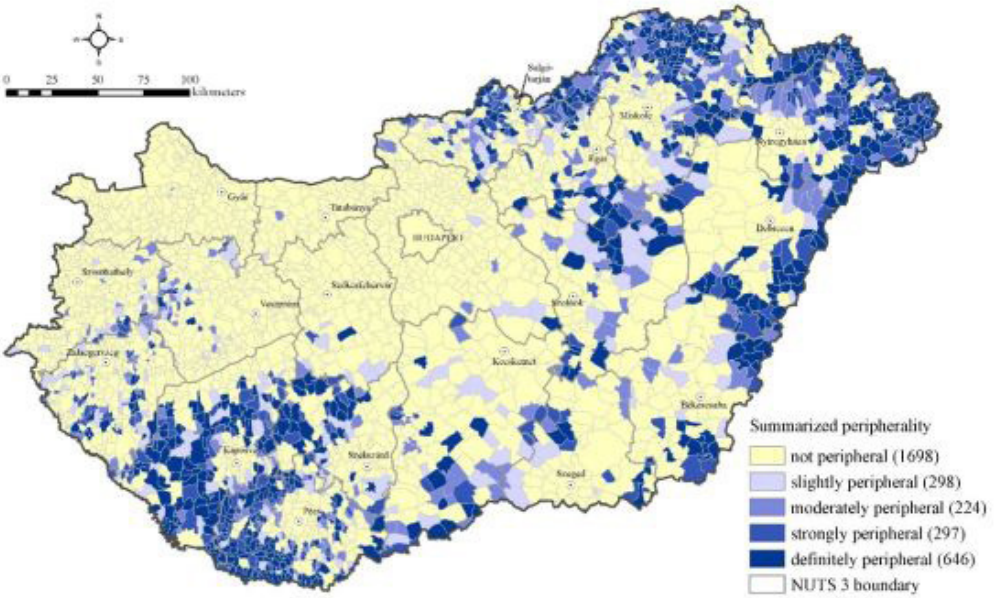

Fig. 1. Summarised pattern of peripherality/backwardness based on the results of four different computations
Source: Pénzes – Demeter, 2021

the hazard and preparing for the impacts, published in 2010, is perhaps the most detailed research work about the potential impacts of climate change on Hungary.

The report shows that the annual distribution of precipitation and the annual and monthly average temperatures are changing (Bartholy - Pongrácz 2010a). The annual amount of precipitation isn't going to change much, because the amount of precipitation in the summers will get around 24-33% drier, meanwhile the winters will get 23-37% wetter. Therefore, the maximum of precipitation distribution will shift towards the winter months.

Depending on the geographical location and altitude, temperatures will rise by 0.5-2 degrees Celsius (Bartholy - Pongrácz 2010a). Meanwhile the annual number of frosty days will decrease and in contrast, the number of heatwave and summer days will show an increasing trend. The available data show that the frequency of heavy precipitation in the Carpathian Basin is already higher than in previous decades, and climate models suggest that this trend will only increase (Bartholy - Pongrácz 2010b). As a result, climate extremes are becoming more frequent, with heavy rainfall, windstorms, more serious and longer droughts, and floods, together with shifts in precipitation distribution and rising temperatures, causing serious damage to agricultural production, the economy, and people's daily lives.

Poor people are more exposed to environmental shocks and stressors and more vulnerable to their impacts (Hallegatte et al. 2018). That means poor people, especially in peripheral settlements of Hungary are more vulnerable to the effects of climate change. Their greater vulnerability also means they have weaker adaptive capacity against climate change. Earlier, Nagy (2021) highlighted the negative impact that environmental injustices can have on poor people in Hungary who are more vulnerable to climate change.

Figure 1 is showing a map, which shows

the peripheral areas of Hungary. The bluer the area is, the more peripheral, therefore the more vulnerable it is. Pénzes and Demeters study shows, that the most peripheral areas of Hungary are the borderland areas and the inner peripheries of the Great Hungarian Plain ant the Transdanubian hills.

The predicted rise in the number of hot days and extreme weather conditions (for example rainstorms, drought, windstorms) cause cumulative problems in the case of the poor settlements. The disadvantaged health condition of the deprived and old age population might result in above average hospitalization and death rate during the summer heat waves. It is also caused by poor access to medical institutions (Pénzes – Demeter 2021). Heat waves made more frequent and longer by climate change could cause an increase in excess mortality of up to 600% by the end of the century compared to the 1990-2020 period (Bobvos et al. 2017)

Agriculture is still the main source of employment for most people in rural areas (Ritter 2020), especially in peripheral areas, and therefore climate change is a threat to their livelihoods. The area most at risk of drought is the Hungarian Great Plain, where a significant part of the population lives from agriculture (Blanka et al. 2013). As a result, food prices could rise further due to decreasing crop yields caused by climate change, which would be a particular problem in poor, peripheral areas. In addition, built environment is also more vulnerable because the buildings are old, the quality of infrastructure is low, and these areas miss financial background. Therefore, there is no possibility to invest in renewable energies and insulation or insurance. In the light of these, the adaptation to the challenges of climate change tends to produce significant regional disparities. According to a study (Kulcsár – Székely 2014), farmers affected by climate change will have lower incomes because of fewer or worse crops. This could impoverish some regions, especially those engaged in agricultural production. Damage to forestry may also play a role.

Perceptions of climate change in Hungary

The European Commission has been conducting surveys on climate change since 2008 as part of its Eurobarometer surveys. The last one was conducted in 2021. These attitude surveys ask people in EU countries how serious they see climate change as a problem and what they personally are doing

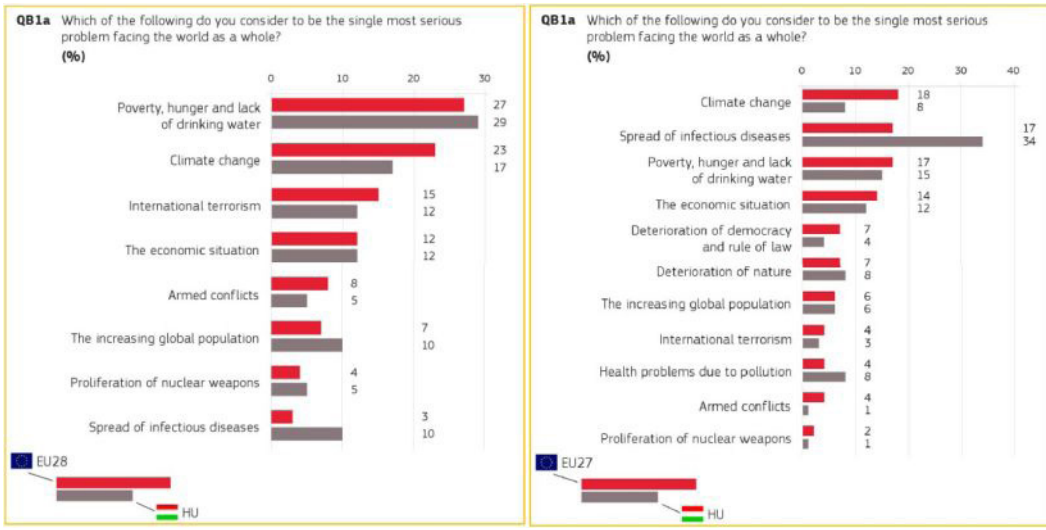

Fig. 2. The single most problem facing the world according to EU citizens in 2019 (left) and 2021 (right)
Sources: European Commission, Eurobarometer 2019 & 2021

about it. About 26.7 thousand participants from all around the EU were asked about climate change, of which were 1046 Hungarians. The survey is not representative, so it is for information purposes only.

As figure 2 shows, the survey shows that the Hungarian population is aware of the threat posed by climate change. The survey points out that 81% of respondents thought climate change was a "very serious" problem compared to the EU average 78%, which is not a big difference. On the other hand, only 8% of respondents (compared to EU average 18%) think that climate change is the single most serious problem facing the world. The previous survey in 2019 showed that respondents from across Europe thought it was a more important problem. In 2019 17% of the answers were climate change in Hungary and 23% in the EU, therefore climate change was the second most dangerous problem at the time. In 2021 Hungarians thought climate change is only the fourth most serious world problem head-to-head with health issues due to pollution and deterioration of nature. The first problem was spread of infectious diseases, the second was poverty hunger and lack of drink water, the third one was the economic situation. This is partly the result of the current pandemic and its economic impact. However, it is a positive result that the EU's climate neutrality objectives are more supported by Hungarians than the EU average (96% compared to 90%).

Participants were asked, how do they act against climate change and environmental pollution. The results are shown in Figure 3. Most of the respondents are trying to collect waste separately and recycle it (63%), but Hungarians are below the EU average 75%. About half of the respondents answered they try to cut down on the consumption of disposable items. 41% of people said they are climate conscious by buying energy efficient products for example refrigerators, washing machines or tv-s. On the other hand, in almost all the available options, the Hungarians were in most cases doing less to tackle climate change than the EU average as the figure shows.

An article from 2012 highlights that energy awareness is a trend in Europe, namely, energy and environmental awareness is declining eastwards and southwards, and Hungary is a transition between the two extremes (Mills - Schleich 2012).

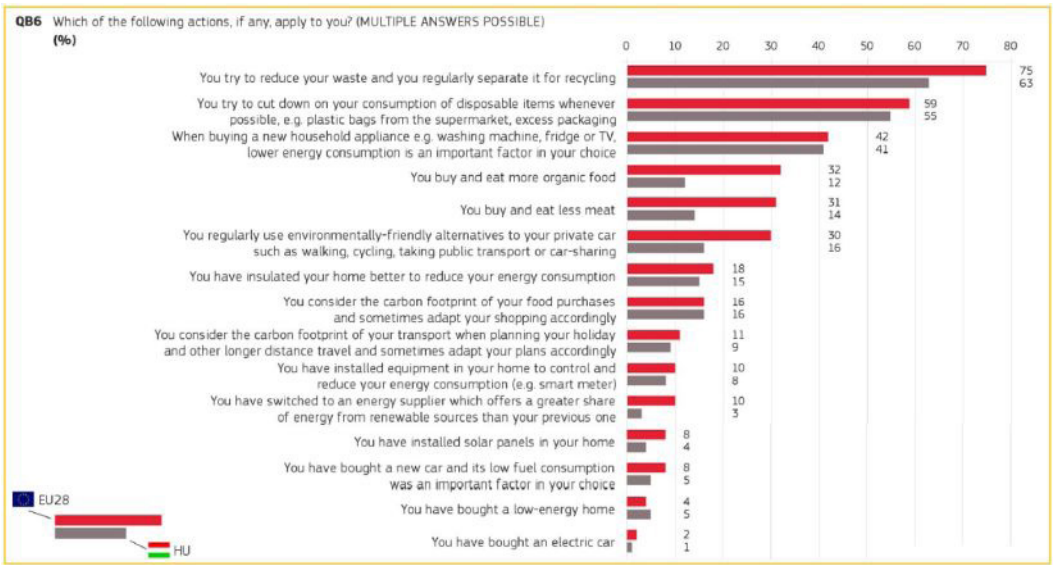

Fig. 3. How EU citizens act against climate change and environmental pollution.
Sources: European Commission, Eurobarometer 2021

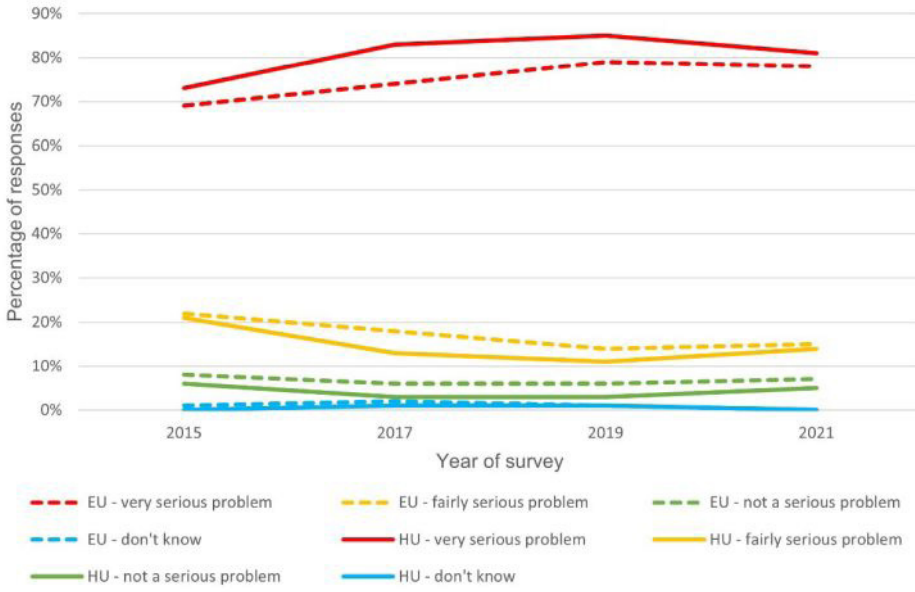

Fig. 4. Thoughts on the seriousness of climate change, Hungary compared to EU avarage
Sources: Own figure based on Eurobarometer surveys

Although the Eurobarometer has been asking EU citizens' views on climate change since 2008, the national breakdown of these surveys has only been available since 2015. I have created a comparative chart of the surveys since 2015. Figure 4 shows how much the Hungarian population rated climate change as a serious threat compared to the EU average. The figure shows that since 2015, the perception of climate change in Hungary has been broadly in line with the EU average, both in terms of those who think climate change is a very serious problem and those who think it is a fairly serious problem. In the period 2015-2021, the share of those who think climate change is not a serious problem has not changed significantly, ranging between 0 and 2 percent. Previous surveys have also found that Hungarians' perceptions of climate change have generally remained the same as the European average (Eurobarometer 2008; Eurobarometer 2009; Eurobarometer 2011; Eurobarometer 2014).

Hungary against climate change

The 27 countries of the European Union have adopted a set of climate targets in 2007 to be achieved by 2020 (European Commission 2022). These targets are reducing greenhouse gas emissions by 20% compared to 1990 levels, increasing the share of renewable energy use to 20%, and improving energy efficiency by 20 % (EEA 2021a). 21 countries have achieved these goals, one of which was Hungary. The other 6 countries had to buy emission quotas from other EU countries, to comply with their legal objectives to achieve these goals.

Although Hungary achieved its 2020 climate goals, the country needs to take actions in two areas to achieve climate neutrality. The EU adopted new climate neutrality goals for 2050. The main goal is to reach a net zero carbon neutral energy production (European Commission 2019). To achieve this goal, Hungary must stop its wasteful energy use by modernising household energy efficiency. Hungarian households have one of the worst energy efficiencies in the EU. As a study of the Odyssee shows (figure 5) for heating purposes, Hungarian buildings use the most energy after Latvian buildings (Enerdata 2021). This is the result, considering the local climate. Another study shows, that in some

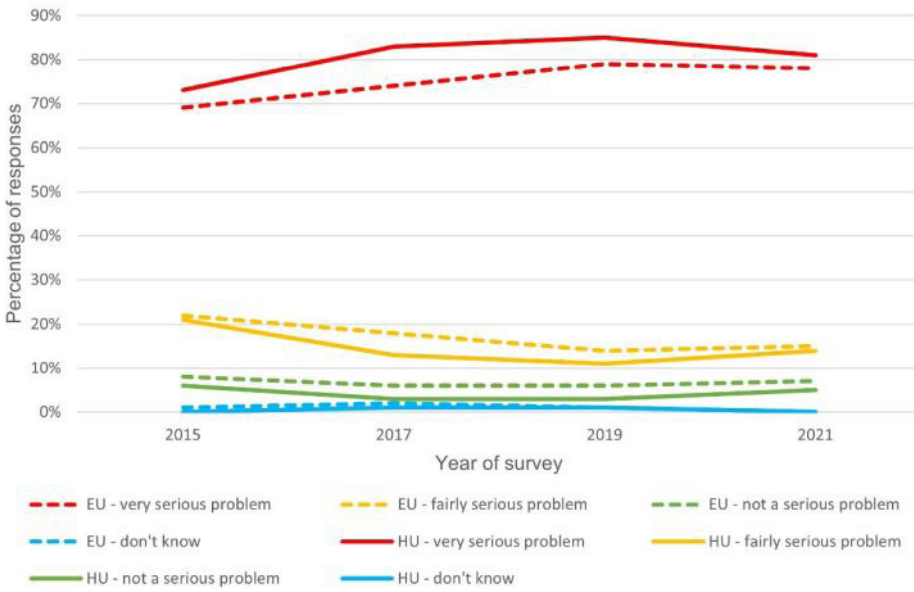

Fig. 5. Households heating consumption per m^2 (climate corrected)
Sources: Enerdata (2021)

areas of Hungary, the energy efficiency of the housing stock is so poor that only about half of the homes are insulated (Pénzes et al. 2014).

The second action is to achieve zero CO2 emissions from energy production by using renewable energy sources. The 2020 climate target of Hungary was to produce 14,65% of energy from renewables. The production was above 15,5% in Hungary, 1% more than the original target (Portfolio 2021).

Use of renewable energy sources in Hungary

Although the use of renewable energy sources is widespread in Hungary, current trends show that the penetration of renewable energy in Hungary is much slower than the EU average, especially in the Western European region (EEA 2021b). In 2020, around 22% of the gross final energy consumed in the European Union was produced from renewable energy sources, meanwhile in Hungary it was just over 13.9%, which means that only three countries consumed less energy as a percentage from renewable energy sources (European Commission 2022). These countries are Belgium, Luxembourg, and Malta. There are both political and social reasons for the slower growth rate, which means that Hungary is unfortunately not at the forefront of the adoption of renewable energy sources.

According to the results of a representative survey conducted in 2014 (Törőcsik et al. 2014), the adult population in Hungary uses renewable energy sources mainly to save money. Despite the widespread support for climate neutrality, the Hungarian population does not use renewable energy sources for environmental reasons, which shows that the nature of action against climate change is strongly influenced by people's financial and economic status. This phenomenon can be explained by the fact that most Hungarians have below-average incomes compared to the EU, while spending a lot of money on energy for everyday life, be it heating or electricity.

At the writing of this article in addition to university, I work part-time as a project manager for a company that installs solar systems. My work experience confirms that the vast majority from my costumers do not think about fighting climate change or

protecting the environment, the main reason why they want to invest in these systems is lower utility bills.

4. Summary

Global climate change is also having an impact in Hungary, average air temperatures are rising, the annual distribution of precipitation is shifting towards the winter half of the year and extreme weather events are becoming more frequent, with peripheral regions suffering the most. Peripheral and poor settlements are more vulnerable against climate change, especially old people and people living from agriculture. Overall, while Hungary is meeting its climate targets so far, there is still plenty of room for improvement before the deadline of the EU 2050 long-term strategy for climate neutrality. Hungarians are aware of the dangers of climate change, the think it is one of the most dangerous threats of current times, but they are underperforming compared to the EU average when it comes to tackling climate change. They are not doing nearly as much as the EU average to tackle climate change or pollution. As surveys show, the use of renewable energy sources is mainly driven by financial considerations, not by environmental or energy security concerns. The financial situation of most Hungarians does not let them invest in renewable energy, even if they do have the financial background, the reducing of utility cost is the main drive of the investments. This problem is more severe in peripheral areas.

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