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## Renewable sources and the greenhouse effect – opinions and situation report based on the results of a research

Ferenc Molnár\* and Ágnes Csiszárík-Kocsir\*\*

\* Senior Renewable Energy Production Manager, MVM and Óbuda University

\*\*Óbuda University – Keleti Károly Faculty of Economics

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### Abstract

*Today, climate change is not only a threat to the existence of flora and fauna that are far from us. Every inhabitant of the Earth experiences the consequences of climate change on a daily basis. As a result of frequent droughts and floods, extreme rainfall and desertification, extreme hot flashes and extreme colds, the number of starving people will increase by almost 100 million. In the near future, one-quarter of the mammalian species and one-seventh of the bird species are expected to die off. The acceleration of the greenhouse effect, which also causes global warming, is responsible for the climate change. Global warming is caused by the accumulation of greenhouse gases (carbon dioxide, methane, etc.) in the airspace of the Earth. The sun's radiation penetrates the airspace of our Earth and heats the Earth's surface as it warms up. However, warmed-up air layers cannot escape from the Earth's atmosphere, which causes the captivity of the greenhouse gas. The University of California's research shows that 30 percent of CO2 emissions from greenhouse gas emissions are the result of electricity production. It can be an obvious solution to use carbon-free energy sources in electricity production. According to a NASA report, the rate of warming is faster than the results of any previous modelling, so the greenhouse gas emissions should be drastically reduced to slow down the process.*

Keywords: climate change, climate change, global warming, greenhouse gases, carbon dioxide, carbon-free

### 1. Overview of literature

As a result of the spread of electrical technologies, the use of electricity in the energy consumption is constantly increasing. New applications for transport and building automation, cooling and heating are emerging. Climate change is already a consequence of the increasing frequency of extreme weather conditions, while the accuracy of their forecasting is reduced. This complicates economic planning and increases the production risk of agricultural sectors. Damage prevention will be a major cost for both the general public and the central budget. Climate change extremes significantly affect the safe operation of critical infrastructures, including energy supply systems (Szabó, 2018).

Most primary energy sources have an impact on the biosphere. Scientists have pointed out that in order to avoid the consequences of threatening climate change, the greenhouse effect of

greenhouse gas emissions from the burning of fossil fuels should be drastically reduced. Coal-fired power plants operating due to the decommissioning of German nuclear power plants deliver 700 million tons of additional carbon dioxide to our airspace annually. A NASA report reports a high-speed melting of the polar ice cap. Global warming due to the greenhouse effect results in irreversible ecological, economic and social damage. According to forecasts, the drainage of mountain water sources will be reduced due to less snow, the drought and the warming climate will adversely affect agriculture and more forest fires are expected. Unfortunately, the results of the modeling show that the rate of warming can double or quadruple compared to what was predicted. By 2040 more power plants will not get enough cooling water due to the low water level of the rivers in the summer, so they will not be able to generate electricity eg. for air conditioners. Sea levels can rise by as much as 1 meter by 2050, which will significantly change the life of the coasts and islands.

Extreme weather events (drought, hurricanes, floods) will lead to economic, ecological, health and political disturbances (Hejazi, 2017). The defense against these effects is the very essence of mankind, which highlights the importance of the spread of renewable and carbon-free energy sources (Andreas et.al, 2017). Directive 2009/29 / EC, adopted in January 2009, sets out the principles for the operation of the European Pollution Trade (EU-ETS) 2012-2020. On this basis, the Commission will set a reduction of 21% by 2020 compared to 2005 emissions for installations covered by the Directive, equivalent to 1.72 billion tonnes of CO<sub>2</sub> emissions. The National Energy Efficiency Action Plan was established by Directive 2006/32 / EC, which required at least 9% final energy savings for all Member States and obliged Member States to draw up action plans. In its Communication 545/2006, the Commission set out an additional 20% energy saving obligation by 2020 (REKK, 2010).

In the medium term, ie until 2027, the share of electricity from renewable sources to consumers can be around 17%. The share of electricity generated by renewable small power plants may exceed 11% of the electricity supplied to all power plants. This is due to the further expansion of small power plants, mainly solar power plants (MAVIR, 2017). Dissemination of knowledge about renewable sources is a major challenge for the future and education (Sinha, 2017).

The Intergovernmental Panel on Climate Change (IPCC) aims to summarize and evaluate research results on climate change (Pachauri - Meyer, 2014). The report is about the difference between an average temperature rise of 1.5 and 2 degrees. For years, we have seen that economic operators are shifting their focus, for example, in energy, not just large power plants, but also smaller services based on local decentralized renewable energy sources. The start-up boom visioned by economists has already begun, with more and more investors and emerging entrepreneurs turning to a greener future. These are, for example, terraced houses that are completely self-sustaining (Ürge-Vorsatz, 2018).

Strategies and action lines can be followed that lead to the paths to combat climate change for sustainable development while helping to develop livelihoods, social and economic well-being and effective environmental measures. The above dimensions of sustainable development mean that more and more farmers recognize the importance of integrating environmental factors (Borzán - Szekeres, 2017). In some cases, economic differences may be an important element of these strategies. Integrated measures are particularly important in energy planning and implementation. They are also important for the interactions between water, food, energy, and carbon capture. Urban

planning also offers good opportunities for reduced emissions and more sustainable development (Pachauri - Meyer, 2014). Focusing on sustainability, with the strengthening of the social role of farmers, has led to the rethinking and expansion of traditional accounting information systems (Borzán - Szekeres, 2018).

The aim of the Energy and Climate Change Approach Action Plan is to spread and strengthen climate-conscious and energy-conscious behaviors and, through this, to increase energy efficiency and create sustainable energy consumption. The long-term goal of the measures is to make the entire population feel rationally and emotionally affected by energy and climate-conscious energy consumption, and that besides cost-centered motivation, the environment should be a conscious approach to shaping consumer habits.

The environmental impacts of the energy issue are most often examined in connection with energy production or consumption issues, while the energy provider and its applied and technological solutions can also play a decisive role (Tóth et.al, 2018). In addition to policy expectations and individual strategies, climate protection, reducing CO<sub>2</sub> emissions and increasing the use of renewable energy sources are becoming increasingly important at company level; is an important determinant of companies' environmental and sustainability performance (Harangozó, 2008a, 2008b).

Household energy consumption in the EU is 25% of total energy consumption, in Hungary it is 30-35%, so the population is an important area for achieving energy efficiency and savings targets. It is characteristic of a significant part of the Hungarian population that it is not aware of the extent of its energy consumption, its composition and distribution, and the possibilities of using renewable energy sources. In order to make energy consumption environmentally conscious and thus reduce it, this knowledge is indispensable. In order to achieve trends towards global and EU carbon emission exemptions, one of the aims of the Hungarian approach is to point out that Hungarian households can satisfy their own energy needs in several ways. This can increase their security of supply against rising gas prices and reduce the risk of difficult living conditions due to energy shortages. The action plan fits perfectly with the energy policy and climate policy goals of the European Union and Hungary's (NFM, 2012) short- and long-term objectives. Of course, the operation of the power generation industry in a specific market structure raises specific regulatory issues at both national and supranational levels (Deutsch et.al, 2012).

## **2. Material and method**

Quantitative research was a national survey conducted between October 2018 and January 2019. The questionnaire contained closed questions, according to which the respondents were able to choose the answer options recorded in the standardized questionnaire. This method made the evaluation more clear and easy. The questions were formulated as not to weaken the respondents' willingness to respond. We tried to ensure that the questions and possible answers do not violate personal rights or the potential sensitivity of potential respondents. We have been looking for answers to questions about the knowledge of energy sources, which has not yet been the subject of a national survey of this kind and provides the researcher with information on the learned or experiential knowledge of the respondents.

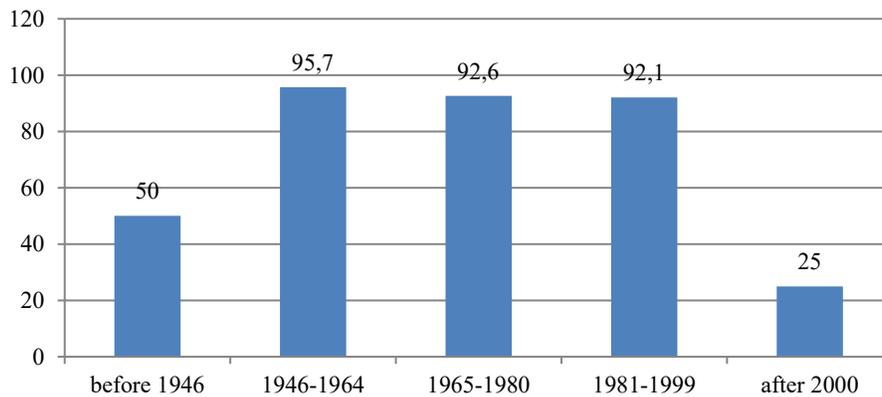
The questionnaire thus produced reached over 200 people. The online questionnaire was filled by 183 people. All 183 completed questionnaires were regular and evaluable. The data was

processed using the SPSS (Statistical Package for Social Sciences) 19 software. The results presented in this study are presented with cross-table analysis. The majority of the respondents consist of those who were born between 1946 and 1999. The activity of the respondents born between 1981 and 1999 also stands out significantly from this set. For the generations born before 1946 and after 2000, few response was received. According to gender, women and men accounted for almost half of the total.

### 3. Results

In this study, we want to assess the respondents' opinion whether natural gas and coal-based electricity generation contribute to greenhouse gas emissions by responding to the age of respondents.

**Figure 1: Distribution of respondents who believe that natural gas and coal-based power plants contribute to the greenhouse effect (%)**



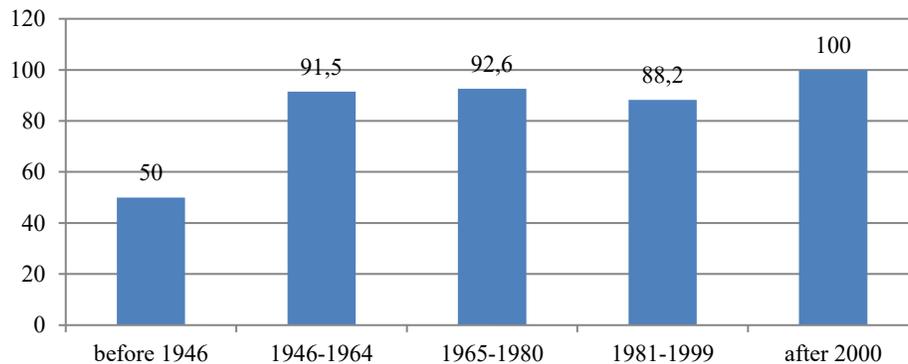
Source: own research, 2019, N = 183

On the basis of the results obtained, it can be stated that the vast majority of respondents think that more than 92% of people born between 1946 and 1999 believe that natural gas and coal-based electricity generation contribute to greenhouse gas emissions. An analysis of the proportions within the age group shows that the ratio between the 1946-1964 generation is the highest with 95.7%. All this shows that the members of the BB and X generations are the ones who, by their life experience, are better able to see the damaging effects of such power plants and resources.

The results show that very few, only 4, or 2.2%, of all respondents thought that natural gas and coal-based electricity generation did not contribute to greenhouse gas emissions, which is very good as far as basic knowledge is concerned. On the basis of the data processed, it can be concluded that 12 of the respondents, ie 6.6% of the respondents, were uncertain. Despite the low proportion of insecure respondents, it can be seen that 5 out of the 1981-1999 generation, or 41.7% of the uncertain, were unable to determine whether greenhouse gases were produced during coal and natural gas combustion. They also represent the highest rate within the age range.

In the following, we were looking for an answer to what the respondents think about whether greenhouse gas emissions (CO<sub>2</sub>, methane) contribute to climate change. Answers were examined by respondents' age.

**Figure 2.: Distribution of respondents who believe that greenhouse gases contribute to the greenhouse effect (%)**



*Source: own research, 2019, N = 183*

After evaluating the answers, it appears that 90.2% of all respondents answered yes to the question. Of the age groups, more than 91.5% of respondents born between 1946 and 1980 think that greenhouse gas emissions (CO<sub>2</sub>, methane) contribute to climate change. The generation born between 1981 and 1999 also showed a good level of proficiency in the subject with a 88.2% response in the age group.

The study showed that 9 out of all respondents think that greenhouse gas emissions (CO<sub>2</sub>, methane) do not contribute to climate change. These 9 people represent 4.9% of all respondents. In particular, who voted with no were among the age groups born between 1946 and 1964 and between 1981 and 1999, above 6.4%. From the processed data, it can be seen that on this issue, 9 out of all respondents, ie 4.9%, showed uncertainty. This number is the same as the number of no votes. Despite the low proportion of respondents with uncertainty in the issue, it can be shown that 7 out of 1965 to 1999 generations, ie more than 33.3% of the uncertain, were unable to decide whether greenhouse gas emissions (CO<sub>2</sub>, methane) contribute to climate change. With this, they also represent the highest rate within the age range of more than 5.3%. Unfortunately, the facts above show lack of information.

#### 4. Summary

From the above results, the general tendency that the population is aware of the destruction of the environment and the need for action is well-established. However, most of the knowledge is superficial, and in many cases, the media is the only source of knowledge. The older people with a greater life experience are more likely to see the effects and dangers, but the younger generation are not interested, and they are not receptive to background information. For the sake of the future, it is essential to expand knowledge and share information. The lectures held in non-classroom and informative conferences contribute greatly to the process. The destruction of our environment, the dangers that await us are no longer just scrambling scenarios, but nowadays they are real dangers. Precise, undistorted situation exploration, greater awareness and interest of all generations will make our planet alive for many centuries.

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