SEIZING ROMANIA'S RENEWABLE POTENTIAL:

ROMANIA'S ROAD TO CARBON NEUTRALITY

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sandbag
smarter climate policy

INTRODUCTION

The challenges posed by climate change are becoming unavoidably evident. The primary cause since the industrial revolution is anthropogenic activities, which are associated with over-exploitation of ecosystem services and natural resources, for the sake of satisfying the increasing demand of human needs. This results in degradation of the environment and the emission of greenhouse gases into the atmosphere, which leads to a dangerous increase in global average temperature.

Far-reaching action is needed to meet the 1.5 °C temperature goal of the Paris Agreement, which Romania has committed to along with its fellow EU Member States. The EU's response to the increased climate ambition required under the Paris Agreement is the European Green Deal and the 2050 climate neutrality goal. This historic project requires an increase in the EU's intermediary 2030 targets, and so in September 2020, the European Commission proposed a 2030 goal of reducing greenhouse gas emissions by at least 55% compared to 1990 levels. All Member States will need to contribute to achieving this collective goal, according to their own situations, needs and potentials. How much can Romania contribute? Considering the country's economic and natural resource potential, as well as past efforts to limit greenhouse gas emissions, Romania has the possibility to become an essential pillar of the energy transition and to play a leadership role among its fellow Member States.

ROMANIAN ENERGY SECTOR AND PERSPECTIVES FOR THE ENERGY TRANSITION

In Romania, the leading source of greenhouse gases is the burning of fossil fuels, primarily for the energy sector. Other areas such as agriculture, waste, various industrial processes, land-use and land-use change contribute significantly to the emissions budget.

The primary sources used for electricity and heat production are still fossil fuels, especially coal and natural gas. Renewable energy sources have a growing share in the national energy mix, reaching 24% in 2018 [1]. Although trends in energy production from fossil sources are declining, Romania is still highly dependent on the import of petroleum products, gas, and coal. The exploitation of energy sources from domestic resources is on a downward trend, and import dependency is increasing. Despite a continuous reduction in population, final energy consumption is growing. In Romania, approximately one-third of energy consumption is related to the residential sector, followed by industry, transport, agriculture and other services [1].

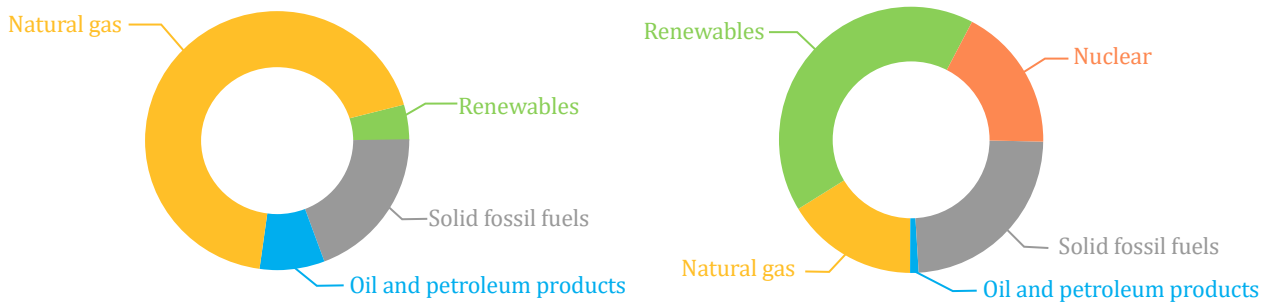

Figure 1: Heat (left) and electricity (right) production by fuel in Romania (2018). Source [1]

Natural gas is a widely used fuel for electricity and heat production, due to its calorific value and its lower price compared to other fossil fuels. However, it comes with many disadvantages compared to other energy sources. It is a depletable source of energy, which can be found in limited quantities and only in some geographical regions. It must be transported over significant distances and due to its scarcity requires strategic negotiations and planning to ensure energy supply. Given its exhaustible nature, investment costs for its exploitation and transport are expected to rise. It is also a greenhouse gas emitting fuel, comparable to coal. Natural gas is composed mostly of methane, a greenhouse gas more potent than carbon dioxide, and its release into the atmosphere (even accidental) causes much more severe damage. The environmental damage caused by the exploitation and use of gas is very high, and the expenses necessary to prevent or repair the damage can be significant. A transition from coal to natural gas cannot be considered as progress towards a carbon-neutral economy. Instead, such a shift would achieve unsustainable energy projects, associated with high risks, that will not contribute to Romania's climate ambitions.

A large share of this consumption is for heating, of which an overwhelming proportion (90%) is provided from fossil sources, especially natural gas. Figure 1 shows the share of energy sources for electricity and heat production.

The implementation of public policies for the support of renewable energies, either through the transposition of European Directives or through local initiatives, has brought positive results. Combined with Romania's renewable energy potential, this policy framework has made the country very attractive for investments in the renewable energy sector. For example, under the EU Directive 2009/28/EC on the promotion of renewable energy resources, Romania's 2020 target for renewable energy production of 24% was set in national law, with a legislative framework established in order to promote the production of energy from renewable sources.

Over the following years, investment in the energy sector increased by over 140% compared to 2008, by more than 2 billion EUR per year [2]. Romania was at that time one of the most important players on the green energy market and had already reached its 2020 target by 2016. More than 4 GW of renewable energy production capacity was installed, mostly wind and solar energy. However, in the following years, due to repeated legislative changes and to the closure of access to the support scheme, many planned projects were suspended. Figure 2 shows an evolution of investments in the energy field, together with the installed electricity capacity from wind and solar sources.

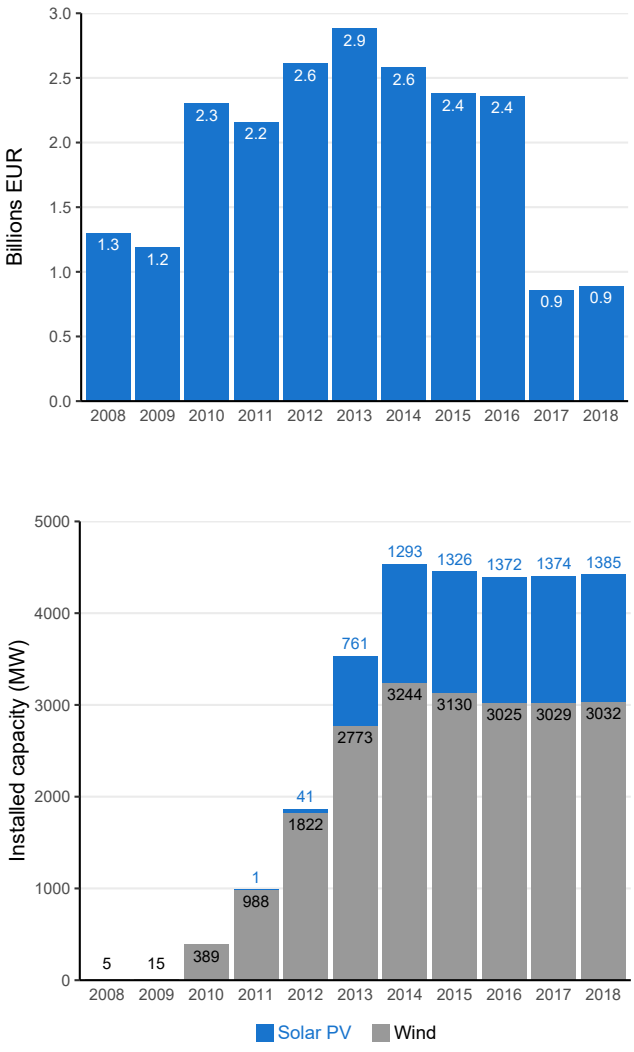

Figure 2: Evolution of energy investments (top) and energy production capacities from wind and solar sources (bottom) in Romania. Source [2]

Due to the increase in renewable energy production, the amount of greenhouse gas emissions at the national level has seen a decrease over the years, although it remains very high. Figure 3 shows the evolution of greenhouse gas emissions in Romania (excluding Land Use, Land-Use Change and Forestry):

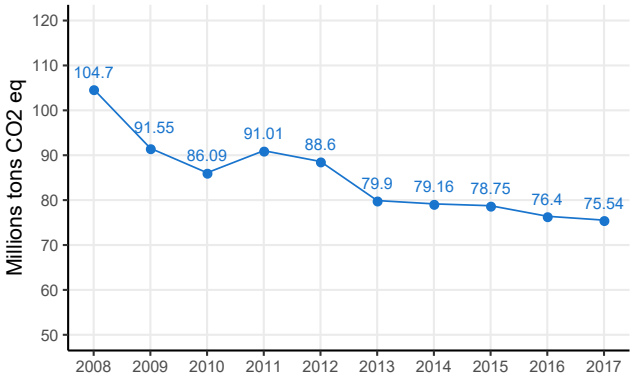

Figure 3: Greenhouse gas emissions in Romania. Source [1]

Romania's past experience shows that proper planning, legislative certainty, and well-made public policy can bring considerable benefits and are essential for the development of the renewable energy sector.

ACHIEVING THE TRANSITION

Romania has a vast potential to contribute significantly to the EU's new climate targets. To embrace a leadership role, Romania must plan and take concerted climate action as soon as possible.

The national energy system, designed before the threat of climate change became apparent, is still mostly dependent on fossil fuels. However, these fossil fuel sources are now associated with more disadvantages than advantages. Besides their significant climate impact, fossil energy contributes to air pollution, environmental degradation and increased import dependency. The transition to renewable energies, which offers an energy system based on less polluting, domestically produced resources, is the only feasible option.

Romania has a high energy potential from renewable sources, which is yet to be fully exploited. It has a great advantage because of the diversity of energy resources available. On top of past investments, there is still room to increase production capacity, especially for solar energy, as can be seen in Figure 4. Moreover, there is significant growth potential for hydropower and biomass, which can be solutions for providing baseload power [3] [4].

Geothermal energy, which can provide renewable heat sources, also deserves attention. The existence of geothermal resources was proven by geophysical surveys conducted before 1990. At the time, few projects were implemented, and geothermal resources are still mostly being assessed through these studies, conducted more than 30 years ago. Accordingly, Romania's geothermal potential is repeatedly underestimated. Increased investments in research could improve the technical potential of geothermal energy significantly [3] [4].

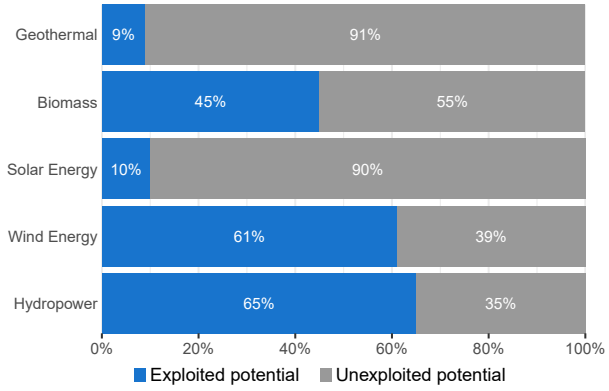

Figure 4: Renewable energy resource potential in Romania. Source [3]

According to current knowledge, both in terms of renewable energy resources and existing technologies, Romania could potentially exploit 144 TWh/year of renewable energies. The final energy consumption in Romania for 2018 was 175 TWh (excluding transport and agriculture). Together with energy efficiency measures, a large part, or even the entire energy requirement, can be supplied from renewable energy sources. The challenge is finding an appropriate energy mix. At the same time, these technologies are under continuous development, and other technologies may emerge, meaning that the technical-economic potential of Romania's renewable resources can further increase.

Delaying investments to reduce greenhouse gas emissions costs Romania about 115 million tons of CO_2 emitted annually [1]. The use of fossil fuels is a significant environmental threat. In the medium- to long-term, prevention and repair of the harmful effects of fossil fuels will have a considerable financial cost. Figure 5 shows the costs Romania incurred for the prevention and repair of environmental damage caused by energy production and distribution. The expense in recent years exceeds the total value of investments in renewable energy projects. Continued investments in fossil fuel expansion are clearly no longer feasible due to the cost of the externalities associated with fossil energy.

While economic development and energy security are important considerations, these goals can also be met by investment in renewable energy sources with a considerably lower environmental impact. The available public and private funds must be directed towards sustainable development. Taking decisive action now will have positive effects immediately, and especially in the medium and long term.

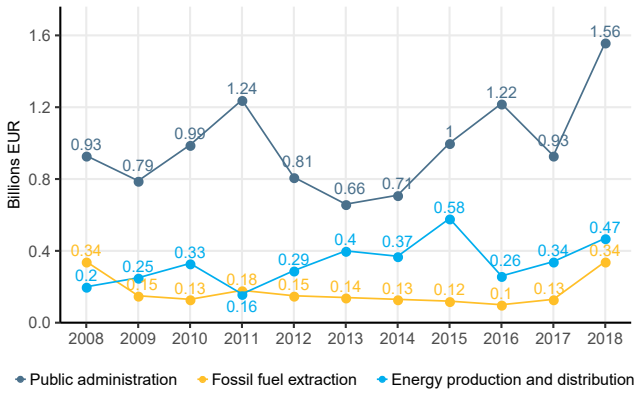

Figure 5: Expenses incurred by public administration and the energy industry, to prevent or repair damage to the environment. Source [2]

Considerable funding options to combat the effects of climate change will be available in the coming years. These will be directed in particular at increasing the use of renewable energy sources and improving energy efficiency, in order to reduce greenhouse gas emissions. Under the 2021-2027 EU budget, Romania can access over 6 billion EUR, through European funds such as those designated for sustainable development and the just transition, and more than 30 billion EUR through the recovery and resilience facility. Another important source of funding is the EU ETS, from which Romania can generate auction revenues estimated at over 15 billion EUR between 2020 and 2030.

For Romania, an increase in the use of renewable sources requires investments of at least 22 billion EUR by 2030 [5], and to achieve a just transition, a necessary budget of approximately 0.7 billion EUR is expected [6]. In order to reach a carbon-neutral energy system by 2050, additional investments are needed.

FINAL REMARKS

There is an urgent need to avoid the continued release of greenhouse gases into the atmosphere, to ensure a safe future for all. The main reason for greenhouse gas emissions is the use of fossil fuels in the energy sector. In Romania, emissions are still very high, although significant investments have been made in recent years. A high share of the electricity produced comes from renewable sources, but there is still a large capacity for improvement. Great attention must also be paid to the thermal energy sector, which is still based on fossil fuels but has a very high potential for emission reduction.

To become a regional forerunner in the energy transition, Romania must invest strategically in sustainable projects based on improving energy efficiency and increasing the use of renewable energy sources for the replacement of fossil fuels. The active involvement of public authorities through policy supports and promotional measures is also crucial. These measures will, in turn, bring long-term environmental, economic, and social benefits. Considering its available renewable energy potential, Romania can make a significant contribution to the European Union's climate objectives and be an example for other countries to follow. Given the financial capacity that will be available in the coming years, Romania can confidently commit to the EU's new 55% emission reduction target.

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