ROMANIA IN THE CONTEXT OF RENEWABLE ENERGY SOURCES

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Abstract

Romania's energy policy, although it has undergone a constant process of transformation and adaptation, in the sense that it has faced a series of challenges and uncertainties dominated by economic, political, cultural, climatic factors and alignment with international regulations and European, however, is in a position to build new energy production capacities, new refurbishment and modernization capacities for energy production, transmission and delivery, as well as to stimulate increased consumption. internally in conditions of sustainability and efficiency of the energy sector. The conditions of sustainability and efficiency of the energy sector largely involve the exploitation and capitalization of the existing potential of energy from renewable sources, regardless of whether we are talking about wind energy or geothermal energy. This study aims to detail in general the regions of Romania, with its areas where the potential of wind energy and geothermal energy is found in order to maintain the functionality of the national energy market based especially on the exploitation and capitalization of energy potential from renewable sources.

Keywords: *energy, renewable energy sources, energy efficiency, wind energy, geothermal energy.*

JEL Classification: K32, K33

1. Introduction

Romania, since its formation as a state, in order to fulfill its main objectives of development and increase economic progress, increase the standard of living of citizens and protect the environment has needed and still needs the establishment a constant mechanism for the development and modernization of the energy sector.

At this moment, Romania's energy policy, although it has undergone a constant process of transformation and adaptation, in the sense that it has faced a series of challenges and uncertainties dominated by economic, political, cultural, climatic and alignment factors regulations in the international and European space, however, are on a leading position in the creation of new energy production systems and equipment, new systems and equipment for refurbishing existing ones and for modernizing and adapting production systems and equipment, energy transport and delivery, all in the context of encouraging the acceleration of domestic cosumption for the sustainability and efficiency of the energy sector.

The efficiency of the energy sector, both at European and national level, must follow the transition from a high-carbon economy to a low-carbon economy, and this plan involves the mobilization of considerable investment from state governments, both for the segment of electricity, thermal energy, energies from renewable sources, energy efficiency of buildings, and encouraging industrial research and innovation in the field.

But the real challenge for European and national leaders is to maintain an efficient functioning of the internal energy market, in which the final consumer benefits from concrete energy products and services necessary to maintain and improve life in order to ensure a decent and long life for present generations as well as future ones.

We note that, along with other sectors of activity, the energy sector has a huge potential for the Romanian economy, in the sense that it can provide and maintain jobs, can support economic growth, can stimulate the business environment, can support research and innovation in the field and can positively influence the competitiveness of the economy in various forms and segments of production, services, delivery that ultimately facilitate the consumer and achieve an economy of fossil fuels, thus limiting the costs of energy imports.

Romania has all the necessary resources to increase the energy sector, which in turn must support the development, especially of industry and agriculture, of the economy in general and which will ultimately generate an improvement in the quality of life of citizens both in urban and to the rural

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2. Renewable energy sources in Romania

Starting from the observance of the principle of sustainability and of the improvement of the citizen's quality of life, Romania, through its entities and bodies, must capitalize on the energy potential from all its regions, regardless of whether we are talking about electricity, thermal energy or renewable energy.

Romania, given its geo-strategic positioning, has been in a constant process of construction, development and alignment with international and European regulations, which has necessitated the development of an appropriate and functional national framework for the energy sector, which facing both present and future challenges. Thus, in order to ensure the functionality of the national energy market, over time, a series of legal instruments have been developed that have only partially regulated the field, leaving major gaps on certain levels.

Among the normative acts elaborated for the energy field, I mention:

- Romania's energy strategy for the period 2007-2020, approved by the Romanian Government Decision no. 1069/2007[2];

- Law no. 123/2012 on electricity and natural gas, with subsequent amendments and completions, published in the Official Gazette of Romania no. 485 of July 16, 2012[3];

- Law no. 121/2014 on energy efficiency, with subsequent amendments and completions, published in the Official Gazette of Romania no. 574 of August 1, 2014[4];

- Law no. 122/2015 for the approval of some measures in the field of promoting the production of electricity from renewable energy sources and regarding the modification and completion of some normative acts, with the subsequent modifications and completions, published in the Official Gazette of Romania no. 387 of June 3, 2007[5];

- Law no. 220/2008 for establishing the system for promoting the production of energy from renewable energy sources, with subsequent amendments and completions, republished in the Official Gazette of Romania no. 577 of August 13, 2010[6];

- Law no. 51/2006 of the community services of public utilities, with the subsequent modifications and completions, republished in the Official Gazette of Romania no. 121 of March 5, 2013[7];

- Law no. 238/2004 on oil, with subsequent amendments and completions, published in the Official Gazette of Romania, no. 535 of June 15, 2004[8];

- Mining Law no. 85/2003, with subsequent amendments and completions, published in the Official Gazette of Romania, no. 197 of March 27, 2003[9];

- Administrative Code.

Romania, aware of its energy potential, in the context of the need to capitalize on renewable sources, has developed at the country level, a normative act to regulate the expansion of the use of renewable energy sources. Thus, in the context of the provisions of art. 1 of Law no. 220/2008 on establishing the system for promoting the production of energy from renewable energy sources, with subsequent amendments and completions, the following possibilities were conferred:

- "attracting renewable energy resources in the national energy balance, necessary to increase

[2] Government Decision no. 1069 of 2007 was published in the Official Gazette of Romania no. 781 of November 19, 2007.
[3] Law no.123/2012 on electricity and natural gas was published in the Official Gazette of Romania no. 485 of July 16, 2012.
[4] Law no.121/2014 on energy efficiency was published in the Official Gazette of Romania no. 574 of August 1, 2014.
[5] Law no.122/2015 for the approval of some measures in the field of promoting the production of electricity from renewable energy sources and regarding the modification and completion of some normative acts was published in the Official Gazette of Romania no. 387 of June 3, 2015.
[6] Law no. 220/2008 for establishing the system for promoting the production of energy from renewable energy sources was published in the Official Gazette of Romania no. 577 of 13 August 2010.
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[8] Law no.238/2004 on oil was published in the Official Gazette of Romania no. 535 of June 15, 2004.
[9] Mining Law no. 85/2003 was published in the Official Gazette of Romania no. 197 of March 27, 2003.

security in energy supply and reduce imports of primary energy resources;

- stimulating sustainable development at local and regional level and creating new jobs related to the processes of capitalization of renewable energy sources;

- reducing environmental pollution by reducing the production of pollutant emissions and greenhouse gases;

- ensuring the necessary co-financing in attracting external financial sources, destined to promote renewable energy sources, within the limits of the sources established annually by the state budget law and exclusively in favor of the local public authorities;

- the definition of rules on guarantees of origin, applicable administrative procedures and connection to the electricity grid in terms of energy produced from renewable sources;

- establishing sustainability criteria for biofuels and bioliquids."

Also in the text of this normative act, at art.2, the Romanian legislator defined the concept of prosumer: "*prosumer - the final customer who owns electricity production installations, including cogeneration, whose specific activity is not the production of electricity, which can store and sell electricity from renewable sources produced in its building, including an apartment building, a residential area, a shared service location, commercial or industrial or in the same closed distribution system, provided that, in the case of to non-domestic self-employed consumers of energy from renewable sources, these activities should not constitute their primary commercial or professional activity*". Concept, as can be seen, which acquires a large dimension in Romania.

Citizens, final consumers, being more and more interested in producing, storing and delivering, in their own homes, electricity and distributing it where appropriate.

As can be seen, the Romanian state, in the context of the existence of the legal framework for regulation and fulfillment of its objectives, has ordered and has the use of renewable sources for energy production, as in the southeast of Romania, respectively in Dobrogea, we meet the largest communities producing energy from wind sources.

Cogealac - Fantanele locality, Constanta county, from Dobrogea, Romania, has the largest wind farm, destined for the production of wind energy, in which are located and operate over 600 installations with wind turbines.

The Dobrogea region, as a geographical location, is located near the Black Sea coast, a coastal region, and due to the existence of extremely strong winds in southeastern Romania, favors the production of currents that cause the transformation of kinetic energy into mechanical energy and later in electricity.

This explains why in Dobrogea, the authorities have allowed major investments in wind turbine wind farms, the region currently having the largest share of wind turbine wind farms on land in Europe, and the main investors are from countries as well as Italy and Portugal.

According to surveys and studies, Constanta County ranks first in renewable energy projects and owns 80% of wind energy production in the country, and in early 2014, renewable energy production reached a record high, when the total capacity of the system projects reached 4300 MW, registering a percentage of 83% higher compared to 2013 and 2012 respectively.

Also in Dobrogea, in Tulcea County, there are other wind turbine parks located in Casimcea, Topolog, Fagarasu, Daieni, Valea Nucarilor, Mihai Viteazu, Agighiol, Cerna and Macin. At this moment, the town of Macin, the town of Cerna and the neighboring towns have only a few installations with wind turbines, but in the future their number will increase by building real wind farms to ensure the potential of wind energy in the area. Thus, in the near future, the Dobrogea region will have the supremacy in capitalizing on the wind potential in the country.

At this moment, at country level, there are approximately 3000 MW in wind projects, most of them being carried out in Dobrogea, and the technological progress will allow, in the coming years, the installation of new installations in other areas of the country, which will it also had storage units.

According to studies and analyzes performed by specialists in the field, the energy produced from wind sources could provide in the future the energy needed for a quarter of the inhabitants of Romania, respectively for the inhabitants of Dobrogea.

In the coming years, parks will be created in the Bucovina region, which will include wind

turbine installations to produce electricity for the inhabitants of the region.

Another region, which has a strong potential in terms of renewable sources, is the western part of the country, where there are warm sedimentary aquifers in the Pannonian Basin with thermal waters that have temperatures between 50°C and 85°C and are deposited in the sandstone aquifers of Upper Pannonia, located at an estimated depth of 800 m to 2400 m.

These extensive reservoirs, from the western part of Romania, have been analyzed and researched in the context of the existence of over 100 geothermal wells, but unfortunately, only some of them are functional, in the localities of Arad, Satu Mare, Oradea and Timis counties, areas, as can be seen, as areas known with a strong geothermal potential in Romania, if we consider other geographical settlements in the country.

Over time, the thermal waters in the western part of Romania have been used, as can be seen, especially for balneological purposes, recreation, as well as for animal husbandry and in activities intended for agricultural purposes.

As an example, among the areas with a strong geothermal potential, in the western part of the country, I mention the town of Dorobanti, in Arad County, which has two thermal pools that have been and are used over time for therapeutic, spa and zootechnics. For zootechnical purposes, the thermal water is used for the heating installations of the local fish farming, with the use of a certain temperature necessary to maintain and maintain the fish stock.

Another area, with geothermal potential is the commune of Lovrin, in Timiș County, which benefits from a thermal water treatment base, equipped with two outdoor swimming pools and an indoor one.

Also, other localities in the western part of Romania, which have a geothermal potential, which uses thermal water, is the city of Deta, Jimbolia, Gottlob, Sannicolau Mare in Timiș County, Pecica in Arad County, Arad with its basins thermal baths in the surroundings, the city of Oradea and its surroundings as well as the Tasnad resort in Satu Mare county.

Tasnad resort, in Satu Mare county, has geothermal potential with thermal water at a surface temperature of 72°C and a total mineralization of 9.84 g/l and has thermal pools, with six pools, used for therapeutic purposes, balneology and recreation.

The thermal water from Tasnad resort, used for balneological purposes, aims to treat a series of diseases, such as: degenerative rheumatism, neurological, gynecological, post-traumatic, occupational diseases, endocrine disorders, metabolic diseases, but also for invigorating and maintaining physical and mental tone.

Another recognized area with geothermal potential, at country level is the area near the country's capital, in the northern area, more precisely in Balotesti, where a thermal resort was built for the public for agreement and relaxation. The resort has ten swimming pools and uses an indoor temperature of 29 - 30°C and a thermal water temperature of 33°C.

Another area at country level, which has geothermal potential is the area of Valea Oltului, respectively the geographical area of Calimanesti and Caciulata.

On the Olt Valley, respectively in the area of Calimanesti and Caciulata localities, due to the existence of geothermal potential, networks with geothermal heating equipment and thermal pools have been created over time, which are used for balneological purposes to treat many ailments, but also for recreational.

3. Conclusions

These areas, localities, mentioned, which have the potential of renewable sources, are just some of the areas in the country, which are actively involved, through its local representatives in order to ensure a better life for the community, in the sense that it wants to use and efficient capitalization of the potential in the area, which can represent the engine of a lasting local economy to ensure the standard of living and the well-being of the community for both present and future generations.

I believe that in order to maintain the functionality of the national energy market, Romania

must exploit and capitalize on the full potential that the country has in all its dispositions for renewable sources.

It should be mentioned that our country, having a strong advance in relation to the other states in the European Union in terms of the share of energy from renewable sources, must be actively involved in achieving and maintaining the functionality of the national energy market. But for this it is necessary to increase the transition towards the production of energy from renewable sources by creating national programs with plans and measures that allow and establish an efficient and lasting synchronization between the business environment and public initiatives.

The potential of renewable energy sources at the country level, as we have already stated, can represent the engine of decarbonization in the energy field, and the acceleration of the transition to an efficient and lasting economy must be made on a capitalization of renewable sources.

The recovery of renewable energy sources must be a major objective for our country in the context of current CO2 prices, prices of equipment and renewable technologies used and the absorption of European funds in the context of an adequate and sustainable legal framework to ensure welfare citizens of our country.

The adequate and sustainable legal framework implies the updating and harmonization of the policies and legislation necessary to encourage investments in renewable energies that will determine an efficient implementation based on the result of renewable energy capacities.

Bibliography

1. Government Decision no. 1069 of 2007 was published in the Official Gazette of Romania no. 781 of November 19, 2007.
2. Law no.123/2012 on electricity and natural gas was published in the Official Gazette of Romania no. 485 of July 16, 2012.
3. Law no.121/2014 on energy efficiency was published in the Official Gazette of Romania no. 574 of August 1, 2014.
4. Law no.122/2015 for the approval of some measures in the field of promoting the production of electricity from renewable energy sources and regarding the modification and completion of some normative acts was published in the Official Gazette of Romania no. 387 of June 3, 2015.
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6. Law no. 51/2006 of the community services of public utilities was published in the Official Gazette of Romania no. 121 of March 5, 2013.
7. Law no.238/2004 on oil was published in the Official Gazette of Romania no. 535 of June 15, 2004.
8. Mining Law no. 85/2003 was published in the Official Gazette of Romania no. 197 of March 27, 2003.