

POTENTIAL AND CHALLENGES OF ROMANIA'S RENEWABLE ENERGY MARKET TOWARDS EUROPA 2020 HORIZON

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Abstract:

This paper intends to offer a short analysis on the progress of Romania regarding renewable energy, by correlating the on-field situation with the National Renewable Energy Action Plan, in order to create an overview on how the objectives for Europa 2020 horizon are being followed. All the advantages, as well as natural potential, political environment, legal framework and other influential factors are being taken into consideration to launch a hypothesis on whether Romania will be able to meet the renewable energy targets set by 2009/28/CE Directive.

Key words: energie regenerabilă, România, strategie, Europa 2020.

JEL Classification: Q28, Q42

1. Introduction – general context

Global climate change is one of the most important problems the world is facing today. Its main driver is human activity: industry, agriculture, transport, etc; all of these contribute to a level of carbon dioxide in the atmosphere 40% higher than before the industrial revolution.

Intergovernmental Panel on Climate Change (IPCC) reveals that over 90% of global warming from the second half of the 20th century is caused by the increase of the green house gases release in the atmosphere by human activity. The same IPCC foresees that, in average, world temperature will rise with 2.5-4.7 °C until 2100, compared with before the industrial revolution. The Earth's surface has warmed up with approximately 0.75 °C from 1900 to present day, a big part of this in the last 50 years (IPCC, 2015)

To avoid this serious situation getting even worse and threaten humanity itself, international authorities have begun initiatives for sustainable development, some of the more important results of debates being the Kyoto and the Copenhagen protocols. Among other environmental protective measures proposed by these documents, we can find objectives of increasing renewable energy production and use. China and India were the first states to come up with the idea of having renewable energy targets (Beck, 2004), and at the beginning of 2014, according to Renewables Global Status Report 2014, at least 144 countries had such objectives set, and 138 of them were implementing national support policies for green energy (REN21, 2014).

Uniunea Europeană a început eforturile în direcția dezvoltării durabile în 1997 prin adoptarea Cartei Albe, însă legislația propriu-zisă a venit câțiva ani mai târziu, prin Directiva 2001/77/EC și mai apoi 2003/30/EC. Orizontul 2020 este vizat de o directivă mai recentă, și anume 2009/28/EC. Aceasta stabilește obiective obligatorii pentru statele membre în ceea ce privește emisiile de gaze cu efect de seră, eficiența energetică, dar și procentul de energie provenită din surse regenerabile din totalul consumului de energie. Nivelul agregat pentru întreaga Uniune Europeană trebuie să fie de 20 procente din totalul consumului de energie, cu niveluri stabilite diferențiat pentru fiecare stat membru, în funcție de potențial, suprafață geografică și alte criterii relevante. Pe lângă acest 20% din total consum energie, fiecare stat membru trebuie să-și asigure un minim de 10% din necesarul de energie pentru transport din surse regenerabile.

The European Union has begun efforts for sustainable development and in 1997 it adopted the White Paper, actual legal framework arriving a few years later, with the 2001/77/EC and 2003/30/EC Directives. 2020 Horizon was set on a more recent directive, the 2009/28/EC. This sets mandatory goals for member states, regarding greenhouse gas emissions, energy efficiency, but also the share of renewable energy in gross total energy consumption. Overall EU renewable share has to be 20 percent of total gross final consumption, with different shares appointed for each member state, according to potential, geographical surface and other relevant criteria. On top of this 20% goal, each member state has to ensure a minimum of 10% renewable transport share.

Table 1 Renewable energy share targets for 2020 and the situation in 2013

GEO/TIME	2013	2020 Target
EU28	15,0	20
Belgium	7,9	13
Bulgaria	19,0	16
Czech Republic	12,4	13
Denmark	27,2	30

Germany	12,4	18
Estonia	25,6	25
Ireland	7,8	16
Greece	15,0	18
Spain	15,4	20
France	14,2	23
Croatia	18,0	20
Italy	16,7	17
Cyprus	8,1	13
Latvia	37,1	40
Lithuania	23,0	23
Luxembourg	3,6	11
Hungary	9,8	13
Malta	3,8	10
Netherlands	4,5	14
Austria	32,6	34
Poland	11,3	15
Portugal	25,7	31
Romania	23,9	24
Slovenia	21,5	25
Slovakia	9,8	14
Finland	36,8	38
Sweden	52,1	49
United Kingdom	5,1	15
Norway	65,5	67,5

Source: Eurostat, Share of renewable energy in gross final energy consumption (t2020_31), 2015.

In order to meet these objectives, every member state has its freedom to choose a incentive policy framework. The most commonly used investment incentives in renewable energy are: investment subsidies, feed-in tariffs, tradable green certificates, along with other fiscal stimulents (exemption from taxes, reduced VAT, etc.) (Haas et al, 2011).

În cel mai recent comunicat al Comisiei Europene privind sectorul energetic sunt reiterate principiile și necesitatea tranziției la o piață eficientă energetic și interconectată eficientă, o Uniune Europeană cu o amprentă redusă de dioxid de carbon și nu în ultimul rând independentă energetic, sau cu o dependență scăzută. În susținerea eforturilor către atingerea acestor obiective, sunt amintite următoarele:

In the most recent press release issued by the European Commission regarding energy, the principles and the necessity of transition to a energy efficient, interconnected European Union that has low carbon dioxide emissions and also a energy independent or a low energy dependent Europe.

„ - The EU is the largest energy importer in the world, importing 53% of its energy, at an annual cost of around €400 billion.

- 12 EU Member States (Cyprus, Estonia, Ireland, Italy, Lithuania, Latvia, Malta, Poland, Portugal, Romania, Spain, United Kingdom) do not meet the EU's minimum interconnection target – that at least 10% of installed electricity production capacity be able to "cross borders". An appropriately interconnected European energy grid could save consumers up to €40 billion a year.

- 6 EU Member States (Bulgaria, Finland, Latvia, Lithuania, Slovakia) are dependent on one single external supplier for all their gas imports.

- 75% of our housing stock is energy inefficient; 94% percent of transport relies on oil products, of which 90% is imported.

- Over €1 trillion needs to be invested into the EU energy sector by 2020 alone.

- Wholesale electricity prices in Europe are 30% higher, and wholesale gas prices over 100% higher, than in the US.

- European renewable energy businesses have a combined annual turnover of €129 billion, employing over a million people. The challenge is to retain Europe's leading role in global investment in renewable energy.

- EU greenhouse gas emissions fell 18% in the period 1990-2011.

- By 2030, the EU aims to cut greenhouse gas emissions by at least 40%, boost renewable energy by at least 27%, and improve energy efficiency by at least 27%.”

These guidelines are being drawn to support continuous European efforts on renewable energy in order to meet the strategic objectives assumed.

2. Romania – potential and progress on renewable energy

(Gaigalis et al, 2014) compiled information about the way each member states uses policies to incentivise the green energy market, showing that 21 EU members have feed-in tariffs as their main stimulent of investment. Romania isn't among them, being one of the 6 exceptions that only use a tradable green certificates system to encourage the use of renewable energy. Even though this system is viable, it is only favorable to big investments, the fixed costs of

transactioning and operating with the green certificates can not be afforded by small renewable energy producers. To offer a solution to this, a number of proposals were introduced in 2014 by the ANRE to install a feed-in tariff scheme for small capacities of under 1 MW.

According to the Renewable Energy Country Attractiveness Index RECAI analysis provided by (Ernst&Young, 2015), Romania has a 44.5 score, making it the 35th most attractive country in the world for investment in renewables, as of March 2015. Alongside Romania, in this chart there are 15 more EU member states, the top 3 of them being: Germany (3rd place – 66.3 points), France (7th place – 58.9 points) and the United Kingdom (8th place – 58.5). Romania's potential of renewable energy is presented in the NREAP (National Renewable Energy Action Plan). According to it, there is important hydro energy potential in Romania (with a great contribution to present renewable energy consumption share), but also wind, solar and biomass potential exists.

Table 2 Renewable energy sources (RES) potential in Romania

RES (% out of total potential)	RES used for	Annual energy potential	Energy economic equivalent (ktep)
Solar Termal (9,85)	Heat	60 mil. GJ	1.433
Solar PV (0,7%)	Power	1.200 GWh	103
Wind (13,4%)	Power	23.000 GWh	1.978
Hydro (23,4%)	Power	40.000 GWh	3.440
Geothermal (1,1%)	Heat	7 mil. GJ	167
Biomass (51,6%)	Heat/Power	319 mil. GJ	7.597

Sursa: PNAER, 2010

According to (Leca, 2014), at the end of 2013, Romania had a functioning RES production capacity of 3.815 MW, from which approximately 64,7% - 2.470 MW is in wind energy capacities, 810 MW solar, 480 MW small hydro power (max 10MW), and 55 MW biomass and biogas. The same author correctly points out the fact that this structure of producing capacities is mainly due to the legal framework that almost exclusively support the production of power, to the detriment of heat.

The tradable green certificates system was offering, in 2012, 2 for every MW produced by wind energy, new plants or refurbished, 3 certificates for every MW of power produced by small hydro plants, and a good 6 certificates bonus for solar energy (ANRE).

Other forms of government support can be: investors being exempt from certain taxes, accelerated depreciation of fixed capital used to harness renewable energy, reduction in budget contributions for newly created jobs, state guarantees for renewable energy investments, etc. (Colesca & Ciocoiu, 2013)

a) Solar energy

Romania has a good potential of solar energy, that can be used for heat or for producing power through PV cells. Even though this type of energy is abundant in theory (the amount of energy radiated by the Sun on Earth in an hour could satisfy world energy consumption for a year), present technology only allows us to harness a small part of that. Solar installations are proper for domestic use and small scale industrial. Seasonality is one of the weaknesses, with differences of 5 to 1 ratio between summer and winter days when it comes to radiation amounts. But even in winter conditions, a solar energy system can insure at least 50% of a household energy needs. The „Casa Verde” programme was created to encourage investment in this field, but it is momentarily closed due to lack of funding, this being another inhibitory factor for the solar energy market. The latest evolution in technology price of solar installations could in fact restart the interest of potential investors, with great cost reductions.

b) Wind

Wind energy was the great beneficiary of the support policies, making the most out of the green certificates system. According to ANRE, circa 75% of the total tradable green certificates were issued for wind energy producers. Romania's national territory has remarkable aeolian potential, especially in Dobrogea, the high mountain areas, western hills, as well as other areas in the Bărăgan Plains or the Bârlad plateau. As mentioned earlier, installed power production capacity from wind energy in 2013 accounted for nearly 65% out of total RES in Romania (excluding large scale hydro)

c) Hydro

Hydro energy has a very high potential in Romania, that is already exploited through large scale hydro plants. The largest hydro plant in Europe, Porțile de Fier is a good example, alongside other important plants on the rivers Olt, Bistrița, Someș, Argeș, Dâmbovița, etc. According to ANRE, in 2010, hydro power share in total Romanian power production was 32.4%, through Hidroelectrica, the national hydro energy producer, but also from smaller hydro installations. These important figures have a decisive contribution to the relatively high shares of renewable energy consumption in gross final energy consumptions, if we consider 2020 targets.

d) Biomass

Lack of coherent support policies and yielding strategies (Leca, 2014) make biomass non-relevant in Romanian energy mix at the moment. Despite theoretical potential, there are only about 55 MW installed biomass or biogas capacity in Romania.

e) Geothermal

It certainly has potential, mainly for domestic heating systems, but only in small geographical areas. One good example can be the Western Plains (ANRE). Can be efficiently harnessed only through investment stimulatory programmes for domestic and small scale industrial use.

3. Challenges in renewable energy strategy implementation

After the analysis of documentation provided by the ANRE and other relevant European and Romanian institutions, as well as the scientific papers referred, I was able to identify some barriers that can slow down or totally discourage investment flows in renewable energy in Romania:

- a) Volatile and bureaucratic institutional framework – legal, political and economic instability make the investors reluctant to the local market; different government urgency ordinances have contradictory effects on the same indicators, the tradable green certificates’ market is coordinated by OPCOM with high bureaucracy effects, the de jure existence of a support program named “Casa Verde” but its de facto inexistence. An empirical study by (Țăpurică & Tache, 2014) identified the main bureaucratic issues faced by renewable energy investors in Romania: first, there are delays in payments by the Romanian state to investors, with a 100% incidence – meaning that all of the study subjects experienced this difficulty; also, 40.45% of investors had problems in joining the national energy system, all of these delays in implementation generating costs, and even sometimes lead to failing project objectives.
- b) Existing infrastructure’s inefficiency – energy inefficient buildings and heating networks cause high energy losses. These losses cancel the possible positive effects of renewable energy heating.
- c) The renewable transport sector does not have a very favorable government support climate – there are no financial incentives for biodiesel or bioethanol retailers.
- d) Consumer behavior – Romanian consumer’s profile is a very price oriented one, so the more expensive renewable energy has a clear disadvantage over conventional energy.

Other barriers for investors, with a more random distribution, but that also have to be kept in mind are other exogenous factors as natural phenomena, hostile community and civil society attitude on renewable energy investments

4. Conclusion

There have been important progress made from 2009, the year 2009/28/EC Directive was adopted, as well as at a European but also at a national level. Romania is one of the EU members that follows the interim targets set by the NREAP towards the 2020 horizon. Most probably, reaching the 24% share of renewable energy use in total gross final energy consumption will not be a problem if we bear in mind the already high levels of total renewable energy use in Romania. But we have to also keep in mind that industrial energy consumption, that holds a very important share in total national energy consumptions in all western countries, is for the moment under its potential in Romania. The first wave of industrial energy consumption was in the 1990s, generated by numerous shutdowns across the country. A certain revival was felt after 2005, but the economy was yet again disrupted by the global crisis in 2009. The real challenge for the future is for the renewable energy market to keep up with a possible new industrial expansion. A slower rate of growth for renewable energy than the growth rate of industrial consumption would generate ever-decreasing renewable energy use shares. The renewable energy market has to also be attractive enough to new investors, and in order to be attractive, efforts must be put into raising the barriers for investors. This way, the important Romanian renewable energy potential can be efficiently harnessed.

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