WIND ENERGY SECTOR IN ROMANIA- PRESENT AND PERSPECTIVES

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Abstract
Renewable energy sources are becoming more and more popular around the world and, through the development of the wind energy sector, Romania has the chance to generate green electricity and with low emissions, and a greater energy security, and thus meet the requirements of the EU with regard to the production of energy from renewable sources. This is a great challenge, not only for developers and investors, but also for State administration and the conventional energy industry. All stakeholders appear to understand the extent and now, although the future of the energy system is the incipient phase, we face a historic chance to create sustainable foundations for the development of modern energy industry and environmental damage over the long term. Wind power and other renewable energy sources are not able to completely replace existing power plants, but it can become an important element of the energy system.

Key words: *Renewable energy; wind energy; romanian wind energy market.*

JEL Classification: *Q29; Q42*

I. INTRODUCTION – WIND ENERGY SECTOR SITUATION WORLWIDE

In the present context, characterized by alarming increasing of pollution caused by production of energy from the combustion of fossil fuels, is becoming more and more important the reducing of dependence on these fuels. Wind energy has already proven to be a very good solution to the global energy problem. Use of renewable resources is addressed not only to produce energy, but through the particular way of generating reframes also the development model through decentralization of sources.

Renewable energy refers to energy forms of produced by energetic transfer of the energy resulting from natural processes (Chirias D., 2010). Annual global investment in renewable energy has grown in recent years from 39 billion dollars in 2005 to 55 billion dollars in 2006, 148 billion in 2007, 155 billion in 2008, and 2009 was the first year that there was a decline, the investment reached 144.5 million dollars (Dobrescu E.M., 2009)

Wind energy in particular, is among the forms of renewable energy that are suitable for small scale applications.

The main advantage of wind power is zero emission of pollutants and greenhouse gases, because they do not burn fuel. Among other advantages of wing energy we can mention (www.greensource.ro):

The production of wind energy does not involve the production of any kind of waste.

Low cost per unit of energy produced. The cost of electricity produced in modern turbines has decreased substantially in recent years, arriving in the USA to be even lower than in the case of energy generated by the fuel, even if it does not take into account negative externalities inherent in the classical fuels utilization. In 2004, the price of wind power was already at one-fifth comparing with the price from the 80's, and the forecast continue to decline, because more and more wind units are put in function with installed power of several megawatts.

Low costs of decommissioning. Unlike nuclear power, for example, where decommissioning costs may be several times higher than the costs of the plant, in the case of wind generators, decommissioning costs, at the normal operating period, are minimal, they can be fully recycled.

The main disadvantages are relatively limited energy resource, inconstancy due to wind speed variation and low number of possible locations. Few places on Earth offer the possibility of producing sufficient electricity using wind energy. At the beginning, a major disadvantage of wind energy production was the price quite high of energy production and relatively low reliability of turbines. In recent years, however, the price of production per unit of electricity has fallen drastically, reaching, through improving the technical parameters of the turbines, the figures of of 3 to 4 eurocents per kilowatt hour.

Another disadvantage is the "Visual pollution"-i.e., they have an unpleasant appearance-and also produce "sound pollution" (too noisy). It also states that the turbines are affecting the environment and surrounding ecosystems, killing birds and requiring large vacant land for their installation. Arguments against them are that modern wind turbines have a stylized, attractive appearance, that cars kill more birds per year than the turbines and that other sources of energy, such as electricity generation using coal, are much more harmful to the environment because it creates pollution and the greenhouse effect. Another disadvantage is the risk of damage in case of storms, if the wind speed exceeds the limits permitted in the design. No matter how great it would be permissible limit, there is always the possibility that she may be exceeded.

Wind energy has now established as a conventional source of electricity and plays a central role in immediate plans and long-term for energy for increasingly more countries. After 15 years of medium growth rate, at the end of last year in about 80 countries the commercial wind facilities have reached the level of 240 GW.

Twenty-two countries have more than 1,000 MW installed, Romania being among them. Demand growth is very slow, nonexistent or negative, so the demand for the new generation of power of any kind is reduced and the competition is fierce. Brazil, India, Canada and Mexico are very dynamic markets, but cannot compensate for the lack of growth in the traditional markets from Europe, USA and China. There are many interesting new markets in Latin America, Africa and Asia where there is a great potential for growth.

According to the Global Wind Energy Council (GWEC), the wind power sector continued its global expansion in 2012. In Europe, Germany and the United Kingdom are market leaders. Romania, Italy, Poland and Sweden are in emerging markets, which have brought a surprising contribution last year. Europe has set a new record of 12,4 GW for 2012 thanks to all developments in these areas. Other regions that have shown a remarkable expansion in 2012 are Brazil with 1.077 MW and Australia which was responsible for the 359MW from the new capacities in Pacific region. In the region of the Middle East and North Africa Tunisia has only completed a 50 MW wind farm and the first commercial sub-Saharan wind park emerged in Ethiopia, marking a promising future for the region. Africa is expected to become a competitive market in the coming years as the generation of green energy has become a priority for economic development.

Below is the chart of global cumulative installed wind power in the past 17 years:

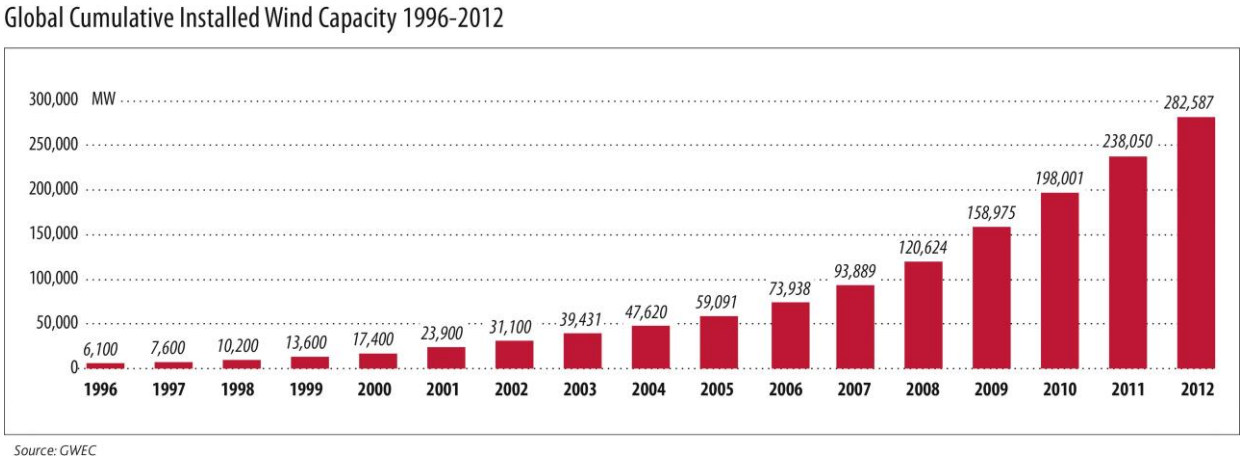

Figure 1- Global cumulative installed wind capacity 1996-2012

According to GWEC (www.gwec.net) in 2012 China has registered a substantial growth again this year, but considerably less than in 2011, when they came to 17.630 MW, adding an additional new wind capacity 13,200 MW and imposing itself as a world leader again in the wind market with a total installed capacity of 75.564 MW at the end of the year.

Annual installed wind capacity increased with 10% in 2012 compared with 2011, continuing the upward trend of last year. However, the installation of new wind capacity at global level has slowed over the past three years, a result of the largest growth in 2009 from 26,5 GW to 38,6 GW, representing a growth rate of just over 45%.

Table 1- Country wind capacities 2011-2012

Country	Wind capacity in 2012 (MW)	2012 Share (%)	Wind capacity in 2011 (MW)	2011 Share (%)
China	75564	26.75	62364	26.4
USA	60007	21.24	46919	19.74
Germany	31332	11.09	29060	12.23
Spain	22796	8.07	21674	9.12
India	18421	6.52	16084	6.77
France	7196	2.55	6800	2.86
Italy	8144	2.88	6737	2.83
UK	8445	2.99	6540	2.75
Canada	6200	2.19	5265	2.22
Portugal	4525	1.60	4083	1.72
Other countries	39852	14.11	32143	13.52
TOTAL	2824825	100	237669	100

II. WIND ENERGY SECTOR SITUATION IN EU AND ROMANIA

In 2012, despite the current difficult economic period, wind energy market was able to recover. As a survival strategy, manufacturers of turbines were updated the turbines, while the developers were much more inclined towards building projects with a higher margin.

The global financial crisis has contributed to the decreasing of economical potential, and, therefore, investments of international companies have been severely restricted or even delayed. However, despite the fall in gross domestic product of most countries, investments in the renewable energy sector have not diminished.

Even though estimates for 2013 and 2014 may even appear to be discouraging, GWEC still provide a general upward trend until 2016. Market forecast provides a positive overview of the evolutions around the world, with Asia remaining the global leader. This shows that the effects of the economic crisis are increasingly lower.

An important milestone was reached by the European market, the installed wind capacity reaching over 100 GW, and new and exciting signals coming from emerging countries. We can see a variety of new players in the market for renewable energy, pension funds investing in wind power field as an alternative to government bonds, while investment funds have begun to act as intermediaries.

12.744 MW of wind power were installed in Europe, of which 11.896 MW were in the European Union. Germany remained the European country with the largest installed capacity, followed by Spain, United Kingdom and Italy. From the emerging markets of Central and Eastern Europe, Romania and Poland have both had record years-both installing approximately 7.5% of the annual total capacity of the EU. Both markets are now constantly in the top ten in the EU for installed capacity annually. It is also important to note the value of the capacity installed in the United Kingdom, Italy and Sweden. These three markets accounts for 16%, 11% and 7% respectively of the total number of installations in the EU in 2012.

Even though Europe is facing an economic crisis, wind power industry has managed to record a serious advance in recent years. The success of this branch was prompted, in part, by the regulations imposed by the European Commission, as well as the plans of each nation in part to reduce the dependency of classical fuels.

This year, the production of wind energy in the European Union member countries came to 100 GW. This amount would have been made by 39 plants or burning of the 72 million tons of coal.

Wind energy represents 7% of the total energy consumed in the EU, according to data provided by the European Wind Energy Association (EWEA) in Brussels.

Although exploits only a tiny fraction of potential, the wind energy has had a substantial impact on Europe's energy security and the environment. In addition, the green industry has created many jobs and has boosted the export of technology. For example, Germany position is very good at this point, falling behind China and the United States at global level, with a production capacity of 30 GW, which represents 11% of total electricity needs of the country. But wind energy success did not come easy. Ten years ago, fossil fuel and nuclear power clearly dominated the European market.

Only after the EU implemented market liberalisation, in 1998, changes started to appear, by imposing more rules to limit pollution and to start the production of renewable energy. Thus, the normative acts adopted at EU level, member states are obliged, until 2020, that 20% of the energy supplying to be from renewable sources. In addition, they are required to reduce carbon emissions and the amount of energy consumed with 20%

The long-term need for energy of Romanian economy makes the energy industry, including renewable energy, to be an extremely exciting area for global equity involvement. The increasing trend of foreign direct and

portfolio investment in this sector takes place despite threats of legal instability, as well as of those limitations, which are described in detail in the third edition of the report "Wind power and other renewable energy in Romania" (www.incomemagazine.ro).

2013 Edition of the report brings together the latest figures and analysis indicators of wind energy market in Romania and provides benchmarks for evaluation of other renewable energy sources: solar energy, hydro power, biomass, geothermal energy. The study includes rigorous analysis of legal provisions for all stages of the development of a renewable energy project and also the description of the fiscal context, the financing sources available for investment and potential constraints and obstacles.

Wind power and other renewable energy sources can become an important element of the energy system. This calls for more support for the sector, and especially the development of a transparent regulatory system, a prerequisite from the point of view of investors. Thus it is necessary to ensure the long-term stability of both legal and regulatory terms and in terms of resolving the problem related to connecting to the network.

Romania was the first country in Eastern Europe which joined the Partnership for Renewable Energy and Energy Efficiency. According to the Ministry of Environment, the potential of our country in the production of green energy is as follows: 65% - biomass, 17% - wind, 2% - solar, 4% - small hydro, 1% + 1% + voltaic geothermal (Tureac C et al., 2011).

Last year in Romania were installed 923 MW, which represents an increase of 94% of the total wind power capacity in our country. Cumulative wind power capacity of Romania has reached 1905 MW at the end of 2012, surpassing the estimates of ANRE and the National Action Plan for Renewable Energy (NAPRE). Romania has been a leader among emerging markets of Europe in 2012 in terms of new installed wind power capacity positioning at number five in Europe, after Germany (2415 MW), United Kingdom (1897 MW), Italy (1973 MW) and Spain (1122 MW), according to the report "Wind power and other renewable energy in Romania"-2013, elaborated by TPA Horwath Romania and Schoenherr and Associates SCA and also 10th place among the most attractive countries in the world in investments in wind energy, surpassing countries like Italy, Brazil, Japan, Australia or the Netherlands, according to the Renewable Energy Country Attractiveness ranking, published by Ernst &. Young (www.ey.com).

Figure 2- Renewable Energy Country Attractiveness ranking

Rank[1]		Country	Wind index	Onshore wind	Offshore wind
1	(1)	China	76	78	69
2	(2)	Germany	68	65	80
3	(5)	US[2]	63	65	56
4	(5)	UK	62	59	78
4	(3)	Canada	62	66	45
6	(3)	India	61	66	39
7	(7)	France	59	60	56
8	(8)	Sweden	55	55	54
8	(8)	Poland	55	57	44
10	(10)	Romania	54	57	39
11	(12)	Ireland	53	54	52
11	(11)	Italy	53	54	45
13	(12)	Brazil	52	55	40
14	(15)	South Africa	51	55	37
14	(14)	Belgium	51	50	58

Source: www.ey.com

Analyzing the development of wind parks in the course of completion, for 2013 is foreseeable the installation of approximately of additional 617 MW, estimating that Romania will be able to secure from 8% the wind energy of total gross energy consumption of the country.

In our country has entered into function the largest onshore wind farm project in Europe, Fantanele-Cogealac windfarm from Constanta County. This project of Czech investors from CEZ has 240 wind turbines of 2.5 megawatt and a total capacity of 600 megawatt.

Also Enel Green Power, renewable energy Division of Italian utility group Enel, has announced the construction of several wind farms in Romania, with a cumulated power of 180 MW. In 2011, the company has invested 330 million euros in the construction of wind parks in Romania. Enel already owns in Romania wind

269 MW units. The company has wind parks in Valea Nucarilor, Casimcea si Corugea, and all in the Tulcea County, and in the villages of Sfanta Elena and Coronini (both in Caras-Severin County).

A joint venture formed by firms ERG SpA and Lukoil (Lukerg Renew GmbH) has announced its intention to buy a wind farm in the area, in case it will be able to access a loan from the European Bank for Reconstruction and Development (EBRD).

GDF SUEZ Energy Romania has entred on the market wind energy, with an investment of 80 million euros in a wind farm at Gemenele, in Braila County with a capacity of 48 MW.

More Electrica has announced the intention to build two wind farms at Frumusita, Galati County and Chirnogeni, in Constanta County.

This year has started the construction of a large wind farm in Botosani, which will stretch on the territory of four communes: Paltinis, Cotusca, Radauti Prut and Viisoara. The investment announced is 800 million euros and belongs to Terra Romania SPV One.

The project Generacion Aeolic Dacia, Crucea Park in Dobrogea of 40MW, has requested this year an additional funding of 46.6 million euro from EBRD. In case that the loan will be approved, the project is going to be put in function in 2013.

Two investment funds from France and Czech Republic, Marguerite and EnerCap Power, have entered on the Romanian market of wind energy, buying a stake of 80% of a wind farm which it be built between Chirnogeni and Independenta, whose commercial operations are to begin in 2014.

Another investment announced for this year is to develop a wind farm at Tulucesti, County of Galati, by Romanian company in Ilfov County. Wind power plant will include 41 turbines and will have a total installed power of 143,5 MW.

Also, the Austrian company Verbund announced the intention to spend 340 million euros for wind projects in Romania until 2016.

In 2013, following the planned wind farms are becoming functional:

Verbun-development of 100 MW located in Casimcea (Tulcea County)

Lukerg-development of 84 MW located in Casimcea (Tulcea County);

EDP -development of 162 MW located in Făcăeni (Ialomiţa County);

PNE WIND- development of 18 MW located in Mircea Voda (Constanta County) using Vestas turbines.

The above projects would bring a total of 494 MW of new electricity from wind energy sources.

According to AREE estimates, the estimated level of the installed wind power capacities is ambitious considering the current investment plans and must be supported by a healthy plan to improve power grids, a clear plan for the decommissioning of old and inefficient power plants, coal-fired power, but also a stable legal framework

EU funds for alternative energy projects were part of the 2007-2013 programmes of the structural funds. Because this funding period ends by the end of 2013, we cannot expect that in 2013 to be subject to the approval of new projects. The following funding period 2014-2020 is still under discussion and, most likely, only at the beginning of the year 2014 will be made public a clear strategy regarding new programs for EU funds.

In the period 2007-2013 funding alternative energy projects could receive EU funds through the following two programs:

- ERDF-European Regional Development Fund-Sectoral Operational Programme "Enhancing the economic competitiveness", Measure 4.2- Investments in renewable energy;
- EAFRD -the European Agricultural Fund for Rural Development-Measure 121 modernization of agricultural holdings.

Within the measure 4.2, were initially allocated approximately EUR 300 million for financing of renewable energy projects in the period 2007-2013, of which 85% are non-refundable EU funds provided by the ERDF and 15% are public funds for financing from the State budget (according to GD 750/2008).

Companies can receive up to 18 million EUROS in EU funds grants for wind energy projects under Measure 4.2. Up to 70% of eligible project costs can fund through this way, being conditioned by the size of the applicant company. Applications for funding were submitted between 2008 and 2010. It were submitted in total 450 alternative energy projects. All projects have competed with each other in terms of quality, so that only the best have been subsidized. At the present time, it is no longer possible to apply for other projects. The only way to benefit from these funds is to purchase a project that was approved and some of them-in various stages of implementation-are even for sale.

III. CONCLUSIONS

In the present context, characterized by alarming increasing of pollution caused by production of energy from the combustion of fossil fuels, is becoming more and more important the reducing of dependence on these fuels. Wind energy has already proven to be a very good solution to the global energy problem

Wind power and other renewable energy sources can become an important element of the Romanian energy system. This calls for more support for the sector, and especially the development of a transparent regulatory system, a prerequisite from the point of view of investors. Thus it is necessary to ensure the long-term stability of both legal and regulatory terms and in terms of resolving the problem related to connecting to the network.

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