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Economic Issues in the Wind Energy Development at World and European Level

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ABSTRACT

Energy has become increasingly more a commodity we can not replace, a good without which modern life can not exist. Over time, sources of energy have experienced several stages of development. The quantitative involution of energy sources from fossil fuels, leading with climate change and a range of additional costs due to their scarcity, have led scientists to find them a replacement. Like any large-scale technological innovation, electricity obtained from wind power required huge cost of implementation, turning out to be a real industry. Nowadays, the investment costs are still high, but the need of this type of power to operate, made the results worth the financial efforts of those involved. Increasingly used both in developed countries and in contries with developing economies, wind energy turns out to be not only in line with sustainable development, but also profitable for investors.

1. Introduction

Form of renewable energy, along with energy from biomass, solar energy, geothermal energy and water (hydro, tidal, osmotic), wind energy has been used for the first time in human history by the Egyptians as a means of propulsion on the Nile. Wind energy was also used by Christopher Columbus in the late fifteenth century, when he discovered America.[1]

Nowadays, wind energy is increasingly used worldwide, being the energy source that recorded the fastest growth in the last twenty years. Its scale is based on a number of considerations. Among them, the most important is the idea of sustainable development, based on respecting the environment for future generations, but also taking into account the alarm signals drawn by holding powers of fossil resources about the sharp reduce of their quantity; this fact has determined a reshape in energy production for the purpose of obtaining it from inexhaustible sources.

Along with the purpose of sustainable development, wind energy has created a real market with multiple implications and sides, being involved in the production and commercialization both private enterprises, state and last but not least, the final consumers. The need to implement green energy policy has made this market experience a drastically increase in record time.

The industry created in the renewable energy sector implies a lot of financial support. For a long period of time, it seemed like everybody benefited from these investments – private investors and financial institutions had the profit, the state had to achieve some green energy goals, humanity had less poluttion. But these positive aspects were accompanied by one big negative one: the costs. If investors and financial institutions recover these costs in time, for the state, this industry mainly generates costs. This is why states are encouraged to support green energy through funds coming from bigger economical markes, such as the European Union for developing and emerging countries.

2. The current state of wind energy use

At a worldwide level, the use of wind energy has been conditioned by the existence of primordial energy source, in this case, the wind. The second issue of major importance is the ability of investment required to capitalize commissioning and production of wind energy. These are the reasons why the states that have nowadays the most important role in this sector are China and United States of America, followed by the first representative state of the European Union in this field, Germany.[2]

Germany has always been the pioneer state of the European Union in terms of energy drastic decisions. The decision to eliminate the use of nuclear energy until 2022, and the recent decision to readjust the few coal mines it has until 2018, in order to deter complete pollutive fossil energy production and replace

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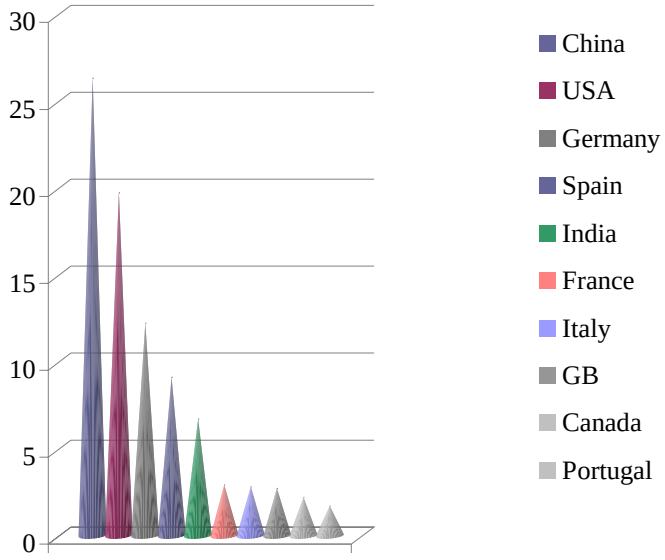
it with a more effective one, determined Germany to invest heavily in green energy production, this fact being also reflected in production of energy from wind sources.[3]

Figure 1. Top 10 market share of global wind energy in 2012

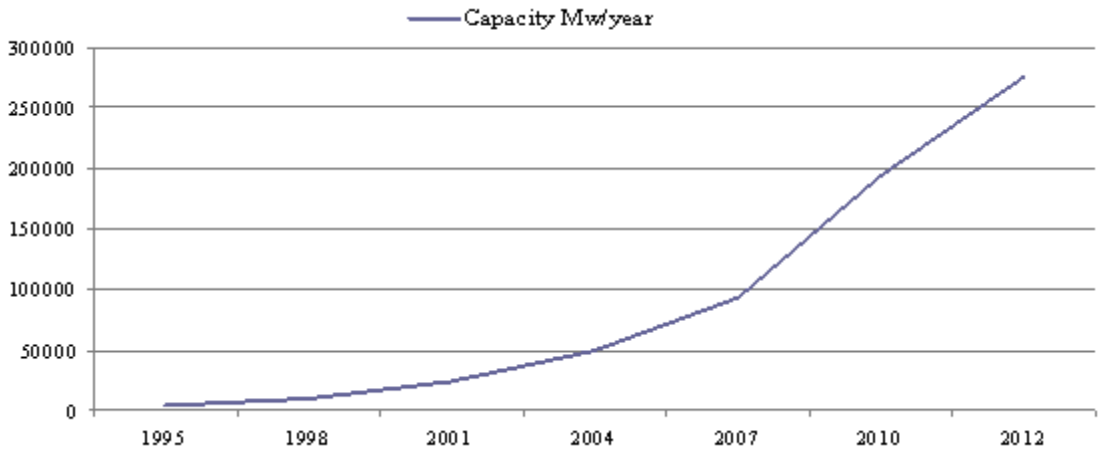


**Source: Own processing of the information in Global Wing Energy Outlook 2012 Report, available at http://www.gwec.net/wp-content/uploads/2012/11/GWEO_2012_lowRes.pdf.*

Along with leading members of the wind energy market, a range of other countries with potential wind energy development joins in order to accomplish the target of gradual elimating the energy produced by fossil fuels, which on the one hand, are of a limited quantity, and on the other hand, they pollute most. All the states that are involved in energy production with wind fuel, made that during 1995-2012 the installed capacity of wind turbines to grow up to 57 times, being a relatively constant trend in rising year by year. As the issue of replacing the classic fuels is more acute, the increased use of renewable fuels is higher. Consequenly, the use of wind turbines is expected to see further significant growth.[4]

The European Union sustains this type of energy production with all possible means, assuring legislation and finance for different projects implying green energy. The need of replacing conventional fuel is so stringent that the European Commision established targets for the 27 states to accomplish and different terms regarding each one of them. The legislative matters were treated very carefully and in a close approach with the financial matters, because of the significantly economical development differences within the Union.

Figure 2. Evolution of installed capacity of wind power turbines worldwide in 1995-2012



**Source: Own processing of the information available at http://www.thewindpower.net/ statistics_world_en.php.*

At continental level, the first place in producing electricity from wind power is occupied by Europe, closely followed by Asia. America has the next place and at a long distance, Oceania and Africa. From the

technological point of view, the biggest engineering results in elements necessary for these processes were obtained from India.[5]

3. Wind energy between economic considerations and sustainable development

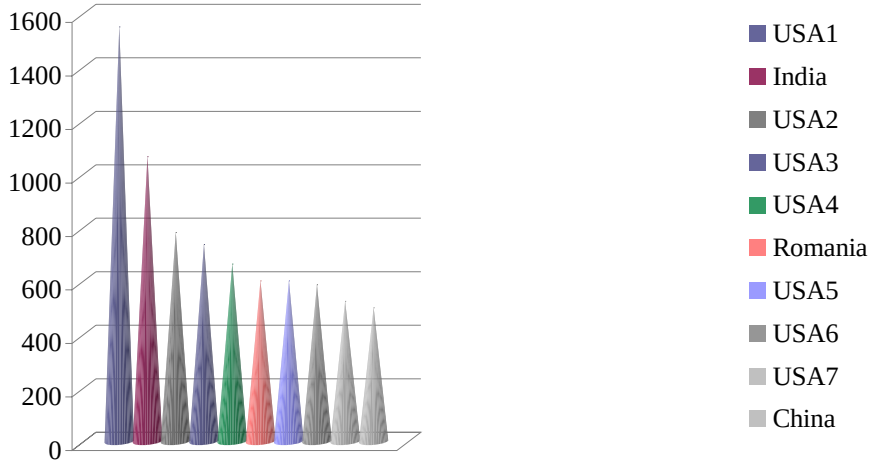
The starting point of using wind turbines for electricity production was the need of mankind to pay attention to becoming more considerate regarding sustainable development in the context of the sharp rise in the number of people in the world and the consequently growth of consumption and needs. These considerations, which were affecting the entire population of the globe, have required increased attention to all aspects that the initialization and development of this energy industry branch assumed and still assumes until reaching a maximum point of development.

Deeply involved in the process, the economic terms have been a priority for private companies that have decided to invest in this sector, but also for the states that subsidize a part of this process and especially for individual users that participate in the development of renewable energy through the green certificates.

At investitional level, the boom known in the development of wind farms demonstrate their profitability. At European level, one of the biggest investors in wind energy is the group British Petroleum. Looking strictly at the business part, British Petroleum has invested in wind energy since the beginning of the mass implementation of turbines. Wind energy's extensive development, in states where wind energy really matters in the energetic system, led to the price of MW to fall a lot.

Altogether with this reason, uncertainties in government subsidies, the discovery of new oil and gas fields and their increased profitability, prompted some investors to readjust. Consequently, British Petroleum has decided to give up all the stakes it holds in wind parks completed or almost completed in the U.S.A.. Along with multilateral developed companies, there are companies specialized in the development of wind farms and electricity production, companies constantly worrying about investing in areas of the world in which this business knows a high profitability.[6]

Figure 3. Top 10 wind farms onshore worldwide (2011)



**Source: Own processing of the information available at http://www.energydigital.com/ top ten/top-10-business/the-top-ten-largest-wind-farms-in-the-world*

The wind farms are located in areas with maximum and relatively constant wind power. This is why, although China is the main producer in the world, U.S.A. has the largest wind farms, China having several smaller parks. The same issue can be observed for the EU member states – they have large wind farms, but there are many smaller regions of location. It is also noted a sharp increase in households resorting to energy independence, less by installing wind turbines, but through solar panels.[7]

At the individual consumer level, amoung with increased quality of life through the introduction of environmentally friendly technologies, wind energy brings additional electricity costs. These costs are due to the introduction of green certificates, through which it is provided additional income for investors operating in an environment so risky, but absolutely necessary. It is estimated that half of the revenue from a wind farm is represented by subsidies provided by the state and the green certificates, and half by the price of electricity supplied.

The state finds it more and more difficult to provide these subsidies, especially in developing countries, such as Romania. Although wind energy potential in Romania could support a lot of investments for the near future, the recent anouncement of reducing with 50% the number of green certificates for producers of renewable energy is expected to bring a decrease in this sector.

4. Conclusions

The need to develop renewable energy is already a way too debated topic in the literature of

specialty. However, the economic funds involved in this process are highly complex and often difficult to quantify. Strategic branch of the national economies of each state, the energy industry suffers permanent changes in „greening" its existence. Since 1980, when there was installed the world's first wind farm in New Hampshire, U.S.A., wind turbines have seen a sharp increase in use, being until now a great opportunity for investors.

Investments in wind power technology were based not only on commissioning as many turbines, but also to optimize them so that the resulting product - electricity - to be in high quantity. To the wind turbines located on land were added offshore turbines.

States that have a real history behind in this field, have managed to get through sustained efforts the cost per MW of wind power similar to a MW of nuclear power. This has led some investors to readjust their investment in branches with greater profitability rate. However, for states where wind energy is emerging, the cost per MW is double compared to the one produced by nuclear fuel and 50% higher than the one produced by fossil fuel. This is why government subsidies are essential, especially if the European states have to achieve targets set by the European Union.

5. References

[1] http://www1.eere.energy.gov
[2] http://www.thewindpower.net/statistics
[3]http://www.forbes.com/sites/kensilverstein/2012/11/28/a-nuke-free-germany-may-be-forced-into-dirty-embrace-with-coal/
[4] http://www.gwec.net/wp-content/uploads
[5] http://ww2.windpowerindia.in
[6] http://www.bp.com
[7] http://www.energydigital.com