

DEVELOPMENT OF WIND POWER IN EUROPE

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ABSTRACT: *We need to develop more environmentally friendly alternative energy sources, renewable energy resources. The sun, the wind, and the Earth's natural heat are renewable resources that can be used to provide energy without negative environmental impacts. These alternate forms of energy are in constant supply and will not run out. They are renewable energy resources. In this paper we talk about wind energy who is renewable resources that can be used to provide energy to buildings without negative environmental impacts and it is important that we begin to develop renewable energy, alternative energy sources for the future. In the paper will see that the wind energy has been develop more in the latest years in Europe.*

KEY WORDS: *environment, wind, energy, develop, capacity.*

INTRODUCTION

The European Union has set a unique path for the development of renewable energies by 2020, but each country has different potential, depending on geographical location, landscape, climate influences and local policies. The wind potential in Romania is considered to be the largest in South-East Europe with the Dobrogea region being the second largest wind potential on the continent. There is a wide interest in reducing

energy consumption. However, we are undoubtedly witnessing demographic growth (more people have access to energy) and economic development, which leads to an increase in energy demand. In 2008, about 81% of the electricity generated on Earth was produced from combustion of fuels, as follows: oil(33,5%), coal (26,8%) and natural gas (20,9%). Combustion of these fuels contributes significantly to greenhouse gas emissions, the main

contributor to the current global warming. In addition to the negative environmental impact of excessive use, fossil fuel energy can jeopardize the future of global energy security as a result of the significant decline in resources remaining on Earth. Combustion of fossil fuels for energy needs contributes to increasing greenhouse gas concentrations in the atmosphere, thereby enhancing the security of the energy supply chain and reducing greenhouse gas emissions that require serious measures now more than ever. This is the main reason why both local and global measures must be taken. Primary energy production from renewable sources is on a long term growth trend. Between 1990 and 2014 it

rose by 174% (an average annual growth rate of 4,3%).

However, in 2011, primary production of renewable energy sources decreased by 2,2%; this was mainly due to the yearly variation of hydroelectric production and the decrease in the burning of solid biomass. This was only the second decrease since 1990 - first, in 2002 (1,6%), was also a consequence of the hydroelectric energy variation. The Renewable Energy Directive[3] states that for accounting purposes hydro power and wind energy production is normalized according to annual variations. Primary energy production from renewable sources is shown in figure 1.

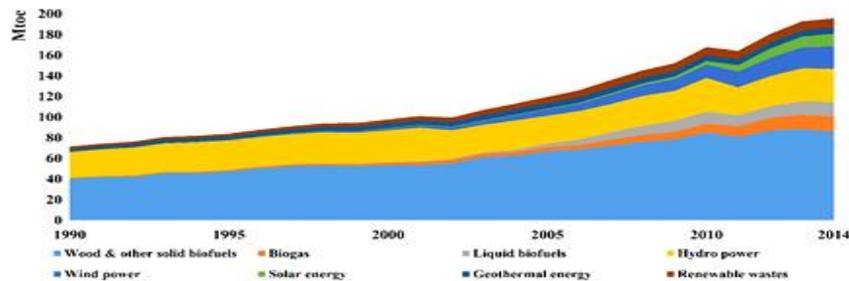


Figure 1 Primary production of renewable energy sources

2.WIND POWER INSTALLED IN EUROPE

Europe installed 16.8 GW (15.6 GW in the EU) of gross additional wind power capacity in 2017, marking a record year on annual installations.

With a total net installed capacity of 168,7 GW, wind energy remains the second largest form of power generation capacity in Europe, closely approaching gas installation. Europe installed 15,638 MW of new wind power capacity during 2017, an increase of 25% compared to 2016 annual installations[4]. 12,484 MW were onshore, and 3,154 MW were offshore. 2017 was a record year for both onshore and offshore installations. Onshore

installations grew 14.3% while offshore grew 101% compared to 2016. Wind power installed was more than any other form of powergeneration in Europe in 2017. Wind power accounted 55% of total power capacity installations. Renewable energy accounted 85% of all new EU power installations in 2017: 23.9 GW of a total 28.3 GW of new power capacity. With 336 TWh generated in 2017, wind power covered an average 11,6% of the EU's electricity demand. This will finance the development of 11,5 GW of new wind farms. This was 19% less than the total investment in 2016[4].

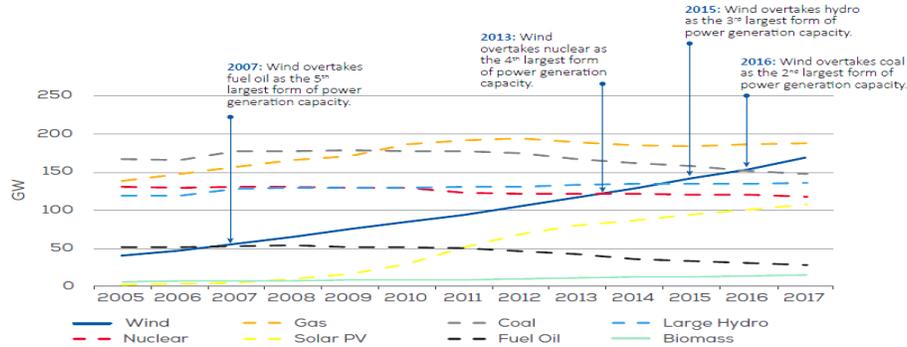


Figure 2. Wind power in Europe 2005-2017

Wind energy investments accounted for 52% of the new clean energy finance in 2017, compared to 86% in 2016. There are now 168,7 GW of installed wind power capacity in the EU: 153 GW onshore and 15,8 GW offshore. Wind energy now accounts for 18% of EU's total installed power generation capacity. Total net EU-installed power generation capacity increased by 18,8 GW in 2017 to 937 GW conventional power sources as fuel oil and coal continue to decommission more capacity than they install. The amount of decommissioned gas-fired generation capacity was almost equal to the amount of newly commissioned gas-fired generation capacity. The annual onshore installations increased by 14%, while offshore installations doubled. Overall, the volume of new installations was 25% up on the 2016. Germany installed the most

wind power capacity in 2017, with 6,581 MW of new capacity (a 15% increase on 2016 and a record year); 19% of the installed capacity in Germany was offshore. UK came second with 4,270 MW installations, five times more than installations in 2016. And France came third with 1,694 MW (9% growth on the previous year), Finland (535 MW), Belgium (467 MW) and Ireland (426 MW) followed, with additions all above 400 MW and reaching record levels of installation. Top six countries in 2017 all reached their highest annual installation. For total, 17 countries saw some new installations last year, down from 2016 with 20 countries. Were no new installations in the Baltic countries. The Czech Republic had new installations (26 MW) after two years of inactivity.

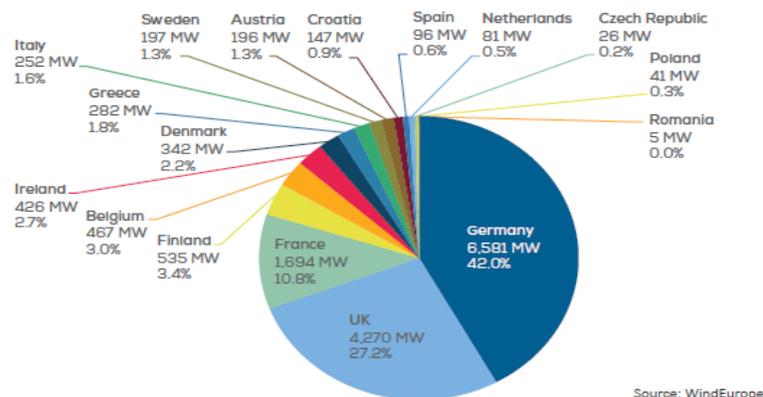


Figure 3 EU country shares of new wind energy capacity installed during 2017[1]

In the year 2017 renewables [5] accounted for a total of 23,9 GW of new capacity, 85% of all new installed capacity in the EU. Renewables contributed over 55% of all additional power capacity in the EU.

3. Onshore And Offshore Installations

Annual wind power installations in the EU have increased over the past 12 years from

6.6 GW in 2005 to 15.6 GW in 2017, breaking all previous records. The offshore wind represented 20% of the annual EU installations, with 3,154 MW of new capacity connected to the grid in 2017. Was double than 2016 and a slight increase compared to 2015, which was an exceptional year due to the resolving of grid connection delays in Germany.

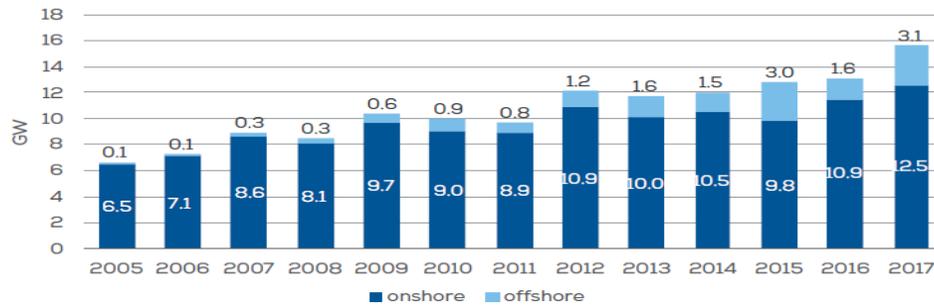


Figure 4 Annual onshore and offshore wind installations in the EU

42% of new wind energy capacity was installed in Germany, slightly lower than in 2016 with 44%. UK and Ireland significantly increased their share in new capacity, from 8% in 2016 to 30% last year, and France remained the third largest region with 14% of the new installed capacity, down from 20% in 2016. In the Iberian Peninsula, Italy and Greece remained very modest, with only 6% of the EU total. The wind power installations in countries that joined the EU after 2005 represented just 1%, down from 10% in 2016.

UK experienced the largest growth of installations with 4270 MW as the support framework. In Germany and UK, offshore installations represented a large share of all grid connected projects thanks to very large wind farms coming into operation. In French onshore market, supported by a favourable regulatory regime, continued to grow, reaching their best ever result with 1692 MW[6], continued to build and connect wind farms at a strong pace, breaking their own national

records, Finland saw its first commercial offshore installation and Denmark had strong onshore installations (342 MW) while no new offshore installations have been registered since 2013. Greece, onshore installations have been growing. Italy (255 MW) is far from the rate of installations registered between 2008 and 2012, Croatia (147 MW) broke a record, doubling its installations from the previous year and Poland (41 MW) had the largest decrease compared to the last two years (above 1200 MW). Sweden and Austria have continued to decrease since 2014, when they experienced their highest values. Ireland with a newly installed wind capacity of 426 MW and an average power consumption of 3GW, is the country with the highest level of new installed wind capacity relative to its total power consumption and Germany (12%) and the UK (12%) follow closely. First remains Germany the EU country with the largest installed capacity, followed by Spain, the UK, France and Italy. Other EU countries (Sweden, Poland, Portugal and

Denmark) have more than 5 GW installed and other seven additional EU countries have over 1 GW of installed capacity: Austria, Belgium, Finland, Greece, Ireland, the Netherlands and Romania[6].

4.WIND TURBINE SIZE

Size and type of wind turbines installed in the EU in 2017 varied significantly between countries. Onshore wind turbines in Denmark and Finland had an average power rating of 3,4 MW, Spain had an average rating of less than 2 MW. Average onshore turbine size was 2,7 MW. Offshore wind turbines in the UK and Germany had an average power rating. All the turbines installed in Belgium belong to a project that started in 2009 and thus uses older turbine models, in France, the relatively low rating is due to the type of project (demo floating wind turbine). Differences observed in onshore wind turbine ratings in the different countries are due to main factors: regulatory restrictions on tip height; duration of projects and wind speeds[1].

Offshore wind turbines, the main difference observed in sizes per country is due to: the year of consent for specific projects; whether they are floating.

CONCLUSION

Year 2017 was a record year for new capacity financed. For total, 11,5 GW worth of projects[2] reached Final Investment Decision(FID) : 2,5 GW in offshore and 9 GW in onshore wind. In monetary terms investments were down by 19% to €22,3bn. This is due to lower offshore wind investments and cost reductions in the industry, while offshore wind energy investments dropped by 60%, down to €7,5bn, onshore investments hit a record level of €14,8bn. The cost reductions across the industry's value chain and increased industry competition have made it possible for

investors to finance more capacity for less cash.

The wind energy investments in 2017 were less geographically concentrated than in 2016, the top three investor countries owned only 64% of FID announcements in 2017, this compares to 73% in 2016. In 2017 Germany was the biggest investor, they generated a activity for the construction of new onshore and offshore wind farms and this accounts for 30% of the total wind energy investments made in 2017. UK came second to Germany, or 22% of the total wind energy investments. Wind energy investments accounted for 52% of the new onshore wind projects alone generated 35% of the total clean energy finance in 2017, compared to 86% in 2016, what's means that the investment activity in the renewable energy sector is grow.

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