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## **The influence of green energy production on FDI on the example of Poland**

### **Abstract**

The aim of the article is to discuss the role of green energy production in attracting FDI. The main assumption of the analysis is the positive role of FDI on a host country's economy. That is why shaping investment attractiveness is a key issue that governments have to address and providing sufficient energy supply is of paramount importance. In order to achieve the article's objective the importance of energy supply in terms of FDI has been presented, energetic situation of Poland was described and special emphasis was put on green energy production in Poland. The final part of the article is the analysis how green energy production in Poland influences its attractiveness and what ought to be done to improve the situation. The main conclusion from the analysis is that it is necessary to develop green energy projects not only to create environmentally-friendly image but also to address the shortages of energy supply that are more and more likely to occur which may force foreign investors to withdraw their capital from the country.

**Keywords:** FDI, green energy.

### **Introduction**

The aim of the article is to discuss the role of green energy production in attracting FDI to the country. The main assumption of the analysis is the positive role of FDI on a host country's economy. That is why shaping investment attractiveness is a key issue that governments have to address and providing sufficient energy supply is of paramount importance. A good subject for such an analysis is Poland as the country has already attracted a significant number of FDI projects and its economic growth is impressive but its power supply system seems not to catch up with the increasing demand for electricity. It is worth considering how energetic situation of Poland affects the investment climate of this country and what could be done to improve the situation, especially in terms of green energy projects.

### **Supply of energy as a determinant of FDI**

Since 1990s there has been a significant growth in FDI net inflows in the world (World Bank). Growing international expansion of companies is one of key dimensions of globalization. This process brings about changes in local communities of different nature, not always positive. Nevertheless, the inflow of FDI usually means benefits for a host country economy and society (Maček, Bobek, Vukasović, 2015, pp. 49–74). If the investors do business in accordance with sustainable growth principles, the negative

impact on the environment can be significantly reduced. That is why governments try to create positive investment climate in order to attract FDI. There are many areas of investment climate and a simple tool that summarizes them is PESTLE framework that is a mix of political, economic, social, technological, legal and environmental factors. One of the key technological factors that plays an important role in FDI absorption is the sufficient and stable supply of energy not only at present, but also for the future. As the supply-demand tension has taken its toll in various countries around the world over the last several years (Audinet, Pardina, 2010, p. 2), that issue is becoming especially vital for those investors whose ventures are of industrial character and consume a great amount of energy.

In terms of energy supply, there are three factors that play the most important role:

- availability,
- price,
- stability.

An investor must be sure that the output of power plants cover the demand for electricity and any blackout of supply reduction is unlikely. Investors also examine the price of energy as in some industries that is an important component of overall production costs. Analyses before investment also concern the prospects for the future — for example trends in energy consumption and production to estimate if the supply will catch up with the demand. Taking into account the fact that FDI project are usually long-term, such analyses are really necessary. The case of Pakistan (Zulfiqar, 2014) shows that if a country is unable to provide a stable energy supply, foreign investors not only lose interest in the country but also begin to withdraw their investment. However, there seems to be one more determinant of FDI in terms of energy supply. The increasing role of corporate social responsibility (CSR) forces corporations to examine their suppliers of raw materials and labour. The way in which energy is generated might also be an important issue here. In the world focused on sustainable development, socially responsible investors will look for energy created not from fossil fuels but in more environmentally-friendly ways. The emphasis of green energy use is important not only because it shows devotion to high moral values but also gives the opportunity to build up the image of an environmentally-friendly company and target environmentally-sensitive target groups.

### **Energetic situation of Poland**

Poland has been for decades self-sufficient in terms of electricity production. As the country is connected with its neighbours with power lines, the surplus of electricity was exported. However, rapid economic development of the country created higher demand for energy and since 2016 the output of Polish electric plants is unable to cover it. It is necessary to import energy from neighbouring countries and the amount of energy acquired that way is increasing. Production and use of electricity in Poland is shown in Chart 1.

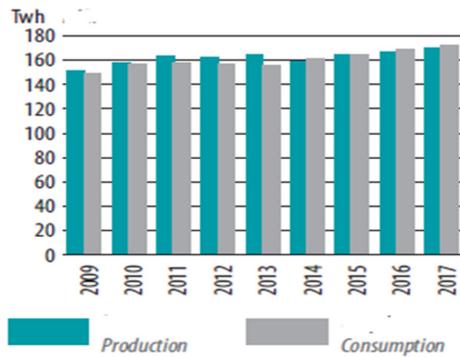


Chart 1. Production and use of electricity in Poland 2010–2017

Source: GUS, 2018.

In summer 2015, due to high temperatures and low level of the rivers, restrictions in supply of electricity for industry were introduced in order to prevent a blackout. Unfavourable climate changes make such situation more and more likely to occur in the future and that is a real threat to the Polish power system.

The main source of electricity in Poland are coal power plants which generated 77.3% of electricity in 2017. Natural gas power plants generated 3.6% and biomass/biogas plants 1.5% of general output. Hydroelectric power plants produced 1.6% and wind power generators produced 2% of the general output. Industrial power plants generated 6.7% and independent renewable energy sources were responsible for 7.3% general output (Agencja Rynku Energii, 2018). The share of renewable energy in electricity production is low in comparison with other EU countries (Chart 2).

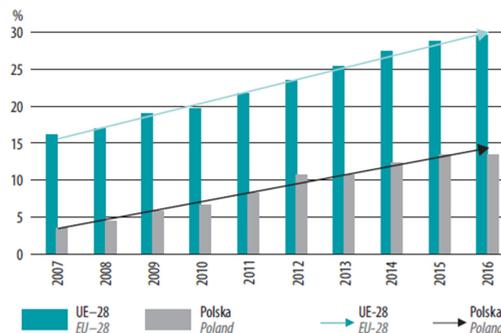


Chart 2. Share of renewable energy in electricity in the years 2007–2016

Source: GUS, 2018.

As the prices of electricity on international market have recently been relatively low, several projects of new plants or upgrades of the existing ones have been delayed as the cost of energy from such investments would be higher than the market price of energy. A good example is the first Polish nuclear plant, but several minor projects, such as Elektrownia Północ near Pelplin, Elektrownia Blachownia power plant or

a new power block in Elektrownia Konin or Elektrownia Łagisza (CIRE, 2018) that have been postponed or halted also illustrate this trend. However, some projects that started a few years ago (for example Elektrownia Opole blocks 5 and 6, 2 x 900Mw) have recently been completed or their construction is progressing and that is the reason why the total output of Polish power plants is slowly increasing.

Another issue in the Polish power system is the fact that the transmission network is not in good condition and generates high losses of transferred electricity (Energetyka24.com, 2017). The lack of sufficient network even puts into question the construction of some power plants. The authorities and energy industry attempt to address this issue but the development of new power lines often encounters resistance from local communities that delay or halt the projects.

The price of electricity in Poland is rather stable, both for the industry and households. Nevertheless, this price is one of the highest in the European Union. There is no doubt that the main determinant of this price is the market price of coal which is the main fuel for Polish power plants. Prices of electricity for households and industry are Chart 3.

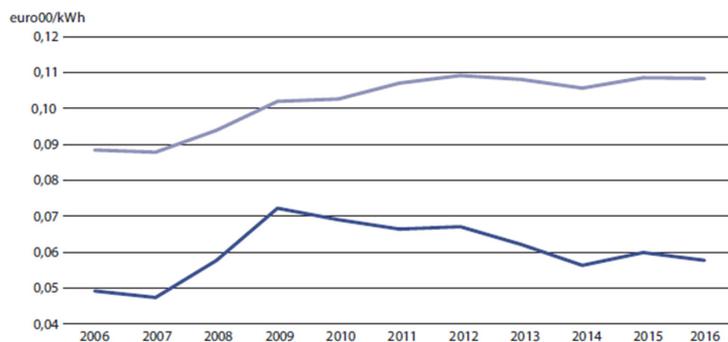


Chart 3. Prices of electricity for households (light blue, top) and industry (navy blue, bottom)

Source: GUS, 2018.

### Green electricity production in Poland

Green energy is defined as energy produced from renewable sources, such as solar, wind, hydro, geothermal, tidal wave and so on that has minimal or reduced adverse impact on the environment (Xianguo Li, 2011, pp. 1–8). The volumes of electricity produced from renewable sources in Poland is illustrated on the Chart 4.

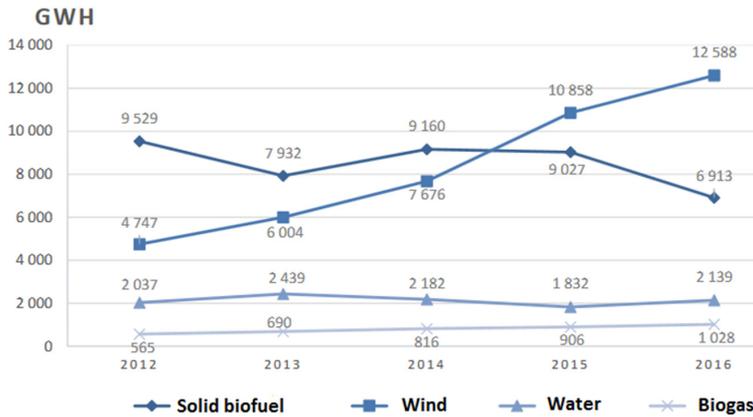


Chart 4. Production of electricity from renewable sources in Poland 2012–2016

Source: Energia ze źródeł odnawialnych w 2016 r., GUS, 2017.

The volumes of electricity produced by wind turbines and hydroelectric power plants depend to a large degree on the weather conditions. Dry years reduce the output of hydroelectric power plants whereas windy years allow wind power generators to produce more energy than average. That is why in order to analyze the potential of green electricity generation, the analysis of installed power is a better solution. Installed power of power plants using renewable resources shown in Table 1.

Table 1. Installed power of power plants using renewable resources in Poland in March 2018

Type of installation	Installed power (MW)						
	2012	2013	2014	2015	2016	2017	2018 (March)
Biogás	131.247	162.241	188.549	212.497	233.967	235.373	239.89
Biomass	820.700	986.873	1008.245	1122.67	1281.065	1362.03	1363.670
Solar	1.290	1.901	21.004	71.031	99.098	103.896	110.563
Wind	2496.748	3389.541	3833.832	4582.036	5807.416	5848.671	5856.818
Hydro	966.103	970.128	977.007	981.799	993.995	988.377	1136.828
Total	4416.088	5510.684	6028.637	6970.033	8415.541	8538.347	8707.769

Source: Moc Zainstalowana (MW), URE, 2018.

Figures from table 1 clearly indicate that since 2012 there has been a rapid increase in installed green power which has almost doubled since then. However, that significant increase was mainly due to investments in wind generators. It is noticeable that since 2016 the development of these installations stopped. That is the effect of the new law from 2016 which imposed the minimum distance from the generator to housing areas that in reality was 1.5–2 km. In fact, that led to the situation in which it is impossible to find location for new turbines and the industry is unable to develop. What is more, the new regulations restricted the construction of generators that already had

construction permits and also did not allow for upgrades of already existing turbines that would lead to the increase of their power output. Along with the new rules of selling green energy, all these changes were a huge blow for the whole industry, reducing profitability and leading to abandonment of new projects. To sum up, development of green electricity installations was deliberately slowed down and it is unlikely that it will change if the ruling party remains in power.

### Green electricity production advantages in terms of FDI inflow in Poland

Poland is a country that has been greatly affected by FDI. Such investment has enhanced the economic growth in Poland and generated a great number of jobs. The indisputable assets of Poland have always been good geographic location in the heart of Europe, membership in the European Union that gives the access to the common market and affordable, well-educated labour and a big market size. The FDI net inflows in Poland are presented in Chart 5

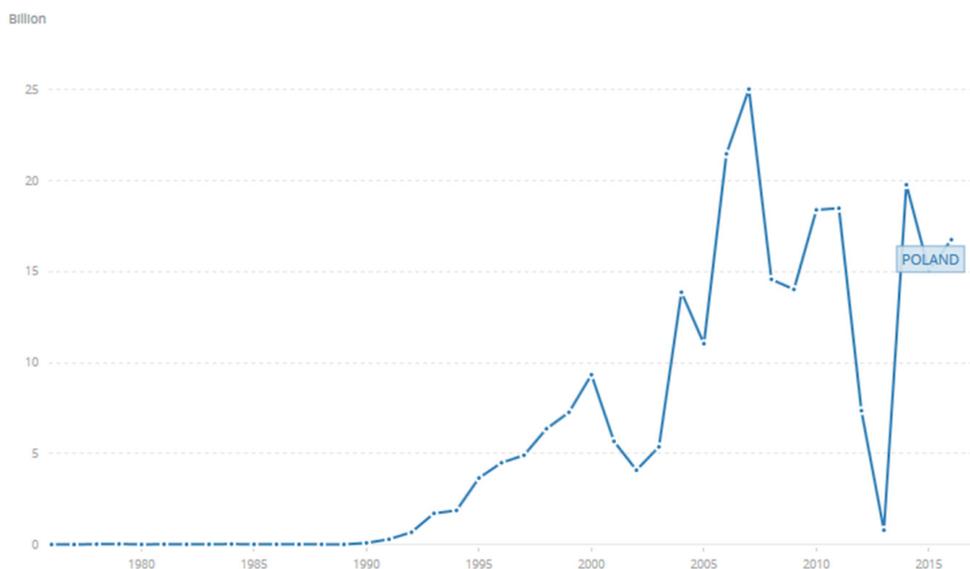


Chart 5. FDI net inflows in Poland 1975–2015 in billions USD (World Bank)

Source: World Bank.

FDI greatly contributed to the economic growth of Poland which is has been one of the highest in EU (Chart 6). What is more, even during recession in the rest of the EU countries Poland still managed to develop its economy. However, some constraints of further development are becoming noticeable. One of them is definitely a lack of labour as the unemployment rate has reached its historical minimum. The issue of power supply might be another issue of that kind.

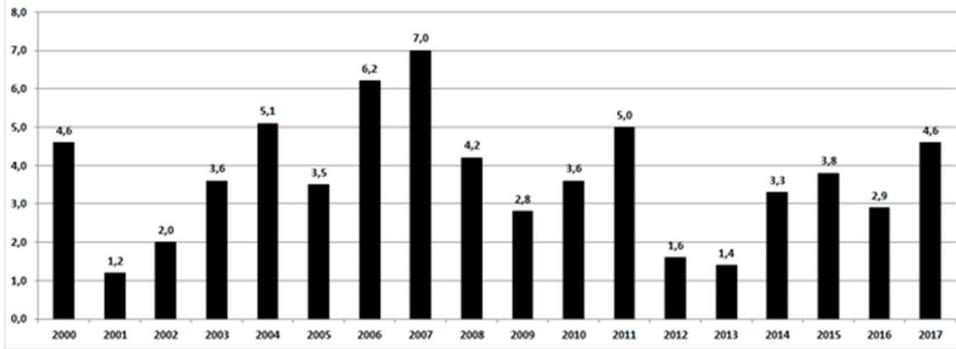


Chart 6. Poland's economic growth (%) 2000–2017

Source: Wzrost gospodarczy najszybszy od 6 lat, Bankier.pl, 2018.

The high rate of economic growth and undertaking numerous industrial projects have led to a situation in which the output of Polish power plants is insufficient to cover the demand for electricity. This negative trend is unlikely to change as the development of new power plants has been slowed down and the transmission network still needs upgrades. Old coal power plants regularly need repairs and maintenance work, leading to temporary reductions of general output. More and more frequent droughts lead to decrease in hydroelectric power plants. These are the threats that can discourage foreign investors from investing in Poland. It can be argued that Poland's network is an open system and electricity can easily be purchased electricity from abroad. That is feasible as long as the prices of energy are low. Taking into account the condition of Poland's transmission network, the increase in electricity prices may put Poland in an unfavorable position. The legal regulations introduced in 2016 completely halted the development of wind power industry which was the most dynamically growing business in this sector, responsible for the overall high rate of growth of the whole green energy sector and now there are not optimistic prospects for the future.

It seems that the best solution to the problem is the development of green electricity production. First of all, these diversified sources of energy allow for higher stability of the output. Secondly, the investment in this kind of business is often made from private funds. Such sources of electricity are dispersed all over the country and are better suited to the shape of Poland's transmission network. Production of energy from renewable resources may patch the hole in the insufficient output of Polish power plants. Green energy installations need much less time to be constructed than huge power plants and the specter of blackout can be addressed in a shorter time. What is more, membership in the EU requires from Poland to comply with its policies on emissions and structure of energy production. The development of green energy projects will allow to fulfill the required levels of renewable resources use. Finally, many companies that pursue CSR policies and try to target environmentally-sensitive groups of customers will not be willing to invest in such a country like Poland knowing that the majority of energy produced there comes from "dirty" sources. On the other hand, if Poland green energy production was high, that fact could be used to attract investors.

## Conclusion

The development of green energy installations is of high importance in terms of FDI inflow into Poland as it is able to quickly address the insufficient output of Polish power plants and diminish the probability of a blackout. What is more, high volume of green energy production can be used as an incentive for environmentally-sensitive businesses to develop their project in full accordance with sustainable growth principles.

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