Stępień, Paweł

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LIBERALISATION OF THE POLISH ENERGY MARKET AND THE EU COMMITMENTS

Paweł Stępień
Faculty of Economics and Management
University of Szczecin

Ireneusz Miciuła
Faculty of Economics and Management
University of Szczecin

Abstract

The power industry in Poland is undergoing reorganisation in line with Poland's obligations as a member state of the European Union. Limiting CO2 emissions, Poland is on its way to liberalising its power industry. The article presents problems of EU countries including Poland encountered during their transition to environmentally friendly energy sources. The purpose of this article is to present the process of energy reorganisation in EU countries and the opportunities they have in using existing technologies in a sustainable way. It also shows the effectiveness of the described processes and arguments in favour of stable and measured changes in the Polish power industry.

Keywords: sustainable development, liberalisation of the energy market, renewable energy

JEL Classification: Q01, Q20, Q40

Introduction

The European Union's (EU) climate policy and environmental regulations are clear: there is little hope for further development of coal-based energy production in Poland. This is the result of Poland's obligations assumed in 2007 as part of the 3 x 20% package i.e. reduction of CO2 emissions by 20%, reduction of energy consumption by 20% and reaching 20% share of renewable energy sources in the energy balance. The problem of the Polish power industry is its dependence on coal, which results in high CO2 emissions. Therefore, in order to reach the status of a low-carbon economy, Poland, whose energy is mostly generated with the use of coal, must find ways to limit CO2 emissions in order to meet its EU commitments. Poland obtained permission from Brussels to lower the share of renewable energy sources in its energy balance from 20% (as stated in the directive) to 15%, due to the current supply of energy generated using coal. According to data from Polskie Sieci Energetyczne (2013), power plants with a total output of about 4500 MW will have been decommissioned in Poland due to age and emission standards by the year 2015. By the year 2028, power plants with a total output of about 8000 MW will have been decommissioned. As a result, at a certain point in time, the energy balance will be destabilised. Also, in the following years, an increased pressure related to environmental constraints may be encountered. This will result in the most advanced technologies becoming the required standard solutions. As much as 85% of energy in Poland is generated using coal. Additionally, 60% of coal-burning plants are over 30 years old. Furthermore, the European Union's climate policy the reliance on coal will have to be

decreased. Therefore, Poland needs a long-term strategy for developing a sustainable fuel mix for its power industry. In order to produce 15% of its power from renewable energy sources by the year 2020, Poland should choose other fuels but also, owing to limited access to natural energy sources, consider producing energy using gas and nuclear plants. The purpose of the following paper is to present arguments in favour of diversification of energy sources and making changes to their structure in a gradual way, in accordance with the situation in the country and its capabilities. This will allow for following the principles of sustainable development, which are based on conscious and controllable relations between economic growth, environment protection and quality of life.

Liberalisation of the energy market in Poland

Liberalisation of the energy market in Europe is an important matter. The idea of liberalising the energy market has been gradually implemented since the 1990s. Initially it was introduced in several American states, then in other English-speaking countries and in Great Britain, where the Margaret Thatcher government introduced the Electricity Act of 1989 regulating the privatisation of power industry companies and separated the production of electricity from its transport and distribution. This became possible with the disbanding of the monopolist Central Electricity Generating Board. Since 2004, liberalisation of the energy market in the European Union has continued as part of a single European energy market. It allows for the selection of other energy and natural gas suppliers, who offer the best supply conditions. In the initial period of liberalisation, prices decreased and then increased as a result of growing oil prices (Balitskiy et al., 2015). As a result of liberalisation, the social paradigm of energy has changed. Beforehand, energy in Europe was treated as a public or semi-public good, available to everyone, everywhere and at a reasonable price. From the socio-economic and physical perspective, access to energy was treated as a social good (Filatov and Makolskaya, 2015). Therefore, from the demand perspective, it was impossible to include the technical standpoint of energy efficiency in the concepts which assumed upper limits of consumption (Ehrenberger et al., 2015). Ever since the market concept has been introduced in the EU countries, energy became a product like every other. The old dogma of "public good" was then replaced with a new one - "minimum intervention in the market". The process of combining the common European energy market into one liberal electricity and natural gas market encounters numerous difficulties. The causes lie in the culture related to approaching matters of energy, which differs among EU countries. One of the features of this culture is the degree of liberalisation understood as the level of freedom in the electricity and natural gas markets – media supplied using networks and creating natural monopolies. The main features of liberalisation are:

- administrative decision separating the trade in energy from its transport;
- rules allowing third-party access to electricity and gas transmission and distribution networks.

These features allow for:

1. liquidating monopolies in the energy and gas supply industry resulting in competition being created in a natural way;
2. introducing energy trade in a form of energy exchange with various hedging transactions;
3. creating varied products and services in place of "only" electricity or gas;
4. lowering the costs of energy supply and improving customer service;
5. allowing customers to choose their supplier and the type of product or service.

These changes affected the improvement of broadly understood energy security. At the beginning of their transformation in 1989, the countries of Central and Eastern Europe also

made changes to their power industries following the British pattern. Before the liberalisation of the electricity market there was no division of the supply chain into goods and services. At that time the industry was vertically integrated. One supplier handled all activities related to the product from creating energy to distributing it to end customers. Creating the energy market is based on three main principles:

1.demonopolisation (separation of production, transmission and commercial activities);
2.liberalisation (applying the TPA principle i.e. free access of third parties to power networks);
3.privatisation (initially the transformation of state-owned companies into sole-shareholder companies of the State Treasury and finally the sale of shares to national and foreign investors).

Currently, as part of liberalisation of the energy market, energy prices for companies have been deregulated and energy producers have been separated from energy suppliers. The legal basis for introducing liberal changes in EU countries are EU directives and national legislation related to energy. The process of liberalisation of the Polish energy market picked up pace with Poland joining the European Union in 2004 and implementing the directives on the common principles regarding the internal electricity and natural gas market:

1. Directive 2003/54/EC of 2003 concerning common rules for the internal market in electricity. This directive establishes common rules for production, transmission, distribution and deliveries of electricity and also rules concerning the organisation and functioning of the power industry, including access to the market, criteria and procedures applicable to calls for proposals and permit issuing.
2. Directive 2009/72/EC of 2009 which applies to implementing intelligent metering systems and securing the introductions of intelligent measurement systems, which will allow consumers to actively participate in the electricity supply market. Implementation of intelligent measurement systems may depend on the economic evaluation of all long-term costs and benefits for the market and for the individual consumer or on the assessment indicating the most economically viable and beneficial form of intelligent metering, and specifying the time over which their distribution is possible.

In May 2013, the Ministry of Economy completed an analysis of social and economic impact of introducing intelligent metering and stated that the introduction of an intelligent metering system in Poland is justifiable. However, it must be remembered that specific rules and regulations applicable to liberalisation of the power industry are provided by national legislation of EU Member States. In Poland, this is regulated by the Act of 10 April 1997 on Energy Law (Journal of Laws 1997 No. 54 item 348). On 16 August 2013, the President of the Republic of Poland signed the Act Amending the Energy Law and the Act on Renewable Energy Sources. The purpose of these Acts is to fully implement Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the promotion of the use of energy from renewable sources, which also regulates the rules for the common internal electricity and natural gas markets. These regulations are important for shaping the energy policy and providing energy security of the country. The amendment to national regulations regulates the legal status of microgeneration plants and small generation plants. It introduces deregulation in the economic law by releasing persons from the obligation to operate a business when selling excess electricity produced in microgeneration plants. Additionally, it was permitted to create small photovoltaic plants (microgeneration plants up to 40 kW) without the need to obtain construction permits for installation works. Also, it advises using equipment powered by energy created from renewable energy sources in all buildings operated by public finance institutions.

Poland's commitments to the EU: CO2 emissions and use of renewable energy sources

Poland's commitments to the EU listed in the Industrial Emissions Directive (IED) of 8 November 2010 are related to the need to limit carbon dioxide emissions (Directive 2010/75/EU of the European Parliament and the Council). The purpose of this Directive is to limit the number of permits for additional CO2 emissions and make the regulations stricter. In Poland, whose economy is based on coal, these changes will have a considerable impact as the energy source structure will be changed. Although environmentally friendly energy sources should be used for the benefit of the sustainable development concept, alternative solutions are required in locations where their application is limited. Additionally, too rapid and forced changes may have a negative impact on economic and social growth. On the other hand, the development of technology allows coal burning plants to meet very rigorous requirements regarding permissible emission levels. No coal-burning plant will be able to function without effective desulphurisation, denitrification (SCR) and particulate filtering systems. Therefore, investments will be required (www.pipc.org.pl, 2014).
However, investing in renewable energy sources requires greater expenditures and it may not be economically viable without EU financial support. Therefore, the directive contains regulations allowing for extending the operation of energy and heat sources based on the previous principles, provided that their output does not exceed 200 MW. Also, integrated permits obtained before 27 November 2002 allow for supplying over 50% of heat generated by these plants to heating networks. The above solution allows for more neutral adaptation to the new requirements, depending on the methods and tools used in their implementation. Renewable energy sources are becoming increasingly important in the power industry around the world. In recent decades, the development of renewable energy sources became one of the major goals of EU countries' energy policy. Directive 2009/28/EC of the European Parliament and the Council specified the national goals related to total share of energy from renewable sources in the total consumption of energy. The demand for raw fuels in the EU countries is vast, which is further confirmed by the fact that these countries consume 21% of energy produced around the world and must import a large portion of it (Kowalski, 2014: 86). Sustainable development of the power industry based on diversification of raw fuel sources, including the use of renewable energy sources, brings many positive aspects and environmental, economic and social benefits (Table 1).

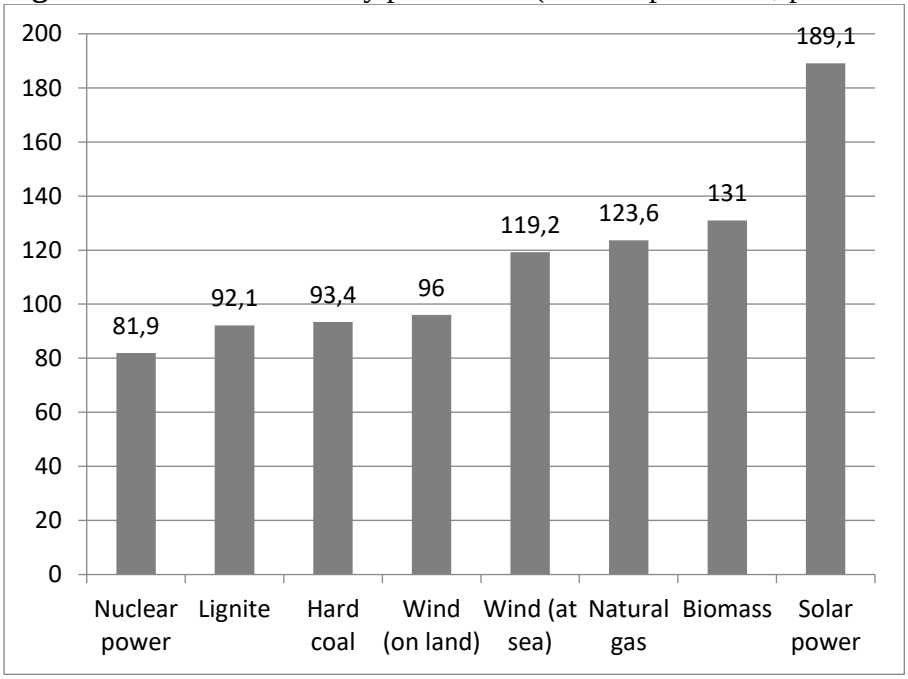
Table 1: Benefits of using renewable energy sources.

Item	Environmental benefits	Social and economic benefits
1.	Reduction of CO2 emissions responsible for the greenhouse effect.	Preserving non-renewable fossil fuel resources, use of renewable energy sources potential.
2.	Reduced emissions of pollutants including SO2, NOx, organic substances, heavy metals etc. to the environment.	Implementation of international commitments in the scope of reducing the emissions of harmful substances to the atmosphere, participation in financial effects (avoiding penalties, trade in emission allowances or renewables e.g. biomass).
3.	Limiting degradation of the environment caused by exploitation of fossil fuels and depositing biomass waste in the environment.	Stimulation of growth in numerous branches of the economy including advanced technology industries. Supporting local labour markets.
4.	Limiting degradation of the environment resulting from unorganised bio-decomposition of the deposited biomass.	Improving the quality of life, increased energy security of the country.

Source: Own results

What needs to be emphasised is the economic viability of changes related to raw fuels, which influence processes affecting entire economies and the possible pace of such changes resulting from environmental, socio-economic and technological constraints. Additionally, the climatic policy forces the energy derived from coal to be replaced with more environmentally friendly energy. This strategy is not beneficial for countries where coal is currently the primary energy source, e.g. Poland. This is clearly visible when discussing rapidly approaching changes, those to be made before 2030, especially when there is no reasonable justification for them, not even financial viability, and when the substitutes offered are not profitable without national or EU subventions or financing (Fig. 1).

Figure 1: Costs of electricity production (in EUR per MWh, prices from 2012).



Source: ARE (2013).

Additionally, it causes various negative changes and disturbances in the energy markets which affect prices in the entire economy. An example of problems resulting from not well thought-out EU strategies are prices of CO2 emission allowances. Since 2014 these prices have increased by over 40% to about EUR 7 per ton. The increased demand is related to recent decisions regarding the EU climate policy including the 40% goal for reduction of CO2 emissions by the year 2030 and also to the expected withdrawal of some of the allowances from the market (Wieczerzak – Krusińska, 2014).

The EU countries' strategy should focus on finding substitutes to raw fuels, which are imported into those countries in over 55%, or attempting to diversify the deliveries, which may affect their prices. Yet the keynote of the strategy is only the "energy mix", i.e. the division of energy production and consumption based on media or methods of production in individual economies in order to reduce the production of carbon dioxide, which may also be achieved by investing in innovative (clean) coal technologies. This is of considerable importance to economies of countries which have over 50% of coal share in their energy mix – these countries include Poland, the Czech Republic, Estonia, Bulgaria and others. Furthermore the government report "Optimum Energy Mix Model for Poland by the Year 2060" assumes that the Polish power industry will be based on coal for almost another 40 years. Therefore, the EU strategy should take into consideration the capabilities and specific conditions in different economies instead of generalising and adapting the trends to the major decision makers in the EU. Further

arguments in favour of measured and effective changes are the prognoses predicting increased demand for energy and the limitations which prevent renewable energy sources from providing 15% of the total demand for energy in the EU countries (Statistical Review of World Energy, 2013). At the same time, owing to the use of modern technologies, numerous raw fuels are becoming more and more environmentally friendly. This mostly applies to gas, as new possibilities of exploiting it from e.g. shales are becoming available.

Plans for balanced energetic development of Poland by the year 2030

In EU countries, biomass is currently one of the major sources of renewable energy used in production of heat and electricity. Because of the need to meet the goals set in the directive, it is estimated that in the upcoming decades the use of biomass in energy production will increase rapidly in European countries. Because its availability is limited, biomass requires sustainable production and use. The energy situation in Poland and some other Central European countries is similar – they do not have large deposits of raw fuels with the exception of hard coal and lignite. In case of shortage of own resources, these countries will be forced to import considerable amounts of raw fuels, especially oil and gas if the current EU strategy is continued. Biomass is one of the major sources of renewable energy and the share of biomass in renewable energy sources reached 85.4% in the year 2010. In 2010, biomass was used to produce 6305 GWh of electricity, including 5593 GWh using cogeneration technology together with coal. Because of its limited resources and burning properties, biomass should mostly be used locally in dispersed technology as its transport causes side effects in the form of additional CO2 emissions. Poland, wishing to limit its CO2 emissions and honour its commitments and at the same reap the benefits, should undoubtedly use renewable energy sources.

Table 2: Possibilities of using renewable energy sources in Poland.

Energy type	Limitations of use in Poland
Wind power	The average wind speed exceeds 4 m/s only in some regions of the country. This is the minimum start-up value for most power plants.
Solar power	Out of 8760 hours of the year, insolation is available in Poland for 1390 to 1900 hours. In most regions the average annual insolation is 1600 hours which translates into 30%–40% of a day. The total solar radiation in Poland (the aggregate of direct and scattered radiation) reaches a maximum value of 1 kW/m2 in optimum conditions (midday, no cloud cover, clear sky).
Geothermal power	In Poland it is possible to obtain 4 million tons of theoretical standard fuel from geothermal sources per year. The majority of waters have a temperature of 80°C which limits their application in heat production.
Tidal power	In Poland this type of power plants cannot be used as there are no major high and low tides.

Source: Annex to Resolution of the Council of Ministers no. 202/2009 of 10 November 2009 "Energy Strategy for Poland by the Year 2030", Ministry of Economy (2009).

However, what needs to be taken into account is a question of how realistic it is that the EU strategy will be implemented on time by individual countries, and the economic effects which may occur as a result of applying financial penalties and trading CO2 emission allowances and other processes enforced by the EU. Economic practice confirms that prognoses of participation of individual fuel types in the production of electricity in Poland for the year 2015 will not be met, which will make it difficult to meet these indications for the upcoming years. Additionally, the prognoses of electricity demand indicate that it will increase by about 50% by the year 2030 compared to the present situation. This will cause economic problems related

to limiting the participation of fossil fuels in the Polish energy mix and difficulties in producing electricity from renewable energy sources, despite the planned construction of two nuclear power plants. In order to switch to renewable energy sources it is required to establish the degree to which it is possible, taking into consideration the capabilities of individual countries or regions. Table 2 above presents conditions and possibilities of using renewable energy in Poland.

Due to limitations in fast development of renewable energy sources it is necessary to use intermediate methods, which will provide stable and sustainable development of EU countries. An additional argument in favour of such solution is the financial viability of the process at the given stage of development of individual countries. At the same time, there are numerous arguments in favour of using coal and gas. These include the innovative coal burning technologies with improved energy production efficiency and use of resource deposits that were unreachable using conventional methods. Additionally, the new technology is more environmentally friendly and allows for limiting emissions of CO2 and other pollutants. For example, the oil refinery in Gdańsk is one of the most energy efficient units of its kind in Europe. Therefore, clean coal-burning technologies should continue to be developed.

The fact that renewable energy sources currently meet about 8.5% of humanity's demand for energy clearly shows that their application in some parts of the world is limited and how unrealistic the goals set by the EU for their share in the energy mix are. Therefore, the most important issues are to provide access to modern energy services and at the same time improve energy efficiency. Only when this is done should it be required to increase the share of renewable energy sources in the energy mix. Access to energy is important not only from the point of view of consumption but also for income generation, which provides subsistence. Balanced energy should be produced and used in a way which supports human development be it social, economic or environmental.

Conclusions and implications

All EU Member States want to strive for reduction of CO2 emissions. However, there are differences in the ways they should reach this goal (www.eecpoland.eu, 2014). The EU strategy involving diversification of energy sources will improve competition and facilitate meeting the environment protection requirements. It will also allow for balancing the interests of companies in the power industry and energy consumers. Yet, we must point out the limitations and feasibility of the EU plans in individual countries and the economic effects which may occur as a result of unfavourable processes enforced by the EU e.g. financial penalties and the CO2 emissions market, which will be felt mostly by the developing countries and will result in creating natural monopolies among the developed countries. The impact of such actions on the functioning of economic entities will be immense. For this reason a special care should be taken to take actions resulting in sustainable development of all EU Member States and providing energy security in a way that is based on rational and effective use of raw fuels. This means that the share of coal and gas will continue to be greater than predicted in the prognoses assumed in the EU strategy. So, to handle the carbon dioxide emissions it is required to develop modern technologies. Additionally, the EU climate policy should take into account the specific energy mixes of individual countries instead of imposing a single energy criterion on all of them. In its plans the European Commission should consider the characteristics of individual countries and their development strategies and adapt the deadlines to each country individually. Changes in the methods used to produce energy and move towards sustainable development as specified in the EU assumptions require time. Additionally, arguments such as economic viability of production and the ability to use the product for other purposes as well as technical

development which meets the requirements of environmental protection are in favour of stable and measured changes leading to sustainable development around the world.

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Information about the authors:

Paweł Stępień (macuser(at)wneiz.pl) is an Assistant Professor at the Institute of Finance, Faculty of Economics and Management, University of Szczecin, ul. Mickiewicza 64, 71-101 Szczecin, Poland.

Ireneusz Miciuła (irekmic(at)wp.pl) is an Assistant Professor at the Institute of Finance, Faculty of Economics and Management, University of Szczecin, University of Szczecin ul. Mickiewicza 64, 71-101 Szczecin, Poland.