Energy Policy of Poland – current status, opportunities, challenges, threats

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Abstract. Energy security is currently one of the most important and widely discussed topics in the country. Over the years, Poland has not developed a coherent energy policy, and the consequences of it are currently being felt. New requirements of the European Union, ending of hard coal resources and its growing imports, weak ratio of energy from RES, no new opencast brown coal mines - this are only few problems of the contemporary energy policy of the country. The article presents the current situation of the power industry, reviewed the applicable laws - domestic and European, and also identified the greatest threats to the country's energy security.

1. Energy situation – current status
Poland is a country, in which almost 80 percent. the share of energy still comes from coal: hard coal (about 49%) and brown coal (about 30%) [3]. In 2017 and 2018, the share of hard and brown coal in electricity production remained at a similar level (78.2% and 78.4% respectively) [5,6].

One of the main problem is the shrinking hard coal resources that are enough for several hundred years and decreasing mining. In 2018, Polish mines extracted 63.4 million tons of hard coal - the least since 1947. In December 2018 occurred the smallest production since the Second World War. Coal mining has decreased from 65.5 million tonnes in 2017 to 63.4 million tonnes in 2018 [8].

A serious problem is also the increase in coal imports, which is currently record-high, and over 78% of the volume comes from Russia. Other import destinations are Colombia, USA and Kazakhstan.

On the other hand, the export of energy coal from Poland is the lowest for 15 years. As a result, foreign suppliers cover about 25% of domestic demand. For many years, coal was a sign of energy security for Poland, and now we are becoming more and more dependent on supplies of this raw material from Russia [6,7].
Table 1. The volume and the value of hard coal imported from Russia [7]

|                          | 2016 | 2017 | 2018 |
|--------------------------|------|------|------|
| The volume of hard coal  | 5,2  | 7,6  | 13,3 |
| imported from Russia by  |      |      |      |
| Poland [PLN bn]          |      |      |      |
| The value of hard coal   | 1,1  | 1,9  | 3,4  |
| imported from Russia by  |      |      |      |
| Poland [PLN bn]          |      |      |      |

The situation is also unstable when it comes to brown coal. The deposits currently in operation ensure a stable level of production in the range of 60 million Mg annually by 2020. After this period until 2030, currently working mines can guarantee a level of about 50 million Mg per year. In the following years, due to the progressing depletion of these deposits, there will be a sharp drop in output and thus a reduction in electricity production based on this fuel until the liquidation of opencast mining at the beginning of 2040. Without the construction of new complexes, in the years 2040-2045 there will be a total disappearance of generation capacity based on brown coal in Poland [4].

Figure 1. Forecast of resources sufficiency in brown coal open mining complexes [4].

In addition to hard coal and brown coal, oil and natural gas are used to produce energy in Poland.
Unfortunately, these raw materials are imported in large quantities from abroad, mainly from Russia. The domestic economy is dependent on these supplies. Oil production in the country does not satisfy even 3% of demand, while natural gas production accounts for about 30% of total demand. Shale gas deposits that are likely to be found in Northern and Eastern Poland have great potential. However, its extraction may be difficult due to its location and unprofitability. Reports from the events "Energy transformation in Poland" from 2018 and 2019 prepared by the Energy Forum, do not differ in conclusions and observations about the state of energy in the country. A constant problem is the fact that Poland still has the least diversified mix of sources of electricity generation in the European Union. However, a slight decrease in the share of coal in favor of gas and renewable sources can be observed. To a small extent, this was associated with a decrease in greenhouse gas emissions.

The problem is also the continuous increase in the demand for electricity (from 2007 to 2017 by 12%, or 18.5 TWh).

In 2014, Poland became a net importer of electricity, although in 2005 we exported 11 TWh. Of the 17 importing countries in the EU, we import in Poland the smallest percentage, only 1.2% of the demand for electricity.

Electricity imports are also growing because its prices in Poland are high compared to other countries [5,6]. Just like the increase in coal imports, the stagnation of renewable energy sources is also worrying, making it impossible to diversify the energy risk of the country.

In 2017, the share of energy from renewable sources in the final gross energy consumption was 11.0%, ie it decreased by 0.32 percentage points. in relation to 2016, [1,2, 20]

2. National and European law
One of the key documents related to the energy of the country is the Energy and Climate Package, also known as the climate package, the "3x20" or "20-20-20" package, and a set of binding laws aimed at ensuring the implementation of the European Union's objectives on combating climate change. The package sets three key objectives:

• a 20% reduction of greenhouse gas emissions (compared to 1990 levels);
• 20% share of energy from renewable sources in total energy consumption in the EU;
• increase by 20% energy efficiency.

The package was accepted by the European Parliament in December 2008. The documents included in the package focus on three key objectives: reducing greenhouse gas emissions, promoting the use of energy from renewable sources and increasing the energy efficiency of the European Union. On October 25, 2012, the European Union accepted the Directive of the European Parliament and of the Council 2012/27 / EU on energy efficiency. This directive, by establishing a common framework to reduce 20% of primary energy consumption in the EU, was an important factor in the success of the implementation of the EU energy strategy for 2020. This document indicated measures to improve energy efficiency also after this date. The document also defined the principles on which the energy market should operate in order to eliminate, among others, any irregularities limiting the efficiency of supply. The legal act also provides for the establishment of national energy efficiency targets for 2020 [9].

The act that caused not a little confusion was the Act of 20 May 2016 on energy efficiency (Journal of Laws of 2016, item 831), which imposed on large enterprises the obligation to conduct energy audits of the enterprise. The audit should have been carried out at the latest within 12 months from the date of entry into force of the act, that is to October 1, 2017, and provide a report to the Energy Regulatory Office [19].

The main objective of the audit was to identify the potential for energy savings in the enterprise and to make a list of priority pro-efficiency actions.
However, the Act did not specify the required competences of entities performing audits. There was only a record that these entities should have appropriate knowledge, experience and technical and organizational measures to carry out such task in a manner consistent with the provisions of the Act [11, 14, 15, 16, 17, 18]. Therefore, the competence of auditing companies turned out to be a problem. Due to the inaccuracy of the records, the services were often performed by people without proper substantive preparation and without equipment back-up (measuring equipment). Therefore, having regard to the manner of conducting audits, its objective has been achieved to a small extent.

On 24 December 2018, Directive of the European Parliament and of the Council (EU) 2018/2002 of 11 December 2018 amending Directive 2012/27 / EU on energy efficiency referred to in this article came into effect. The revised directive as an objective demonstrates an increase of at least 32.5% energy efficiency in 2030 [10].

One of article of the directives indicated that Member States must achieve total savings in final energy consumption in each year from 1 January 2014 to 31 December 2020 at least 1.5% of the value of the volume of energy sold to end users. In addition, from January 1, 2021 to December 31, 2030, they must achieve new savings of 0.8% of annual final energy consumption each year (averaged for 2016-2018). After 2030, Member States still have to implement new annual savings for the next 10 years, unless the EC's review in 2027 shows that it is not necessary [15].

National laws and regulations need to be adapted to the revised directive within 18 months, by 25 June 2020. On 1 January 2021, further amendments to the directive will come into force, which were introduced by Regulation (EU) 2018/1999, from 10 January 2019 in force directly in all EU Member States.

The December directive sets a new target for the 2030 horizon, namely to further increase energy efficiency by at least 32.5% by 2030, and to create the conditions for further improvement of energy efficiency beyond these dates. The national target for improving energy efficiency by 2030 is 23% for primary energy consumption according to the primes 2007 forecast. Both the new directive and the state document "National plan for energy and climate for 2021-2030" put a strong emphasis on the energy efficiency of the country. The content of the documents clearly suggests maintaining the existing support systems and obligations set out in the Act of May 20, 2016 [12].

The topics discussed in the directive are reflected in the "National Plan for Energy and Climate 2021-2030. These include, among others: the closed cycle economy, the question of energy poverty or raising the awareness of final consumers of energy.

3. Summary

The general problem of the country is the lack of a coherent development plan for maintaining energy security. A mistake that can cost a lot is the lack of diversification of risk in the area of energy sources (80% of energy from coal).

The Polish economy faces huge challenges related to electricity prices, emission reductions, hard-to-reach hard coal deposits and maladjustment of transmission networks to work with renewable energy sources.

Most experts, including specialists from „Polish Power Grids“, predict a further increase in the demand for electricity.

EU and state regulations clearly indicate that the improvement of energy efficiency will be a trend occurring in the following decades. Therefore, Poland will have to face the search for new solutions to improve efficiency, because the identified activities carrying the potential for improving energy efficiency are most often presently discounted payback periods of 10 years and more.

Energy efficiency will play an even greater role in the coming years, which is confirmed by the amendment to Directive 2012/27 / EU, as well as the draft "National Plan for Energy and Climate for 2021-2030". Improvement of efficiency will be increasingly difficult, which is why there is a need to review existing tools and develop new ones. The future in this respect will be
inextricably linked with the full awareness of the potential for energy savings at the enterprise level, which ultimately should translate into the level of the national economy [15].

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(Dz. U. z 2016 r. poz. 831) - zwanej dalej: „ustawą”, nałożonym na określoną kategorię przedsiębiorców oraz mając na uwadze zgłaszane przez przedsiębiorców wątpliwości interpretacyjne, poniżej przedstawiono wyjaśnienia odnośnie sporządzania tych audytów <https://www.ure.gov.pl/pl/efektywnosc-kogenerac/efektywnosc-energetyczna/audyt-energetyczny-prze/7127,W-zwiazku-z-obowiazkiem-sporzadzania-audytu-energetycznego-przedsiebiorstwa-wyni.html> [dostęp: 30.07.2019].

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