ENERGY POLICY STUDIES No. 1(12)2023: 48-56; e-ISSN: 2545-0859

Update of Poland's Energy Plan 2040 in Light of European Union Strategic Documents: Directions, Challenges, and Perspectives

Maciej Mrozowski

DOI: https://doi.org/10.62316/SPKU5459

Abstract: Poland, possessing abundant coal resources, has been dependent on this raw material for many years, utilizing it as the primary source of energy in the country. However, due to global regulations and the European Union's commitment to achieving climate neutrality by 2050, Poland, like other nations, has set a goal for the transformation and modernization of its energy sector. Additionally, there is an emphasis on increasing the role of renewable energy sources in the national energy mix. The Energy Plan for Poland 2040 (PEP 2040) is a crucial document outlining the directions for the development of the energy supply in Poland for the next two decades. In light of new strategic documents introduced by the European Union, it is essential to update this plan to align it with overarching goals related to combating climate change, electricity production, and energy sources. "RePowerEU" is a significant EU document that outlines actions aimed at rapidly reducing dependence on Russian fossil fuels, accelerating the development of renewable energy sources, and hastening the ecological transformation of the continent. This article proposes changes to the Energy Plan for Poland 2040 (PEP 2040) in the context of European Union strategic documents. The analysis focuses on key aspects and recommendations of the EU, such as diversifying supplies and supply routes, increasing the pace of renewable energy development, improving connections within European energy networks, and enhancing the European energy security system. The article discusses major threats arising from past energy policies and presents the benefits that the implementation of the updated PEP 2040 will bring.

Key words: REpowerEU, European Union, energy transformation, Poland energy plan

Introduction

In the face of the global climate crisis and international commitments related to the reduction of greenhouse gas emissions, energy policy has become one of the key areas where European Union member states must take decisive actions. Poland, as an active participant in this EU community, not only influences the energy policy of the region but also must align its energy goals with the requirements of the European Union.

The update of Poland's Energy Policy until 2040 gains particular significance in light of new documents and guidelines issued by the European Union. The shift towards a green economy, sustainable development, and low CO2 emissions has become a priority on the European continent. The European Union has committed to achieving climate neutrality by 2050 and reducing greenhouse gas emissions by at least 55% by 2030 compared to the 1990 level.

Poland, as an integral part of the European Union, has an obligation to adjust its energy policy to achieve these goals and collaborate with other member countries in the pursuit of sustainable and environmentally friendly development. In this article, we will examine the essence of updating Poland's Energy Policy until 2040 in the context of new documents and guidelines from the European Union, emphasizing both the challenges and opportunities associated with this process. We will also explore the benefits of accessing EU funds for projects related to energy transformation. Poland faces key challenges and opportunities in transforming its energy sector, and our article aims to shed light on this important issue.

Polish Energy Policy until 2040

Poland's energy policy for the next two decades takes shape within the framework of the Energy Plan for Poland 2040. This ambitious document outlines key goals and assumptions regarding the development of the energy sector in Poland. Here are the main points of this plan:

1. Less Coal, More Renewable Energy Sources: One of the main goals of the plan is to reduce the share of coal in Poland's energy mix. Coal currently constitutes the primary source of energy, but it has a negative impact on the environment. The plan envisions a gradual replacement of coal with more environmentally friendly sources, such as solar and wind energy. According to projections, a significant decrease in the share of coal in the structure of electricity generation is expected by 2030. Annual consumption of hard coal is expected to remain around 36 million tons until 2027, but according to Poland's Energy Policy until 2040, the share of coal in the balance of primary energy production will decrease from approximately 57% to around 39%. This phenomenon is mainly a result of international commitments, such as the European Union's goals for reducing greenhouse gas emissions and increasing the share of renewable sources (Kielar et al., 2019: 4).

2. Development of Renewable Energy: The history of renewable energy in Poland dates back to the early 20th century when the first hydroelectric power plants were launched in Leśna on the Kwisa River with a capacity of 2.7 MW and a larger power plant in Plichowice with a capacity of 13.3 MW. Despite the fact that the share of renewable energy in Poland increased to 12% in 2017, it is worth noting the introduction of a law by the Polish government that restricted the construction of wind farms and imposed additional fees on existing ones, reducing the profitability of electricity production (Sowa, 2018: 4). The new plan envisions a significant increase in the share of renewable energy sources in the Polish energy mix. The goal is to achieve a 23% share of renewable energy by 2030 and 28.5% by 2040. This entails investments in technologies such as photovoltaic panels and wind farms (PEP2040, 2021).

3. Energy Security: Diversification of energy sources and supplies is a fundamental aspect of strategies aimed at ensuring the energy security of nations. In the context of this challenge, both sovereign states and international organizations, such as the European Union, strive to diversify their energy carrier portfolios, encompassing both imported resources and domestic energy reserves. A widely adopted norm in European Union countries is not to purchase more than 30% of an energy carrier from a single exporter (Nagy et al., 2005: 5). The Polish Energy Policy Plan until 2040 aims to enhance energy security through the diversification of energy supply sources. Poland hopes to reduce dependence on a single major natural gas supplier and increase the utilization of LNG (PEP2040, 2021).

4. Power Plant Modernization: The aging energy infrastructure in Poland, characterized by significant decapitalization of the transmission network, requires immediate modernization. The average age of transmission lines is estimated at 40 years, bringing them close to technical obsolescence. In Poland, especially for high-voltage networks, as much as 82% of 220 kV lines and 25% of 400 kV lines are over 30 years old, imposing constraints on the transmission of electrical energy and the connection of modern generation sources, especially renewables (Jankiewicz, 2018: 3). The plan entails investments in clean combustion

technologies and solutions that will reduce greenhouse gas emissions from coal-fired power plants, as well as the modernization of transmission lines (PEP2040, 2021).

5. Electromobility: Currently, the electric vehicle market in Poland is in a developmental stage, as evidenced by the limited availability of charging infrastructure and relatively low interest in this service in locations where it already exists. Additionally, the sales of electric cars remain at a relatively low level. In 2017, only 907 electric passenger vehicles (PEVs) were registered (a total of 1,692 from 2011 to 2017). This includes 475 battery electric vehicles (BEVs) (totaling 848 until 2017) and 432 plug-in hybrid vehicles (PHEVs) (totaling 844 until 2017). Comparing these figures, it can be concluded that despite some progress, the electric vehicle market in Poland still requires further development, especially in charging infrastructure, to gain popularity among consumers (Sendek-Matysiak et al., 2018: 2). As part of the plan, the promotion of electromobility is anticipated, including the construction of charging infrastructure for electric vehicles and financial incentives for electric vehicle purchases, which can contribute to the reduction of CO2 emissions in transportation (PEP2040, 2021).

6. Energy Efficiency: In the broadest sense, energy efficiency refers to the effective utilization of energy resources in the context of achieving results, providing services, producing goods, or the consumption of energy in the processes. In the light of Directive 2006/32/EC, it is a measure of the effectiveness of energy use within economic activities. Efficient energy management is one of the key tools supporting entrepreneurship and innovation. Modern society increasingly recognizes the reduction of energy losses not only as economically beneficial but also as a significant step towards sustainable social development. Therefore, the pursuit of energy efficiency not only contributes to the optimal use of resources but also aligns with widely accepted values of sustainable development (Skoczkowski et al., 2016: 2). Increasing energy efficiency is a crucial element of the plan. These actions are intended to help reduce energy consumption in construction, industry, and transportation.

7. Support for Small Energy Sources: The plan envisages the development of micro-installations of renewable energy sources, such as photovoltaic panels on house roofs and small wind turbines, to increase the involvement of citizens in energy production.

8. Social Policy and Retraining of Workers: The transformation of the coal sector entails the need to support the industry workers. The shift from coal mining should primarily rely on natural workforce attrition, involving career path changes or retirement. Additionally, a crucial aspect should be to curb the influx of new workers into this sector. Miners opting for a change of industry should be supported in the retraining process, which, in turn, requires early identification of gaps in their skills and assets. Optimal outcomes of this process can be achieved through close collaboration with mining companies, support from public employment services, and potential new employers, contributing to the effective transition of workers to new job opportunities (Kiewra et al., 2019: 4). The PEP2040 plan includes social programs designed to help workers adapt to new market conditions.

Poland's Energy Policy until 2040 is a bold step towards a sustainable and efficient energy policy. However, its success will depend on the collaboration of various stakeholders, investments, and consistent monitoring of progress in achieving the set goals. The paramount value is to ensure Poland's secure, stable, and environmentally friendly access to energy in the upcoming decades.

RePowerEU

RePowerEU is the European Union's initiative aimed at reducing dependence on Russian fossil fuels through a transformation towards renewable energy, diversification of supplies, and enhancing the energy security of the EU. The initiative stems from Russia's aggression towards Ukraine and seeks to achieve both climate goals and secure energy supplies. Here are the main points of this plan:

1. Energy saving: Energy saving is a key element of the transition towards clean energy, enhancing the resilience of the EU economy and shielding it from high fossil fuel prices. The plan involves long-term investments in energy efficiency, such as modernizing buildings, as well as immediate energy savings through behavioral changes.

2. Diversification of energy imports: The European Union is working on diversifying the sources and supplies of energy to minimize the rise in energy prices by creating a Union energy platform with three main goals: connecting and structuring the demand, optimizing the infrastructure, and engaging in international actions. Diplomatic visits are being conducted to countries that can replace Russia in terms of energy raw material supplies, seeking alternative sources and partners in the energy supply sector. As a result of these efforts, the European Union has achieved significant success, as in 2022 it was already noted that non-Russian gas imports with connections to Europe increased by 14 billion cubic meters (Ciechanowska, 2023: 2). This initiative aims to reduce dependence on a single energy supplier and lower costs, contributing to the stability of energy supplies in the EU.

3.Replacement of fossil fuels and acceleration of Europe's transition towards clean energy: As is widely known, Poland possesses some of the largest reserves of hard coal and lignite in Europe. The registered balance reserves of hard coal in Poland exceed 58,000 million tons, and lignite reserves exceed 20,500 million tons (Gawlik et al., 2017: 3-5). In Poland, the share of coal in electricity generation is approximately 69%, making this aspect extremely important for our country, as it focuses on the plans and goals of the European Union regarding the energy transition towards clean energy and reducing dependence on fossil fuels. The European Commission proposes increasing the use of renewable energy and promoting environmentally friendly technologies. The plan includes increasing the capacity of renewable energy production, including photovoltaics and wind energy. Furthermore, the European Union aims to increase the production and use of renewable hydrogen as an alternative to fossil fuels (REPowerEU Plan, 2022).

4.Smart Investments: The implementation of the REPowerEU program entails the need for additional investments amounting to 210 billion euros by 2027, in addition to the funds required to achieve the goals set within the "Fit for 55" package. These additional investments are deemed cost-effective, and it is anticipated that they will enable the European Union to save 80 billion euros annually in gas imports, 12 billion euros annually in crude oil imports, and 1.7 billion euros annually in coal imports by 2030. The REPowerEU plan envisions a significant shift in the energy system in terms of quantity and directions of energy flows. Consequently, the European Commission encourages the implementation of many long-awaited infrastructure projects, especially

cross-border connections, to create an integrated energy market that secures supplies in the spirit of solidarity (REPowerEU Plan, 2022).

5.Enhancing Preparedness: Europe must be prepared for potential disruptions in gas supplies. The European Commission calls on member states to take actions aimed at securing gas supplies, including replenishing reserves, implementing energy savings, updating emergency plans, accelerating technical work in transmission systems, establishing solidarity agreements, defining priorities in deliveries, developing an energy demand reduction plan, and reviewing readiness plans in the electricity sector.

RepowerEU faces the task of coordinating and accelerating the energy transition in the European Union. This initiative has the potential to transform the European energy sector into a more sustainable, efficient, and environmentally friendly system. The key challenges facing RepowerEU include increasing the role of renewable energy, improving energy efficiency, strengthening international cooperation, as well as supporting innovation and technological development. In summary, RepowerEU faces a significant challenge but also has tremendous potential. Its success depends on effective collaboration among member states, investments in renewable energy sources, the development of modern technologies, and commitment to achieving ambitious climate and sustainable energy goals in Europe.

Poland's Goals - Adapting to EU Standards Challenge

Poland has declared its own climate and energy goals. Although Poland's specific goals may change over time, in the early 21st century Poland was planning to gradually reduce greenhouse gas emissions by 30% by 2030 compared to the 1990 level. However, faced with increasing pressure to reduce emissions, Poland must increase the level of emission reduction by at least 20% compared to current plans. In response to EU guidelines, Poland will strive in the coming years to increase the significance of the share of renewable energy sources such as solar, wind, and biomass in the country's energy economy. Our policy initially aimed to achieve a 23% share of renewable energy by 2030, which, in light of the new plans of the European Union, is insufficient. Poland must increase the share of renewable energy by an additional 25-30% by 2030.Energy efficiency is also a crucial aspect to which our country must pay special attention due to both emission reduction and improving energy efficiency. The introduction of carbon dioxide emission fees will increase costs for CO2-emitting companies and encourage investment in more environmentally friendly technologies. Another important commitment is the transformation of the industry, essentially restructuring it towards a more sustainable and low-emission production model. It is essential to invest in environmentally friendly technologies and make changes in production processes.

Challenges of Adapting to EU Standards

As a member of the European Union, Poland faces a complex task of aligning its energy and climate policies with EU standards. This challenge, although crucial from the global environmental perspective, brings with it many specifics that must be taken into account. One of them is undoubtedly the transition to more sustainable energy sources and the reduction of greenhouse gas emissions, which requires significant investments. Poland must allocate substantial financial resources to implement new technologies, develop renewable energy sources, and modernize its energy infrastructure. These investments extend beyond the public sector,

since the private sector also plays a significant role. Adapting to EU climate standards will require new financing models and partnerships between the public and private sectors. The key challenge is the efficient use of these funds, ensuring that these investments yield the expected benefits for the environment and the economy. Another topic is the change in Poland's energy structure, as the country still relies heavily on coal as its primary energy source. This poses a challenge both in terms of reducing greenhouse gas emissions and achieving long-term sustainable development. Transitioning to a more sustainable and low-emission energy structure entails gradually phasing out coal and increasing the share of renewable energy sources. This may raise concerns and resistance, especially in mining regions where many jobs depend on the coal sector. Poland must develop support strategies for these regions that consider both the need for environmental protection and securing the future of these areas. Additionally, it is essential to conduct an open dialogue with stakeholders taking into account their needs and concerns and providing accurate information about the benefits of the energy transition. Increasing awareness and social engagement in the adaptation process are crucial.

The Importance of EU Funds in the Context of Poland's Energy Transformation

EU funds play a crucial role in the process of Poland's energy transformation. They provide significant financial support, enabling the implementation of projects related to renewable energy sources, improving energy efficiency, and reducing greenhouse gas emissions. Access to these funds helps Poland meet EU requirements regarding emission reduction and the share of renewable energy. Furthermore, these funds help to lower the costs of transformation, which is essential for both consumers and businesses. With financial support, companies can invest in new technologies, modernize energy infrastructure, and align with EU regulations contributing to their competitiveness in the European market. Additionally, access to these funds stimulates innovation in the energy sector, leading to the development of new technologies and solutions in the field of renewable energy. EU financial resources also attract investors who see the potential for energy transformation in Poland. This, in turn, can contribute to increased investments and the creation of new jobs. Finally, EU funds support the sustainable development of the country, helping Poland adapt to environmental protection challenges and climate change mitigation. Therefore, they are a key tool in achieving the goals of Poland's energy and climate policy.

Perspectives and Opportunities Arising from the Harmonization of Polish and EU Plans

The harmonization of Polish energy plans with EU goals, including RepowerEU, brings forth numerous perspectives and benefits for both Poland and the European Union as a whole:

1. Increasing Competitiveness and Innovation: Striving to achieve EU goals, such as increasing the share of renewable energy or improving energy efficiency, fosters investments in modern technologies and innovative solutions. This, in turn, can stimulate the development of the energy sector and create opportunities for Polish companies to participate in research and development projects.

2. Improving Air Quality: Poland experiences some of the highest levels of air pollution in the European Union, as seen in indicators such as the concentration of suspended particulate matter PM10, which can lead to conditions such as asthma, allergies, and

respiratory system failure. In November 2015, Poland ranked second, just behind Bulgaria, in terms of PM10 levels. Concerning benzo(a)pyrene, a recognized carcinogen, permissible limits were exceeded in 42 out of 46 air quality monitoring zones in Poland (Zagórska et al., 2018: 2-3). Transitioning to more environmentally friendly energy sources, such as wind and solar power, can help reduce air pollution emissions and improve the quality of life for Poland's residents, particularly in areas affected by smog-related issues.

3. Reduction of Greenhouse Gas Emissions: Undoubtedly, climate warming is evident at every spatial scale, from global to local. Over the past 50 years, most observed signs of warming are likely the result of an increase in atmospheric concentrations of greenhouse gases induced by human activities. The absence of effective climate policies will likely lead to a temperature increase exceeding the 2°C threshold by the year 2100 (Kundzewicz, 2011: 9-10). Aligning Polish energy policy plans with EU climate goals, including RepowerEU, contributes to global efforts to mitigate climate change by reducing greenhouse gas emissions.

4. Job Support: Development of the renewable energy sector and modernization of energy infrastructure can create employment opportunities in sectors related to production, assembly, maintenance, and management of new installations.

5. Energy Security: Russia had been our primary supplier of fossil fuels for many years. In 2012, Russia's share in crude oil imports was 95.5%, and by 2022, it had decreased to 72% (Pangsy-Kania et al., 2022: 10). Investments in renewable energy sources help diversify energy supply sources, contributing to greater energy security for the country. Poland is becoming less dependent on a single type of fuel or a single supplier.

6. Access to EU Funds: Harmonizing with EU goals enables Poland to access EU funds for projects related to energy transformation. This can support investments in energy infrastructure, the development of renewable sources, and the improvement of energy efficiency.

7. Increased Energy Independence: The development of renewable energy sources, including wind and solar energy, can help to increase Poland's independence from the import of fossil fuels. This is a strategic goal in the context of energy security.

8. Improving Poland's Image: Actions towards a sustainable energy transformation can contribute to improving Poland's image in the context of combating climate change and caring for the natural environment.

9. International Cooperation: Harmonizing with EU goals enables Poland to actively collaborate with other EU member states in implementing cross-border projects.

As a result, aligning Polish energy plans with EU goals, especially RepowerEU, can bring a range of benefits in terms of sustainable development, economic growth, environmental protection, and improved quality of life for citizens. This works towards the common good of both Poland and the entire European Union.

Summary

The article discusses key aspects of Polish energy policy and its alignment with European Union standards, particularly in the context of the RepowerEU initiative. Poland has set ambitious goals for reducing greenhouse gas emissions, promoting renewable energy sources, modernizing power plants, and increasing energy efficiency. The RepowerEU initiative aims to reduce dependence on Russian fossil fuels through energy savings, supply diversification, fossil fuel substitution, and intelligent investments. Poland must align its climate goals with EU standards, which requires significant investments, industrial restructuring, and changes to its energy structure. EU funds play a crucial role in Poland's energy transformation by supporting investments in renewable energy sources and energy efficiency improvement. Harmonizing Polish plans with EU goals brings such benefits as increased competitiveness, improved air quality, emission reduction, job creation, enhanced energy security, improved Poland's image, and international cooperation. Adapting Polish energy policy to EU standards is crucial for environmental protection, addressing climate change, and the country's economic development. It is both a challenge and an opportunity to transform Poland's energy sector into a more sustainable, efficient, and environmentally friendly industry. Poland has the opportunity to co-create a sustainable and competitive future for energy in Europe. By aligning its energy policy with EU standards, especially within the RepowerEU initiative, Poland can play a significant role in achieving global climate goals. Access to EU funds supports these efforts, and both Poland and the entire European Union will benefit from harmonizing Polish plans with EU goals. Energy transformation is a challenge but also a tremendous opportunity to create a more sustainable and environmentally friendly future for energy in Europe.

Bibliography

1. Gawlik L., Mokrzycki E., Paliwa kopalne w krajowej energetyce – problemy i wyzwania „Polityka Energetyczna" 2017, s. 6-26.
2. Sendek-Matysiak E., Szumska E., Infrastruktura ładowania jako jeden z elementów rozwoju elektromobilności w Polsce „Prace naukowe Politechniki Warszawskiej" 2018, s. 329-340.
3. Komunikat Komisji Do Parlamentu Europejskiego, Rady Europejskiej, Rady, Europejskiego Komitetu Ekonomiczno-społecznego i Komitetu Regionów „Plan REPowerEU" 2022, s. 1-25.
4. Skoczkowski T., Bielecki S., Efektywność energetyczna – polityczno-formalne uwarunkowania rozwoju w Polsce i Unii Europejskiej „Polityka Energetyczna" 2016, s. 5-20.
5. Jankiewicz S., Infrastruktura energetyczna jako istotny element bezpieczeństwa Polski „Przedsiębiorczość i zarządzanie" 2018 s. 195-202.
6. Nagy S., Rychlicki S., Siemek J., Import gazu a bezpieczeństwo energetyczne Polski „Polityka Energetyczna" 2005 s. 1-13.
7. Ciechanowska M., Zaawansowanie działań Komisji Europejskiej ukierunkowanych na uniezależnienie Europy od rosyjskich paliw kopalnych „Nafta-Gaz" 2023, s. 61-66.
8. Pangsy-Kania S., Wierzbicka K., Niezależność od importu surowców energetycznych jako kluczowy element bezpieczeństwa ekonomicznego państwa. Polska na tle krajów UE "Optimum. Economic Studies" 2022, s. 86-102.
9. Polityka Energetyczna Polski do 2040 roku 2021, s. 1-104.
10. Sowa S., Odnawialne źródła energii jako czynnik wpływający na poprawę efektywności energetycznej „ Instytut Gospodarki Surowcami Mineralnymi i Energią Polskiej Akademii Nauk" 2018, s. 187-196.
11. Kiewra D., Szpor A., Witajewski-Baltvilks J,. Sprawiedliwa transformacja węglowa w regionie śląskim. Implikacje dla rynku pracy 2019, s. 1-5.
12. Zagórska M., Roszkowska W., Skowrońska I., Zambrzycka A., Dąbrowska K., Szatyłowicz E., Skoczko I., Ocena jakości powietrza w Polsce „Inżynieria Środowiska – Młodym Okiem" 2018, s. 127-148.
13. Kielerz A., Porzerzyńska-Antonik M., Węgiel w energetyce zawodowej i ciepłownictwie – stan obecny i perspektywy „Instytut Gospodarki Surowcami Mineralnymi i Energią Polskiej Akademii Nauk" 2019, s. 39-50.
14. Kundzewicz Z.W., Zmiany klimatu ich przyczyny i skutki – obserwacje i projekcje „Landform Analysis" 2011, s. 39-49.

Maciej Mrozowski – Student, Power Engineering, The Faculty of Civil and Environmental Engineering and Architecture at Rzeszów University of Technology. Volunteer at the Institute of Energy Policy, Vice President of the "Eurointegration" Scientific Circle. Scientific interests: hydrogen technologies, renewable energy technologies, energy characteristics of buildings, and energy transformation.