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# Sustainable transport in the face of the energy crisis related to the war in Ukraine

**Abstract:** The energy crisis caused by Russia's aggression in Ukraine has had a huge impact on the functioning of many countries in various spheres. The Russian Federation was the main supplier of many raw materials, which had to be abandoned as a result of the sanctions that were imposed. Consequently, the prices of various commodities – primarily natural gas, crude oil and coal – have risen. This posed a particular challenge for Poland, which is highly dependent on coal. At the same time, Poland, being a Member State of the European Union, has committed to achieving the goals of climate neutrality and the related concept of sustainable transport. In this light, the author analysed the issue of striving for climate neutrality and sustainable transport in the conditions of the crisis caused by the war in Ukraine. It seems appropriate, for instance, to determine whether the energy crisis has led to a collapse of the European Union's climate policy and a change in its objectives. The process of the electrification of transportation, which, as a result of the current situation, may have become more challenging to implement, should also be considered.

**Keywords:** climate neutrality, sustainable transport, renewable energy sources, energy crisis, war in Ukraine.

## Introduction

Access to energy sources is one of the basic factors of economic development.<sup>1</sup> The growing demand for energy resources, such as hard coal, lignite, crude oil and natural gas, arises from them being treated for many years as the only

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<sup>1</sup> I. Miciuła, "Polityka energetyczna Unii Europejskiej do 2030 roku w ramach zrównoważonego rozwoju," *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania* 2, 2015, no. 42, p. 57.

energy carriers used on a large scale.<sup>2</sup> These circumstances, as well as the current war in Ukraine started by Russia's military attack on 24 February 2022, have caused justified concerns about maintaining energy security, as it was Russia that had been a supplier of various raw materials for many years. Therefore, it should be emphasized that energy security is defined as a state of guaranteeing access to energy sources for all citizens and enterprises operating within the state that meet their needs, while maintaining liquidity and avoiding disruptions in the transmission process. Such energy must be sold at acceptable prices which can be estimated in the short term.<sup>3</sup> Ensuring this has become an important task of the bodies of public administration.

It should be remembered that the energy crisis – although directly affecting the energy industry – has had a significant impact on the functioning of many sectors of the economy, including transport, which is understood as the purposeful movement of all loads and people, which is technically, organizationally and economically separated from other activities.<sup>4</sup>

Therefore, the purpose of these deliberations will be to establish the impact that the energy crisis has had on transport services, with a special focus on public transport. Has the described energy crisis caused changes in the activities of public authorities to achieve sustainable transport? Has it proved that the implementation of renewable energy sources is crucial for maintaining stability in energy and transport sectors? Both the analytical and dogmatic method, which is used to analyse legal texts and views of the doctrine, as well as elements of the legal and comparative method in the use of legal acts and policies prepared by the European Union, are used for these analyses.

## 1. The European Union's and Poland's energy policy before the energy crisis related to the war in Ukraine

Activities intended to ensure energy security should be conducted at several levels, namely supranational, international, state and local, in order to ensure their mutual cooperation.<sup>5</sup>

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<sup>2</sup> K. J. Świdzińska, "Kryzysy energetyczne a bezpieczeństwo energetyczne," [in:] *Kryzysy we współczesnej Europie i próba ich przezwyciężenia*, ed. K. Garczewski, Toruń 2017, pp. 110–111.

<sup>3</sup> M. Jastrzębski, I. Protasowicki, Ł. Nowakowski et al., *Polityka bezpieczeństwa energetycznego państw Europy Środkowo-Wschodniej. Rola i znaczenie Grupy Wyszehradzkiej*, Warszawa 2016, pp. 38–39.

<sup>4</sup> A. Koźlak, *Ekonomika transportu. Teoria i praktyka gospodarcza*, Gdańsk 2008, p. 11.

<sup>5</sup> K. Tomaszewski, "Rola czynnika ludzkiego w kształtowaniu polityki energetycznej współczesnego państwa," *Środkoeuropejskie Studia Polityczne*, 2020, no. 1, pp. 147–149.

One of the most important priorities of the European Union in recent years has been the implementation of the assumptions of the European Green Deal, including the direct objective of achieving climate neutrality, which is reflected in Article 2 of the European Union Regulation of 30 June 2021,<sup>6</sup> according to which national emissions and removals of greenhouse gases regulated in Union law are to be balanced within the Union at the latest by 2050, thereby reducing emissions to net zero by that date. The intermediate target for achieving the main objective in this measure is to reduce greenhouse gases by 55% by 2030 compared to 1990 levels, which requires differentiated and multi-level actions and applies to both public and private transport, especially the ban on the sale of CO<sub>2</sub>-emitting cars from 2035.<sup>7</sup> Such measures had the objective of increasing the well-being of current and future generations in the form of fresh air, clean water and air, as well as cleaner energy and the latest eco-friendly technological solutions.<sup>8</sup>

Therefore, it should be remembered that, as a European Union Member State, Poland is required to apply EU regulations and implement EU directives. One reflection of this is the legislation adopted by Poland primarily constituting the implementation of EU regulations. However, it can certainly be added that Poland does not have such an integrated climate policy as that developed by the European Union.

A strategic act that deserves consideration in this respect is Poland's Energy Policy until 2040, which is Poland's current long-term policy regarding energy. According to the assumptions, it is meant to implement the goals of the European Green Deal and, more broadly, of the Paris Agreement. Three pillars have been established, on which eight specific objectives have been based, together with the actions needed to achieve them. These pillars are a just transition, a zero-emission energy system and good air quality, while the objectives include the transformation of coal regions, the implementation of smart power grids, the construction of the second line of the Pomeranian Pipeline, the implementation of the action plan to increase cross-border electricity transmission capacity, the implementation of the Polish nuclear energy programme, the development of an offshore wind energy programme, the development of the Kogeneracja (Cogeneration) heating system and the improvement of energy efficiency.<sup>9</sup> This leads to the conclusion that the assumptions of this policy constitute the effects of the energy sector's pur-

<sup>6</sup> Regulation (EU) 2021/1119 of the European Parliament and of the Council of 30 June 2021 establishing the framework for achieving climate neutrality and amending Regulations (EC) No 401/2009 and (EU) 2018/1999 ('European Climate Law'), [https://eur-lex.europa.eu/legal-content/PL/TXT/?uri=uriserv%3AOJ.L\\_.2021.243.01.0001.01.POL&toc=OJ%3AL%3A2021%3A243%3A-TOC](https://eur-lex.europa.eu/legal-content/PL/TXT/?uri=uriserv%3AOJ.L_.2021.243.01.0001.01.POL&toc=OJ%3AL%3A2021%3A243%3A-TOC) (accessed: 30.05.2023).

<sup>7</sup> EU ban on sale of new petrol and diesel cars from 2035 explained | News | European Parliament (europa.eu) (accessed: 15.06.2023).

<sup>8</sup> European Green Deal (europa.eu) (accessed: 15.06.2023).

<sup>9</sup> Energy Policy of Poland until 2040, pp. 5–7, <https://www.gov.pl/web/klimat/polityka-energetyczna-polski> (accessed: 15.06.2023).

suit of sustainable development and meeting climate goals. Importantly, the future of the Polish energy sector is to be based on the development of new technologies that will contribute to the conversion to a distributed energy model based on energy storage, digitization, sector coupling and electrification.<sup>10</sup>

## 2. Concept of sustainable transport

The need to achieve climate neutrality has resulted in an increasing interest in the concept of sustainable transport. According to this idea, transport should not threaten human life or the environment, either now or in the future. This concept assumes the improvement of safety and the reduction of gas and noise emissions, as well as the use of renewable resources in quantities that can be reproduced.<sup>11</sup>

Sustainable transport should meet three basic conditions. First, it should ensure access to the transport system for individuals and society in a safe manner, which is consistent with the needs of human health and ecosystems, in line with the capital value requirements within a given generation and across generations. Second, special attention is paid to the role of public transport that is affordable and efficient, offers a choice of means of transport, and is an alternative to private cars. Third, it is about reducing emissions and waste, taking into account the planet's ability to absorb them, minimizing the consumption of non-renewable resources, and limiting the consumption of renewable resources to a sustainable level.<sup>12</sup>

As a result, sustainable transport should lead to an improvement in societal health, an increase in the standard of living, as well as a preference for public transport. It also implies the need to take into account the needs of pedestrians and cyclists. It is important to invest and plan the layout of transport networks rationally, taking into account the presence of environmentally valuable areas.<sup>13</sup>

The challenges related to the concept of sustainable transport are reflected in the Sustainable Transport Development Strategy until 2030. For this reason, its primary established objective is to increase transport accessibility while improving

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<sup>10</sup> J. Gola, J. Mielczarek-Mikołajów, A. Pinkas, "Stan regulacji prawnych prawa krajowego: wnioski de lege lata i de lege ferenda," [in:] *Rekomendacje do zmian legislacyjnych w zakresie przeprowadzenia transformacji energetycznej i osiągnięcia neutralności klimatycznej*, ed. Jerzy Korczak, Wrocław 2021, pp. 24–25.

<sup>11</sup> Communication from the Commission to the Council, The European Parliament, The European Economic and Social Committee and the Committee of the Regions. Towards a thematic strategy on the urban environment COM (2004) 60 final, Brussels, 11 February 2004.

<sup>12</sup> Assessment & decision making for sustainable transport, European Conference of Ministers of Transport, OECD 2004, pp. 1–19.

<sup>13</sup> B. Bartniczak, "Zrównoważony transport na poziomie regionalnym jako przedmiot pomiaru wskaźnikowego," *Studia Ekonomiczne*, 2013, no. 143, p. 12.

traffic safety and the efficiency of the transport sector. This is to be achieved by creating a coherent, sustainable, innovative and user-friendly transport system in the national, European and global dimensions. Therefore, special attention should be focused on building an integrated, interconnected transport network supporting a competitive economy and improving the organization and management of the transport system. It is also important to ensure a level of traffic safety, as well as to influence changes in individual and collective mobility, with a particular preference for public transport. Transport should limit its negative impact on the environment. It was also decided that another important goal was to improve the efficiency of the use of public funds on transport projects. These measures must have a complementary and mutually permeating nature, which is to serve the purpose of the entire Strategy.<sup>14</sup>

### 3. The European Union's and Poland's energy policy during the energy crisis related to the war in Ukraine

As is clear from the above considerations, the primary goal of the European Union's energy policy is to ensure energy security in Europe, which arises from the lack of sufficient energy resources available to the Community. The infrastructure for energy transmission, which was built several decades ago, has made countries in Central and Eastern Europe particularly dependent on Russian supplies of resources, primarily natural gas.<sup>15</sup> Russia was the leading supplier of natural gas, crude oil and coal to European Union countries in 2020 and 2021. According to Eurostat, in 2021, Russia accounted for 45% of the EU's total coal imports, 36% of global natural gas imports, and 25% of overall crude oil imports,<sup>16</sup> making it the largest energy supplier to the EU by a significant margin. The war in Ukraine, which was triggered by Russian aggression, has resulted in multifaceted consequences. The sanctions imposed by the European Union in the form of a ban on the purchase, import and transfer of coal, gas and other solid fossil fuels have led to a sharp increase in the prices of these energy resources. They have also demonstrated

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<sup>14</sup> "Strategia Zrównoważonego Rozwoju Transportu do 2030 roku", Ministerstwo Infrastruktury, <https://www.gov.pl/web/infrastruktura/projekt-strategii-zrownowazonego-rozwoju-transportu-do-2030-roku2>, pp. 65–73 (accessed: 15.06.2023).

<sup>15</sup> M. Ruszel, "Wpływ rosyjsko-ukraińskich kryzysów gazowych na politykę energetyczną UE – ujęcie teoretyczne," *Przegląd Politologiczny*, 2015, no. 2, pp. 49–50.

<sup>16</sup> L. Boehm, A. Wilson, *EU energy security and the war in Ukraine: From sprint to marathon*, pp. 1–2, EU energy security and the war in Ukraine: From sprint to marathon, [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2023\)739362](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739362) (accessed: 12.06.2023).

that it is not advisable to be dependent on just one energy source or supplier. Consequently, these sanctions have forced the EU to look for new suppliers.<sup>17</sup>

Contrary to the initial fears, it seems that the war in Ukraine – although it has undoubtedly resulted in an increase in the prices of energy resources – did not pose a threat to the achievement of the objectives of the European Green Deal. The challenges faced to date, including the huge costs of radical green transformation and the development of new technological solutions for the low-emission sector, are still present. It is therefore becoming necessary to accelerate the production of energy from renewable energy sources, phase out fossil fuels, including liquefied natural gas (LNG), and generate energy to improve efficiency in all sectors and industries. In addition, the European Union has the capacity to build strong international partnerships that can help interested countries in their own energy transitions, and support them in becoming key commercial players for renewable energy partners.<sup>18</sup>

In the light of the above, the Polish public authorities have started to take steps to guarantee the import of hard coal, natural gas and crude oil at an appropriate level, although at significantly higher prices. This situation has certainly translated into the acceleration of projects intended to increase the diversification of the directions and sources of strategic energy resources, particularly natural gas. On the one hand, it has not resulted in a threat to the implementation of the goals of Poland's Energy Policy until 2040, but on the other, it has highlighted the weaknesses of the Polish energy sector, which include an energy mix dominated by coal, a still small share of renewable energy sources in the power industry, and the forced diversification of sources of supply of energy resources (particularly hard coal).<sup>19</sup> Paradoxically, however, the energy crisis may be an opportunity to accelerate the energy transition and make greater investments in renewable energy sources, which, in the face of the current situation, seem to be the most reliable sources of energy.

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<sup>17</sup> E. Sadowska, "The impact of the Russian-Ukrainian war on the European Union's energy security," *Energy Policy Studies* 10, 2022, no. 2, pp. 42–43.

<sup>18</sup> G. Ileana, A. Faus Onbargi. *European Green Deal and the war in Ukraine: Addressing crises in the short and long term*, Brussels 2022, pp. 7–8.

<sup>19</sup> W. Hebda, "Rosyjska agresja militarna na Ukrainę a bezpieczeństwo energetyczne Polski," [in:] *The war must go on: dynamika wojny w Ukrainie i jej reperkusje dla bezpieczeństwa Polski*, ed. A. Gruszczak, Kraków 2023, pp. 122–123; S. Tokarski, "Transformacja energetyczna – zapotrzebowanie na źródła energii pierwotnej w perspektywie 2040 r. Co się zmieni po wybuchu wojny na Ukrainie?," *Nowa energia* 83, 2022, no. 2, pp. 10–11.

## 4. The concept of sustainable transport in the era of the energy crisis related to the war in Ukraine

The transport industry was directly affected by the energy crisis caused by the war in Ukraine. In this analysis, attention needs to be paid to the extent of the impact on the level of electrification of transport, the quality of services provided, and the pace of investments.

The electrification of transport is undoubtedly one of the basic assumptions of sustainable transport, primarily because of the reduced negative environmental impacts. Although, in 2010–2021, the number of electric cars (BEVs) on the world's roads increased from 17,000 to approximately 11 million, the war in Ukraine resulted in a great deal of uncertainty related to the development of this industry.<sup>20</sup> These fears were justified, because the increasing prices of energy affected decisions regarding further investments. For example, Switzerland introduced a temporary ban on using electric cars.<sup>21</sup> Despite this, as the data in the report shows, there was an increase in the registration of electric cars in 2022, the number of which at the end of this period was approximately 3.2 million, which was an increase of 1.1 million compared to the previous year, and 180% more than in 2020. This increase was smaller in Poland, at approximately 130% compared with the previous year. Despite this, the proportion of electric vehicles to the total number of passenger cars in Poland is only 0.12%, which places Poland third from bottom in the ranking of EU countries.<sup>22</sup> According to other data, 40,926 passenger and utility electric vehicles were registered in Poland at the end of April 2023. In the period between January and April, this number increased by 7,201, which was 71% more than in the corresponding period of 2022. Simultaneously, 69 new public charging stations were built, which is still extremely inadequate compared to existing needs.<sup>23</sup>

The energy crisis has also created uncertainty with the electrification of public transport. Even though 950 electric buses are already being used in Poland,

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<sup>20</sup> *Raport. Wpływ elektromobilności na rozwój gospodarczy w Polsce, Wariantowe scenariusze rozwoju*, p. 3. [https://pspa.com.pl/wp-content/uploads/2022/11/PSPA\\_Wplyw\\_elektromobilnosci\\_na\\_rozwoj\\_gospodarczy\\_Polski\\_Raport-2.pdf](https://pspa.com.pl/wp-content/uploads/2022/11/PSPA_Wplyw_elektromobilnosci_na_rozwoj_gospodarczy_Polski_Raport-2.pdf) (accessed: 15.06.2023).

<sup>21</sup> *Szwajcaria ogranicza ładowanie aut elektrycznych i hybryd plug-in*, DailyDriver.pl, <https://dailydriver.pl/nowosci/wydarzenia/szwajcaria-ogranicza-ladowanie-aut-elektrycznych-i-hybryd-plug-in/> (accessed: 15.06.2023).

<sup>22</sup> A. Kiwacka, "Polska w czołowie państw UE z największą dynamiką sprzedaży samochodów elektrycznych," <https://strefainwestorow.pl/w-zielonej-strefie/elektromobilnosc/sprzedaz-elektrykow-polska> (accessed: 15.06.2023).

<sup>23</sup> *Infrastruktura ładowania pojazdów elektrycznych*, <https://op.europa.eu/webpub/eca/special-reports/electrical-recharging-5-2021/pl/#chapter11> (accessed: 15.06.2023).

this is largely a result of earlier investments. According to the data of the Polish Automotive Industry Association (PZPM), 140 electric buses were registered in 2022, including two hydrogen buses manufactured by Autosan and Solaris. For example, in 2022, a worse result was recorded than in 2021, when 213 electric buses were added to the fleet as, proportionally, this was a 36.3% share in all newly registered municipal buses whereas, in 2022, it was just 23.2%.<sup>24</sup>

Therefore, it should be emphasized that the obligation to purchase electric vehicles for public transport arises from Article 36, para. 1 and Article 68, para. 4 of the Polish Electromobility Act. The share of zero-emission buses or biomethane buses in the vehicle fleet in use should be at least 5% from 1 January 2021, 10% from 1 January 2023, 20% from 1 January 2025 and 30% from 1 January 2028. Despite a fairly high total number of electric buses in Poland, many cities do not meet the requirements set out in this Act. Some have delayed the purchase of zero-emission buses because of the current energy crisis. The example of Lublin is important in this regard, as it has been meeting the requirement of having 30% zero-emission buses for several years. Due to the prevailing crisis and high electricity prices, the Public Transport Authority in Lublin decided to suspend some electric trolleybuses and replace them with diesel buses. Similar decisions were also made in Nowy Sącz, while Gdynia cancelled a tender for the purchase of six new vehicles.<sup>25</sup> This confirms the negative impact of the energy crisis on the timeliness of investments made.

Increasing energy prices have resulted in temporary increases in ticket prices. Even so, public transport still has many supporters. Most users express positive opinions about the quality of the services provided.<sup>26</sup> However, the ongoing crisis has resulted in reduced investments in public transport, while the absence of established supportive measures, such as an anti-crisis shield for public transport, has hindered its functioning and impeded the modernization of railway and bus routes, which are not being implemented at a satisfactory level and exacerbate the issue of transport exclusion.

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<sup>24</sup> *W Polsce jeździ najwięcej autobusów w Europie. Są jeszcze starsze od osobówek*, <https://regiony.rp.pl/transport/art37981651-w-polsce-jezdzi-najwiecej-autobusow-w-europie-sa-jeszcze-starsze-od-osobowek> (accessed: 15.06.2023).

<sup>25</sup> *Kryzys energetyczny: trolejbusy do zajezdni, autobusy na ulice* (Energy crisis: trolleybuses to the depot, buses to the streets) ([portalkomunalny.pl](http://portalkomunalny.pl)).

<sup>26</sup> *Badanie satysfakcji pasażerów kolei 2023 – UTK czeka na Twoją opinię*, <https://utk.gov.pl/pl/aktualnosci/20123,Badanie-satysfakcji-pasazerow-kolei-2023-UTK-czeka-na-Twoja-opinie.html> (accessed: 15.06.2023).



## 5. Conclusions

Taking into account the considerations mentioned above, it should be emphasized that the transport industry has strongly felt the effects of the energy crisis. The ongoing war in Ukraine has made many people realize that energy transformation is truly necessary and that it is not only a response to the prevention of climate change, but also offers the opportunity to ensure energy independence and security. The energy crisis proved that the implementation of renewable energy sources is vital to ensure energy security.

However, energy transformation in Poland is a complex and highly expensive process because of the significant dependence on coal and traditional energy sources. This has a significant impact on the changes taking place in other sectors, such as transport. In this context, it is worth emphasizing that the energy crisis has caused temporary delays in the process of greening the transport sector, which is already at a lower level than other European countries. This situation means that Poland is currently in the early stage of the development of electromobility, with one of the main barriers being the relatively higher prices of electric vehicles compared with their combustion engine counterparts. However, there is no doubt that these changes must be implemented. The prospect for the future is positive because the Polish domestic market serves as a key supply destination for many companies operating in the field of electromobility. Selected leading manufacturers of zero-emission buses and charging stations in Poland are already today supplying the majority of their products to Polish local government units and national public infrastructure operators.<sup>27</sup> This gives hope that the uptake of activities in the field of electromobility will become faster and further improvement of public transport in terms of quality, frequency and accessibility of services will lead to more residents opting to forgo travelling by passenger car.

## References

- Bartniczak B., "Zrównoważony transport na poziomie regionalnym jako przedmiot pomiaru wskaźnikowego," *Studia Ekonomiczne*, 2013, no. 143, s. 11–20.
- Gola J., Mielczarek-Mikołajów J., Pinkas A., "Stan regulacji prawnych prawa krajowego: wnioski de lege lata i de lege ferenda," [in:] *Rekomendacje do zmian legislacyjnych w zakresie przeprowadzenia transformacji energetycznej i osiągnięcia neutralności klimatycznej*, ed. Jerzy Korczak, Wrocław 2021, pp. 22–37.
- Boehm L., Wilson A., *EU energy security and the war in Ukraine: From sprint to marathon*, pp. 1–2, EU energy security and the war in Ukraine: From sprint to marathon, [https://www.europarl.europa.eu/thinktank/en/document/EPRS\\_BRI\(2023\)739362](https://www.europarl.europa.eu/thinktank/en/document/EPRS_BRI(2023)739362).
- Jastrzębski M., Protasowicki I., Nowakowski Ł. et al., *Polityka bezpieczeństwa energetycznego*

<sup>27</sup> *Raport. Wpływ elektromobilności na rozwój*, pp. 72–73.

- państw Europy Środkowo-Wschodniej. Rola i znaczenie Grupy Wyszehradzkiej, Warszawa 2016.
- Hebda W., "Rosyjska agresja militarna na Ukrainę a bezpieczeństwo energetyczne Polski," [in:] *The war must go on: dynamika wojny w Ukrainie i jej reperkusje dla bezpieczeństwa Polski*, ed. A. Gruszczak, Kraków 2023, pp. 115–124.
- Ileana G., Faus Onbargi A., *European Green Deal and the war in Ukraine: Addressing crises in the short and long term*, Brussels 2022.
- Koźlak A., *Ekonomika transportu. Teoria i praktyka gospodarcza*, Gdańsk 2008.
- Miciuła I., "Polityka energetyczna Unii Europejskiej do 2030 roku w ramach zrównoważonego rozwoju," *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania* 2, 2015, no. 42, pp. 57–67.
- Tomaszewski K., "Rola czynnika ludzkiego w kształtowaniu polityki energetycznej współczesnego państwa," *Środkoeuropejskie Studia Polityczne*, 2020, no. 1, pp. 147–169.
- Raport. Wpływ elektromobilności na rozwój gospodarczy w Polsce, Wariantowe scenariusze rozwoju, p. 3. [https://pspa.com.pl/wp-content/uploads/2022/11/PSPA\\_Wplyw\\_elektromobilnosci\\_na\\_rozwoj\\_gospodarczy\\_Polski\\_Raport-2.pdf](https://pspa.com.pl/wp-content/uploads/2022/11/PSPA_Wplyw_elektromobilnosci_na_rozwoj_gospodarczy_Polski_Raport-2.pdf).
- Ruszel M., "Wpływ rosyjsko-ukraińskich kryzysów gazowych na politykę energetyczną UE – ujęcie teoretyczne," *Przegląd Politologiczny*, 2015, no. 2, pp. 49–57.
- Świdzińska K. J., "Kryzysy energetyczne a bezpieczeństwo energetyczne," [in:] *Kryzysy we współczesnej Europie i próba ich przewyciężenia*, ed. K. Garczewski, Toruń 2017, pp. 110–127.
- Tokarski S., "Transformacja energetyczna – zapotrzebowanie na źródła energii pierwotnej w perspektywie 2040 r. Co się zmieni po wybuchu wojny na Ukrainie?," *Nowa energia* 83, 2022, no. 2, pp. 10–16.
- Sadowska E., "The impact of the Russian-Ukrainian war on the European Union's energy security," *Energy Policy studies* 10, 2022, no. 2, pp. 41–52.