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Energy efficiency in the European Union – legal and economic aspects

Abstract: Energy efficiency, understood as measuring energy consumption, is an important element of the energy policy of the state, in particular because of the problem of energy overconsumption by a rapidly growing population and dynamic economic development, particularly with regard to emerging markets and developing countries. Therefore, the issue of energy efficiency requires appropriate legal regulation and a suitable policy pursued by the public authorities. The aim of the article is to describe energy efficiency in the context of the basic assumptions of the economic analysis of law, as well as the importance of the norms of public economic law in the social market economy. The analysis considers the regulatory frameworks of energy efficiency at the level of the European Union and the selected Member State, namely Poland.

Keywords: energy efficiency, European Union, economic analysis of law.

Introduction

Energy efficiency is one of the main issues of the state's energy policy, although this concept is sometimes misinterpreted. Energy efficiency should not be considered as being synonymous with energy conservation, which means using less energy when performing the same function or just an act of using less energy. Therefore, energy efficiency can be considered the adoption of technology, which consumes less energy without affecting the relevant functionality of a given

electronic device.¹ Parrott defined energy conservation as the voluntary choice to use less energy-consuming technologies.²

Therefore, energy efficiency is the measurement of energy usage, while energy conservation relates to behaviour in favour of using less energy. The popularity of energy efficiency as a field of study arises from the fact that data on energy consumption across the countries and regions provided by several international organizations, such as European Environment Agency (EEA) and International Energy Agency (IEA) indicated over-consumption of energy by societies, mostly from non-renewable sources, mainly due to rapid population growth and the improvement in the quality of life.³

The aim of this article is to characterize energy efficiency in the context of the basic assumptions of economic analysis of law, as well as the importance of norms of public economic law in a social market economy. The analysis considers the regulatory frameworks of energy efficiency at the level of the European Union (EU) and the selected Member State, namely Poland.

The article uses a formal-dogmatic method. Thanks to its use, it is possible to determine the content of applicable legal norms. The subject of the analysis is the content of applicable law and its interpretation. Moreover, in the considerations of this study, the findings of economic sciences were used, to the extent necessary, so that the analyses carried out in the article were multi-aspect and multi-layered.

1. Efficiency and its impact on the functioning of legal regulations

At the outset, it should be noted that efficiency has many levels. According to the dictionary, efficiency means something positive, relevant, real, efficient. Efficiency can be considered *ex post* and *ex ante*. And so, when calculating *ex ante* efficiency, the expected effects are estimated with the involvement of specific resources and time, while *ex post* efficiency is determined by the results of specific activities. Efficiency in the public sector is related to the implementation of the principles of new public management. They refer precisely to the limitation of public spending, which leads to an increase in operational efficiency. In addition,

¹ V. Oikonomou et al., "Energy saving and energy efficiency concepts for policy making," *Energy Policy* 11, 2009, no. 37, pp. 4787–4796.

² K. Parrott, "Energy conservation," [in:] *Sustainable Cities and Communities: Encyclopedia of the UN Sustainable Development Goals*, eds. W. Leal Filho et al., Cham 2015, pp. 158–167.

³ Md. A. Hasan et al., "The synergy between climate change policies and national development goals: implications for sustainability," *Journal of Cleaner Production* 2020, no. 249, 119369; D. Zhu et al., "Analysis of the robustness of energy supply in Japan: Role of renewable energy," *Energy Reports* 2020, no. 6, pp. 378–391.

this concept draws attention to the fact that limiting the impact of the policy on the sphere of implementation of public tasks is also intended to help ensure the efficiency of these tasks based on the measurement of the results and activation of the market mechanism, while performance budgeting is the tool that enables the measurement of the effects of public entities and supporting cost management.

It points to the so-called management efficiency, which is the objective of competition law. Its achievement by the bodies of economic administration may also satisfy the other constitutional and legal criteria referred to above.⁴ Economic efficiency itself does not have a uniform definition. It is most often presented as an activity, the aim of which is to achieve a given effect using the smallest amount of available resources, or to achieve a result using a certain number of resources. The concept of economic efficiency is related to productivity, which refers to the production by the economy of the best combination of quantity and quality of goods and services with the available technologies and scarce resources. The requirement of economic efficiency is synonymous with the utilitarian imperative of maximizing social welfare. In other words, an economically efficient law should enable the selection of such a possible solution that maximizes social welfare.

Efficiency theories naturally follow from the findings of the economic analysis of law. The legal doctrine defines the economic analysis of law – law and economics – as a specific trend. It developed in the early 1960s and it has been finding its followers among legal theorists all over the world since the 1970s.⁵ It has become one of the most developing areas of jurisprudence. The very emergence of economic analysis of law, understood as the research methodology used by economic studies for studying the law, was possible as a result of the development of legal realism, as well as sociological jurisprudence.

Law, which is the subject of economic analysis of law, is understood very broadly. In addition to statutory law, it includes treaty law, customary law, as well as law-making court decisions. Meanwhile, legal institutions are not treated as “being” existing outside the economic system, but as certain variables within that system.⁶ Economic analysis of law tries to observe the effects of changes in these institutions and their impacts on the economic system.⁷

The institution of efficiency is also referred to by both the EU and the national legislator in other normative acts in the sphere of public economic law – specifi-

⁴ J. Drexler, L. Idot, J. Monéger, *Economic Theory and Competition Law*, Cheltenham-Northampton 2009, pp. 236–244.

⁵ R.A. Posner, *Economic Analysis of Law*, New York 2014.

⁶ N. Garoupa, “Doing comparative law and economics: why the future is micro and not macro,” [in:] *Essays in the Law and Economics of Regulation: In Honour of Anthony Ogus*, eds. M. Faure, F. Stephen, Antwerpen-Oxford-Portland 2008, pp. 63–71.

⁷ E. Severin, “The negotiation of disputed rights or how the law comes to economics,” [in:] *Law and Economics in Civil Law Countries*, eds. B. Deffains, T. Kirat, Amsterdam-London-New York-Oxford-Paris-Shannon-Tokyo 2001, pp. 43–60.

cally in competition law and the regulation of infrastructure sectors. This could prove the great importance of efficiency in the context of the state's function with regard to the economy and its impact on the economic development of the state. It is only its presence that makes it possible to influence competition and limit various types of pathologies in the infrastructure sectors.⁸ It should be remembered that the difficulty of the regulatory mission arises from the need for regulatory authorities to apply specific rules affecting the functioning of a given sector, which should contribute to the protection of public safety and order, and their activities are *de facto* similar to the implementation of not only regulatory but also police and rationing functions that cannot be ineffective.

The matter of the functioning of certain institutions of competition law can also be raised in the context of efficiency in the law of the infrastructure sectors. It is emphasized that an important factor that can counterbalance the deterioration of competitiveness is the so-called premise of an increase in productivity.⁹ Council Regulation (EC) No. 139/2004 of 20 January 2004 on the control of concentrations between undertakings states, that “in order to determine the impact of a concentration on competition in the common market, it is appropriate to take account of any substantiated and likely efficiencies put forward by the undertakings concerned. It is possible that the efficiencies brought about by the concentration counteract the effects on competition and, in particular, the potential harm to consumers that it might otherwise have and that, as a consequence, the concentration would not significantly impede effective competition in the common market or in a substantial part of it, in particular, as a result of the creation or strengthening of a dominant position. The Commission should publish guidance on the conditions under which it may take efficiencies into account in the assessment of a concentration.”¹⁰

Representatives of the legal doctrine emphasize that these norms use the term “efficiency” and not “efficiency”, which, in practice, gives greater freedom of interpretation. The increase in efficiency is an end in itself for the companies involved, and, in adopting the view of the regulator, optimization of the company's internal operating mechanisms is of minimal importance, as having an impact on the market and, consequently, on consumers is essential. It is emphasized that the condition cannot be regarded as satisfied if the only effect is a reduction in costs, because this is internal in nature. Efficiency gains alone will therefore be insuf-

⁸ S. Harnay, I. Vigouroux, “Judicial competition, legal innovation and European integration: an economic analysis,” [in:] *The Economics of Harmonizing European Law*, eds. A. Marciano, J.M. Josselin, Cheltenham-Northampton, 2002, pp. 87–100.

⁹ B. Deffains, “Competition between legal systems: A comparative law and economics perspective,” [in:] *Law and Economics in Civil Law Countries*, eds. B. Deffains, T. Kirat, Amsterdam-London-New York-Oxford-Paris-Shannon-Tokyo 2001, pp. 9–22.

¹⁰ European Commission (2004), Council Regulation (EC) No. 139/2004 of 20.01.2004 on the control of concentrations between undertakings. Available at: <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32004R0139&from=EN> (accessed: 24.02.2021).

ficient if it is not shown that they are directly related to the improvement of the situation of consumers.

In the Treaty on the Functioning of the European Union, the presence of the institution of efficiency can be noticed in the regulations on energy. For example, in the context of the establishment or functioning of the internal market and, taking into account the need to preserve and improve the state of the environment, the EU energy policy aims, in the spirit of solidarity between the EU Member States (EMS), to promote energy efficiency and energy savings, as well as to develop new and renewable sources of energy. Energy efficiency itself may be related to energy security, which should be one of the priorities of the EU's economic policy. Furthermore, it is worth noting that energy security is one of the main elements of public safety. It is closely related to the smooth functioning of the internal energy market.

Energy security itself means security of fuel and energy supplies at a level which guarantees that the needs of individual EMS will be satisfied and at prices that are acceptable to the economy, assuming the optimal use of energy resources and by diversifying the sources and directions of supplies of crude oil, as well as liquid and gaseous fuels. The proper functioning of internal energy market requires the cooperation of individual regulatory authorities of the EMS. An example of such cooperation is the establishment of the Agency for the Cooperation of Energy Regulators. A uniform energy policy needs to be developed at EU level, which will be manifested in the existence of a uniform energy security management system encompassing a set of actions and measures aimed at achieving an appropriate level of security and will affect efficiency in the energy sector.

In summary, it should be stated that the security of fuel and gas supplies should be one of the EU's most important priorities. There is no doubt that *de lege ferenda* a basic, new and coherent framework for cooperation needs to be established at EU level, which would apply to economic relations in the energy industry. Only in this way can the EU join the group of countries deciding on energy policy in the international arena. It will also have a greater impact on the political situation, which is often changed by economic instruments. The greatest threat to the EMS in the area under review may be the total dependence on the energy economy of an external country, which could lead to divisions across the EMS and a reduction in energy efficiency.

2. The EU and national regulatory frameworks of energy efficiency

2.1. EU level

The EU energy policy, including the priority of energy efficiency, dates back to the 1950s, although its current content is heavily determined by the developments of the last four decades, which have paved the way to the European Energy Union (Table 1).

Document (year)	Document (year)	Document (year)	Document (year)
Treaty of Paris (1952)	Green Paper on an EU energy policy (1994)	Emission Trading Scheme (2005)	Europe 2020 Strategy (2010)
Euratom Treaty of Rome (1958)	White Paper on an EU energy policy (1995)	Green Paper on sustainable energy (2006)	Energy Union Strategy (2015)
Internal Energy Market (1988)	Electricity Directive (1996)	The Lisbon Treaty (2007)	Clean Energy for All Europeans Package (2019)
European Energy Charter (1991)	Gas Directive (1998)	Climate and Energy Package (2009)	European Green Deal (2019)
The Maastricht Treaty (1992)	Lisbon Strategy (2000)	The Commissioner for Energy (2010)	

Table 1. Main documents of the EU on energy policy

Source: K. Wach et al., "Europeanization Processes of the EU Energy Policy in Visegrad Countries in the Years 2005–2018," *Energies*, 2021, no. 14, 1802.

While the first period of the EU energy policy (1952–1973) mainly focused on coal mining, energy efficiency was highlighted for the first time in the second period (1973–1988), as this was strongly affected by the oil crisis of the 1970s. The Internal Energy Market 1988 document emphasized a gradual reduction of fossil fuels as the primary source of energy in favour of higher, more effective use of renewables. Attempts were made in the third period (1988–2000) to open the EU's energy market, including raising political and social awareness about the need for the effective use of energy. Starting with the Lisbon Strategy (2000), transformation towards a low-carbon economy was enhanced under fourth period of the EU energy policy (2000–2015), when energy efficiency and deeper penetration of renewable sources of energy within a single energy market was emphasized. An important component of the politics of the time was the Emissions Trading System (2005), which contributed to a reduction in greenhouse gas emissions.¹¹

¹¹ M.G. Pollitt, "The European single market in electricity: An economic assessment," *Review of Industrial Organization* 2019, no. 55, p. 67.

The EU set a 20-20-20 target in the Climate and Energy Package (2009), which included a 20% increase in energy efficiency by 2020. Five priorities were stated in the Energy Union Strategy (2015), which formally opened up the current, fifth period of the EU energy policy. These included energy efficiency with regard to a reduced dependence on energy imports and greenhouse gas emissions. The Clean Energy for All Europeans Package by 2030 was a set of eight legal documents in which the EU obliged the EMS to adopt national laws to meet five priorities, including energy efficiency, through energy savings and reduced greenhouse gas emissions. The Climate and Energy Framework, an updated version of the Climate and Energy Package, revised the energy policy's goal, setting it at 40-32-32.5.¹²

The EU legislator obliged the EMS to develop national plans intended to lead to the implementation of the basic principles of energy efficiency. This is, among others, a manifestation of the fulfilment of the obligations to submit reports to the European Commission under Directive 2006/32/EC of the European Parliament and of the Council of 5 April 2006 on energy end-use efficiency and energy services, as well as Directive 2012/27/EU of the European Parliament and of the Council of 25 October 2012 on energy efficiency. The Energy Efficiency Directive (EED) laid down a set of measures to achieve the 20% energy efficiency goal by 2020. The EED obliged the EMS to maximize energy efficiency at all stages of the value chain, including generation, transmission, distribution and end-use of energy. Apart from good practices published by the European Commission, a central role is played by the set of measures laid down in the EED, including the preparation of national energy efficiency action plans at EMS level every three years.¹³

The EED was amended by Directive 2018/2002 of the European Parliament and of the Council of 11 December 2018. This Act sets the 2030 energy efficiency target at 32.5%. Importantly, the EMS are being obliged to achieve new energy savings for final energy consumption of up to 0.8% per year in 2021–2030, as well as to prepare integrated ten-year national energy and climate plans to meet the energy efficiency targets by 2030. Also, a review of the EED was requested by 2024. Public consultations were organized between November 2020 and February 2021 to pave the way to the review and revision of the EED by the European Commission. Under the European Green Deal, the requirement to improve energy efficiency was increased further to a 55% reduction in greenhouse gas emissions by 2030 – compared to the 1990 levels – and to Europe is to become the first con-

¹² K. Wach et al., “Europeanization processes of the EU energy policy in visegrad countries in the years 2005–2018,” p. 6.

¹³ Energy Efficiency Directive, European Commission, 2021, https://ec.europa.eu/energy/topics/energy-efficiency/targets-directive-and-rules/energy-efficiency-directive_en (accessed: 22.02.2021).

tinent which is climate-neutral by 2050.¹⁴ More detailed legislative proposals are expected by June 2021.¹⁵

As for the implementation of the EU regulations at EMS level, the European Commission has announced three recommendations addressing the transposition of the energy saving obligations under the EED, the implementation of the metering and billing provisions of the EED and the assessment of effective heating and cooling potential under the EED. There is also Commission Guidance COM (2013)/762 Implementing the Energy Efficiency Directive (2012/27/EU).

2.2. National level

An example of the regulations on energy efficiency at EMS level can be the Polish regulations contained in the Energy Law of 10 April 1997. The legislator defines many normative institutions, including with regard to the award of administrative permits by the national regulatory authority operating in the infrastructure sector. For example, the President of the Energy Regulatory Office may grant an authorization if the condition that this administrative act does not cause a deterioration of the conditions of competition and effectiveness of the functioning of the gaseous fuel market in the EU or the gas system in which the new infrastructure has been or will be built is met. The Polish legislator also refers to this concept in terms of the procedure of selecting vendors *ex officio*. He indicates that, when specifying the bid evaluation criteria in the tender documentation and when selecting the bid for the *ex officio* supplier, the President of the Energy Regulatory Office needs to take into account the bidder's experience and the economic efficiency of his business.

The Polish legislator also refers to the concept of energy efficiency in the Act on renewable energy sources of 20 February 2015. This Act applies to the renewable energy sector, which is part of the energy sector, which means that it belongs to the so-called regulated sector. The introduction of these regulations into the legal order was related to the adaptation of Polish law to the regulations of the EU. The basic EU act regulating the renewable energy sector is 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, amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC, which contains detailed regulations that have the objective of implementing the postulates of the European energy policy of increasing energy production from renewable sources, and obliges the EMS to achieve strictly defined goals. Examples of the legislator's use of the term

¹⁴ "Energy efficiency in the European Green Deal," European Commission, 2021, https://ec.europa.eu/energy/topics/energy-efficiency/targets-directive-and-rules/energy-efficiency-directive_en#energy-efficiency-in-the-european-green-deal (accessed: 1.03.2021).

¹⁵ "The European environment – state and outlook 2020: Knowledge for transition to a sustainable Europe," European Environment Agency, 11.05.2020, <https://www.eea.europa.eu/publications/soer-2020> (accessed: 14.02.2021).

“efficiency” include Article 72, para. 3, item 6 of the Act on renewable energy sources, according to which, when setting the maximum amount and value of electricity from renewable energy sources, the Council of Ministers shall take into account, *inter alia*, the need to effectively use primary energy obtained as a result of the simultaneous generation of electricity, heat and cold.

Another legal act worth mentioning and which *in concreto* relates to efficiency is the Polish Act on energy efficiency of 20 May 2016. The substantive scope of this Act includes rules for the preparation of a national energy efficiency action plan, the tasks of public sector units regarding energy efficiency, the principles of fulfilling the obligation to achieve energy savings and the rules for conducting an energy audit of an enterprise. Importantly, the Act introduced a legal definition of energy efficiency into the legal system, which means the ratio of the value of the utility effect of a given facility, technical device or installation obtained under typical conditions of use or operation, to the amount of energy consumption of this facility, technical device or installation, or as a result of the service rendered necessary to achieve this effect. It could be said that this explanation is strictly “technical” and is not the same as the concept of economy. It does, however, address issues related to the appropriate use of energy and the indirect environmental impact of such activities. The achievement of energy efficiency is to be ensured by the national energy efficiency action plan prepared by the minister responsible for energy. It includes, in particular, a description of the planned programmes containing measures to improve energy efficiency in individual sectors of the economy, the setting of a national energy efficiency target, information on the energy savings achieved, including in transmission or distribution, delivery and final energy consumption and a strategy for supporting investments in the renovation of buildings, including the results of the inspection of buildings located in the Republic of Poland, the identification of methods of rebuilding or renovating buildings and estimated data on possible energy savings as a result of the reconstruction or renovation of buildings.

According to a recent assessment of the progress made by the EMS towards national energy efficiency targets and the implementation of the EED, Poland increased both primary and final energy consumption in 2005–2018 at a rate that was higher than the rate of decrease required for 2005–2020 to meet national energy efficiency targets.¹⁶ Poland’s greenhouse gas emissions in 2018 amounted to 106.2% of the 2020 target, with the EU average at 97.8%. The share of renewable energy in gross final energy consumption was 76.5% of the 2020 target (the EU

¹⁶ Report from the Commission to the European Parliament and the Council 2019 – assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU, COM(2020) 326 final, Brussels 2020, pp. 15–16, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0326&from=EN> (accessed: 24.02.2021).

average was 90.1%), while primary energy consumption in Poland in 2018 was close to the EU average – 104.8% and 104.7% of the 2020 target respectively.¹⁷ This, in turn, makes Poland a kind of exception among the EMS with regard to meeting the EU climate and energy policy targets, including energy efficiency, particularly in the post-2015 period.

3. Conclusions

In conclusion, it should be stated that studies on energy efficiency must be conducted on the basis of the basic assumptions of the economic analysis of law. The analysis of the legal norms relating to the electricity sector enable them to be seen from an economic point of view and allow for the prediction of the effects of applying specific solutions, thereby determining the extent of economic efficiency of the law.

It should be remembered that the energy efficiency of the state is one of the basic assumptions of the European energy policy. It is one of the elements of the national energy policy of each EMS, harmonized with the EU policy, to guarantee the security of supply of all energy media, while respecting the rules of competition in the internal market and national markets. As such, energy efficiency is said to contribute to economic development at EU level. As a result, the EU is among the group of entities deciding on energy policy on a global level. This is why cooperation and mutual relations between EMS are important, often even more important than relations with countries outside the EU.

It is the interdisciplinary approach to the subject matter that will allow for the identification of potential areas of cooperation between the law and the economy and the use of the achievements of economic analysis of law in this respect. Energy efficiency depends on the correct and effective normative solutions that directly affect the situation of entities participating in economic processes. Its level affects the economic situation of a given country through the functioning of reliable and correct spending of public funds.

References

- Danmei Z., Mortazavi, Mostafa S., Akbar M., Alireza A., Hossein Y., “Analysis of the robustness of energy supply in Japan: Role of renewable energy,” *Energy Reports* 2020, no. 6, pp. 378–391.
- Deffains, B. (2001), “Competition between legal systems: A comparative law and economics perspective,” [in:] *Law and Economics in Civil Law Countries*, eds. B. Deffains, T. Kirat, Amsterdam-London-New York-Oxford-Paris-Shannon-Tokyo 2001, pp. 9–22.

¹⁷ K. Wach et al., “Europeanization processes of the EU energy policy in Visegrad countries in the years 2005–2018,” p. 12.

- Drexel J., Idot L., Monéger J., *Economic Theory and Competition Law*, Cheltenham-Northampton 2009.
- “Energy efficiency in the European Green Deal,” European Commission, 2021, https://ec.europa.eu/energy/topics/energy-efficiency/targets-directive-and-rules/energy-efficiency-directive_en#energy-efficiency-in-the-european-green-deal.
- “The European environment – state and outlook 2020: Knowledge for transition to a sustainable Europe,” European Environment Agency, 11.05.2020, <https://www.eea.europa.eu/publications/soer-2020>.
- Garoupa, N. (2008), “Doing comparative law and economics: why the future is micro and not macro,” [in:] *Essays in the Law and Economics of Regulation: In Honour of Anthony Ogus*, eds. M. Faure, F. Stephen, Antwerpen-Oxford-Portland 2008, pp. 63–71.
- Harnay, S., Vigouroux I., “Judicial competition, legal innovation and European integration: an economic analysis,” [in:] *The Economics of Harmonizing European Law*, eds. A. Marciano, J.M. Josselin, Cheltenham, Northampton, 2002, pp. 87–100.
- Hasan A., Abubakar I.R., Rahman S.M., Aina Y., Chowdhury I., Khondaker A.N., “The synergy between climate change policies and national development goals: implications for sustainability,” *Journal of Cleaner Production* 2020, no. 249, 119369.
- Oikonomou V., Becchis F., Steg L., Russolillo D., “Energy saving and energy efficiency concepts for policy making,” *Energy Policy* 11, 2009, no. 37, pp. 4787–4796.
- Parrott K., “Energy conservation,” [in:] *Sustainable Cities and Communities. Encyclopedia of the UN Sustainable Development Goals*, eds. W. Leal Filho, A. Azul, L. Brandli, P. Özuyar, Cham, pp. 158–167.
- Pollitt M.G., “The European single market in electricity: An economic assessment,” *Review of Industrial Organization* 2019, no. 55, pp. 63–87.
- Posner R.A., *Economic Analysis of Law*, New York 2014.
- Report from the Commission to the European Parliament and the Council 2019 – assessment of the progress made by Member States towards the national energy efficiency targets for 2020 and towards the implementation of the Energy Efficiency Directive as required by Article 24(3) of the Energy Efficiency Directive 2012/27/EU, COM(2020) 326 final, European Commission, Brussels 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52020DC0326&from=EN>.
- Severin E., “The negotiation of disputed rights or how the law comes to economics,” [in:] *Law and Economics in Civil Law Countries*, eds. B. Deffains, T. Kirat, Amsterdam-London-New York-Oxford-Paris-Shannon-Tokyo 2001, pp. 43–60.
- Wach K., Głodowska A., Maciejewski M., Sieja M., “Europeanization processes of the EU energy policy in Visegrad countries in the years 2005–2018,” *Energies* 2021, no. 14, 1802.