

EVALUATION OF SELECTED ECONOMIC POLICY INSTRUMENTS IN MANAGING THE PROCESS OF ACCEPTANCE OF RENEWABLE ENERGY SOURCES BY THE ENTREPRENEUR SECTOR IN POLAND

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Purpose: The article aims to answer the question of which of the economic policy instruments may have the greatest impact on the acceptance of renewable energy sources by the business sector in Poland.

Design/methodology/approach: The research process used a tool in the form of a method (CAWI), which was used to verify the role of selected economic policy instruments in the process of the announced energy transformation. The research area focused on assessing the possibility of changes in the acceptance of renewable energy sources by the business sector in selecting economic policy instruments. Economic and non-economic instruments were analyzed.

Conclusions: The authors conclude that the management of the process of acceptance of renewable energy sources by the business sector should be implemented using appropriately selected economic policy instruments and go hand in hand with changes taking place in the economic environment.

Research limitations/implications: The presented survey research was conducted on a specific research sample of approximately 250 respondents - entrepreneurs in a selected voivodeship, which is a national leader in the development of renewable energy sources. It is necessary to conduct much broader analyses and research, in particular covering regions of Poland where the share of energy obtained from renewable sources is negligible.

Practical implications: The research results are the first approach to indicate to government administration entities which economic policy tools have the greatest impact on managing the process of acceptance of renewable sources by the business sector in Poland.

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Keywords: management, instruments, economic policy, renewable energy sources, entrepreneurial sector, market research.

Category of the paper: Research paper.

1. Introduction

As the literature on the subject indicates, the term energy transformation is a process whose aim is to modify economies and existing energy networks to make them less dependent on fossil fuels, which will increase their energy efficiency (Bonfert, 2024; Dębicka et al., 2024; Więckowski et al., 2024). To put it simply, this means reducing energy consumption, switching to renewable or low-emission energy sources and restructuring energy systems, energy infrastructure and energy supply chains (Dusiło, 2024). This idea was included in two key documents regarding the energy transformation in Poland. in the National Energy and Climate Plan for 2021-2030 (Ministerstwo Klimatu i Środowiska, 2024) of 2019 and the Polish Energy Policy until 2040 with a perspective until 2040 (Ministerstwo Rozwoju i Technologii, 2024) of 2021 (Michalik, Zieliński 2024).

Therefore, for some time now the problem of energy transformation has been moved from the debate level to the political level, where there is an active discussion on the impact of individual instruments on changes taking place (Rybacz, 2024; Herudziński, Swacha, 2022). Taking into account that economic policy covers all economic relations and the production and service potential available, exploited and developed in a given country (Seroka, 2022). At the same time, presenting the doctrine in the area of development of an innovative economy. Directly constituting one of the instruments for shaping the high quality of life of residents and strengthening competitiveness as an attractive place to live and work (Łucki, 2010). It should be emphasized that the role of economic policy is mainly to consciously influence the authorities and their immediate and distant environment on the economy, its dynamics and structure, as well as on external economic relations using specific tools to achieve the planned goals (Mastalerska, 2011; Winiarski, 2012). However, observations of market realities indicate that the discussion on the energy transformation ahead of us ignores aspects related to selected economic policy instruments in managing the acceptance process. renewable energy sources by the business sector in Poland (Pultowicz, 2009; Rapacka, 2024). Given that this demand group plays an important role in the social life of every city and region (Tomaszewski, Sekściński, 2020). Entrepreneurs often stimulate the development of their immediate environment by deciding to innovate. Thus, transforming not only your own business but also the entire economic environment (Szymańska, Mroczek, 2023). At this stage of consideration, other researchers should be informed that the opinion of the business sector may prove crucial for the further development of renewable energy sources in each region of Poland.

Moreover, the authors share the opinion of other researchers that when it comes to the pace of development of renewable energy sources in Poland, it is defined by the selection of appropriate economic policy instruments (Rybasz, 2024; Dragan, Zdyrko, 2023). Various classifications of the instruments used can be found in the available literature. For example, one of the researchers, adopting the criterion of the nature (type) of the tool, divided the instruments

of economic policy into two groups - economic (parametric): and non-economic tools (non-parametric) (Sathiendrakumar, 2020). However, another thinker proposed dividing them into four groups: legal (legislative), economic, communication and structural. This does not change the state of affairs that all the instruments mentioned have a direct impact on the business sector (Tomaszewski, 2020).

The literature on the subject emphasizes that the acceptance of renewable energy sources by the corporate sector must be coordinated with the proper management of economic policy instruments (Czepło, 2022). The main problem in this matter is the adaptation of economic and non-economic tools to the expectations of the demand side itself, in this particular case - entrepreneurs (Sokołowski et al., 2022). In the scientific discussion on the behaviour of entrepreneurs themselves, there is a noticeable increase in interest in issues related to renewable energy sources, especially in the context of contemporary disputes regarding the possible benefits and threats related to energy transformation in individual sectors and industries of the Polish economy (Michalik, Zieliński, 2024).

The analysis of the available literature showed that there is a lack of research on the assessment of selected economic policy instruments in the management of the process of acceptance of renewable energy sources by the demand side (Katarzyński, Przekota, 2024). In particular, publications focus on identifying areas important for entrepreneurs themselves. All the more so because entrepreneurs are an extremely important element of society, significantly influencing the development and economic growth of a given country (Tarasova, 2024). Moreover, the presented research may help identify challenges related to energy transformation processes in Poland. At the same time, it constitutes a basis for verification of the currently adopted strategy in this area and the economic policy instruments used (Lach et al., 2023).

Therefore, the presented considerations have many important implications, both theoretical and practical. Given the fact that the goal of this research is to gain extensive knowledge about the impact of economic policy instruments on managing the process of acceptance of renewable energy sources by entrepreneurs in Poland. The article is divided into individual parts. Section 2 contains a detailed description of the purpose, scope and research method used to answer the research questions. Section 3 describes the experimental results and their interpretation. In turn, Section 4 discusses the research results and presents conclusions - pointing to their limitations in the perspective of research conducted so far, and also indicates future research directions about the issue of the impact of economic policy instruments on the process of acceptance of renewable energy sources by the business sector.

2. Materials and Methods

2.1. Conceptual framework

The research project aimed to obtain knowledge from entrepreneurs about the impact of economic policy instruments on the process of their acceptance of renewable energy sources. The presented characteristics of the selected issue refer only to the recipients of economic policy, i.e. the demand side defined as the business sector. However, in the research area, the focus was on assessing possible changes in the aspect of selected economic policy instruments. Economic and non-economic instruments were analyzed. The questions focused on issues related to, among others: possible benefits and threats related to the use of renewable energy sources on a larger scale and instruments used in the area of economic policy. Following this line of reflection, an attempt was made to answer the following research questions:

- What benefits and threats does the development of renewable energy sources bring to entrepreneurs?
- Which of the instruments of economic policy may have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?
- Which economic instruments in the area of economic policy can have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?
- Which of the non-economic instruments in the area of economic policy can have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?

2.2. Sampling method

In the context of the dynamically changing nature of the development processes of renewable energy sources in Poland and all the yet unidentified economic effects of these changes, affirmative actions were taken to properly select the research sample. The survey was addressed only to entrepreneurs who correctly defined the essence of renewable energy sources and the nature of economic policy instruments. Therefore, the awareness criterion was the main factor determining the participation of a given entrepreneur in the study - potential respondents were initially verified whether they met this condition. During the study, the vast majority of respondents confirmed this role and provided correct answers to the first two questions asked for this purpose.

The selection of respondents for the study was carried out among entrepreneurs operating in the West Pomeranian Voivodeship, which is a leader in obtaining energy from renewable sources energy (Bera, Lewicki 2023). The study did not divide it according to legal form, industry affiliation or size of the entity, with one reservation that the respondents were only

entities planning to replace conventional energy sources with those from renewable sources. Due to the diversity of the sectors of the economy from which the entrepreneurs came, one research course was conducted using one communication channel - the Internet. The time frame of the study was set in the period from January to March 2024, i.e. in the period when the liberalization of energy prices in Poland was planned. The research sample included 248 respondents. Therefore, the adopted strategy assumed that a sample of 240 interviews was considered sufficient for the adopted analysis scheme and made it possible to answer the research questions.

2.3. Tool description

The study used the CAWI method (interviews conducted via the Internet). The survey form enabling its completion was made available on the appropriate website using the Google Forms Tool. The survey was anonymous, which allowed respondents to freely express their opinions. The arrangement of the presented results is reflected in the completed questionnaires. A group of survey questions was devoted to issues related to entrepreneurs' awareness of managing the process of accepting renewable energy sources and the impact of economic policy instruments on this process.

2.4. Analysis flowchart

During the study, 248 completed answer sheets were obtained (240 were accepted for analysis) in electronic form via the Google Forms Tool. The survey included 10 questions related to energy transformation plans in Poland (an analysis of the answers to 4 of them can be found in the article below). In the adopted scheme, the questions asked concerned the assessment of selected economic policy instruments in managing the process of acceptance of renewable energy sources by the demand side in Poland - entrepreneurs. The study further consists of substantive notes and charts containing the results of answers to the questions contained in the form sheets. After entering the answers into the spreadsheet, the obtained data were subjected to statistical and substantive analysis. To increase the readability of the answers obtained, the results are presented in the simplest form (percentage values) in individual figures 1 to 4. Because all questions were multiple choice, percentages always added up to 100%.

Technical notes on the method of data presentation are included in the titles and footers of the figures. Since respondents were not required to answer all questions in the survey, the number of correct answers varied from question to question, which did not affect the final result because the numerical and percentage losses were not significant. The layout of all analyses was subordinated to the above-described research objectives.

3. Results and discussion

At the first stage of research, what benefits and threats do entrepreneurs think the development of renewable energy sources brings?

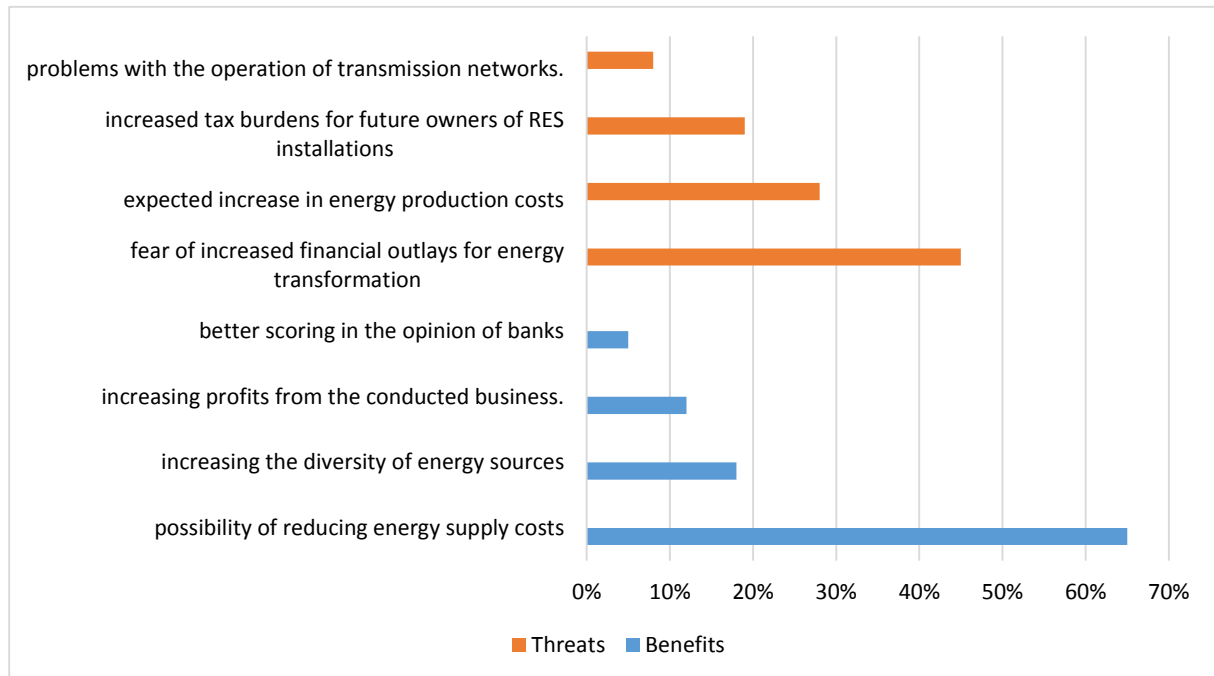


Figure 1. Benefits and threats to the development of renewable energy sources in the opinion of entrepreneurs.

Source: own study.

The analysis of the responses obtained shows that over 65% indicate the possibility of reducing the costs of energy supply. 18% of respondents indicated increasing the diversity of energy sources. Another 12% to increase profits from your business. Another 5% for better scoring in the opinion of banks, consumers and shareholders. However, in the case of threats, over 45% indicated fear of increased financial outlays on the energy transformation. Another 28% for the expected increase in energy production costs and 19% for an increase in tax burdens for future owners of renewable energy installations. And 8% for problems with the operation of transmission networks.

In the next stage, respondents were asked to indicate which of the economic policy instruments may have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland.

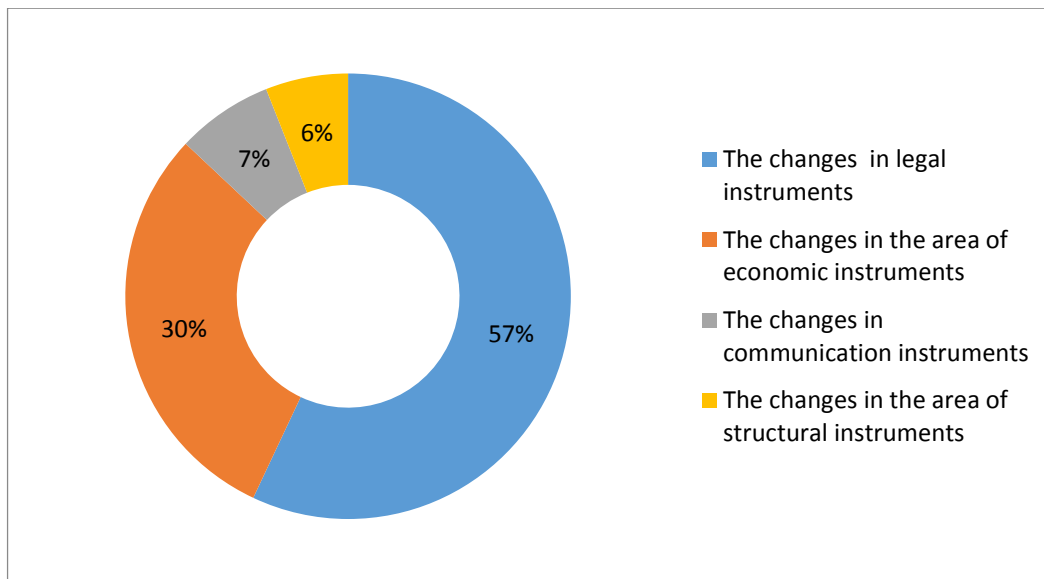


Figure 2. Which economic policy instruments can have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?

Source: own study.

The results of the responses obtained indicated 57% of the need for changes in legal instruments. In turn, 30% emphasized the need for changes in the area of economic instruments. Moreover, 7% of entrepreneurs drew attention to the need for changes in communication instruments. Only 6% of respondents indicated changes in the area of structural instruments.

In the next stage of the study, respondents were asked to indicate which economic instruments in the area of economic policy may have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland.

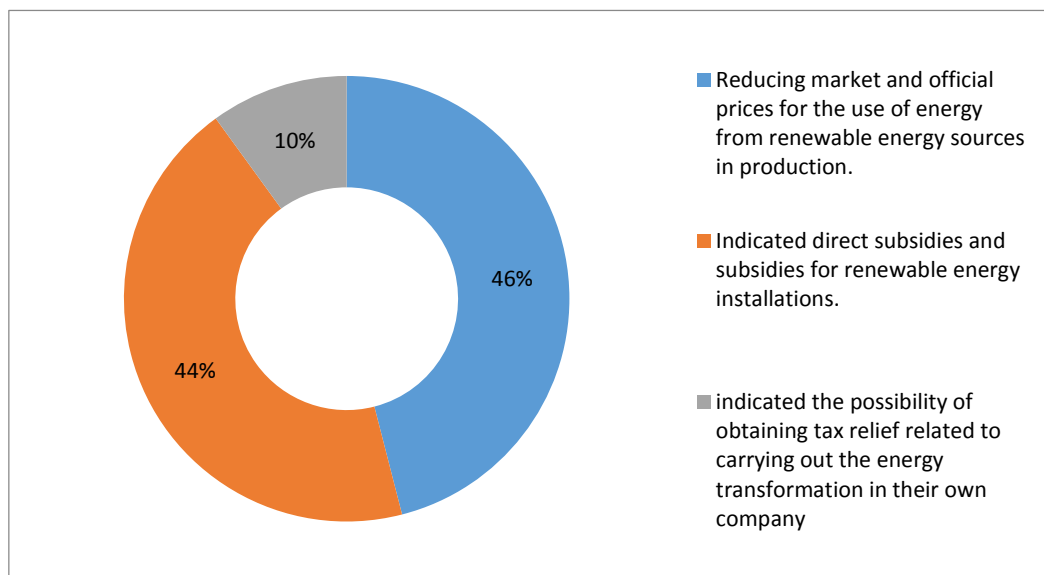


Figure 3. Which of the economic instruments in the area of economic policy can have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?

Source: own study.

Research shows that, according to 46% of respondents, the most effective tool will be reducing market and official prices for the use of energy from renewable energy sources in production. On the other hand, another 44% indicated direct subsidies and subsidies for renewable energy installations. However, 10% of respondents indicated the possibility of obtaining tax relief related to carrying out the energy transformation in their own company.

In the last stage of the study, respondents were asked to answer the question of which of the non-economic instruments in the area of economic policy may have the greatest impact on the acceptance of renewable energy sources by entrepreneurs in Poland.

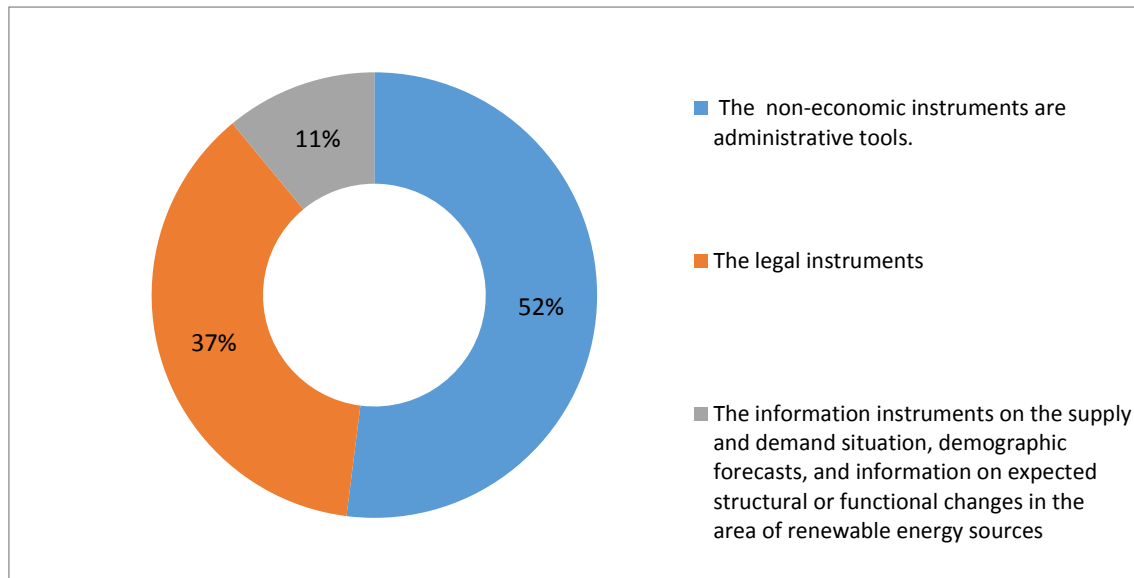


Figure 4. Which of the non-economic instruments in the area of economic policy can have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland?

Source: own study.

The analysis of the results of the responses shows that, in the opinion of 52% of respondents from the group of entrepreneurs, the most effective non-economic instruments are administrative tools. In addition, 37% of respondents indicated legal instruments. Only 11% indicated information instruments on the supply and demand situation, demographic forecasts, and information on expected structural or functional changes in the area of renewable energy sources.

4. Summary and Conclusions

Without a doubt, energy transformation is becoming one of the most important global megatrends of modern times (Sinsel et al., 2020). It is important to understand that energy transformation processes contribute to changes taking place in various spheres - including economic policy (Drożdż et al., 2023). Therefore, the most important political challenge is to

develop the concept of energy transformation, taking into account the acceptance of the business sector. In the available literature, many researchers have identified necessary activities in the field of modernization of power grids or electrification of existing infrastructure (Husin, Zaki, 2021; Coban, Lewicki, 2023). The foundations for a green and innovative economy were also developed, using all available national and EU funds. At the same time pointing to the social aspect of energy transformation and decarbonization, including its tasks and opportunities (Tomaszewski, Sekściński, 2020). Recognizing also the important role of the demand side, including entrepreneurs themselves in yes difficult process that is the energy transformation (Tomaszewski, 2020).

However, one of the fundamental challenges in the transformation process is managing the process of acceptance of renewable energy sources by the demand side (Voytyuk, 2012). This effect can be achieved by selecting appropriate economic policy instruments. The available literature emphasizes that the renewable energy sector is a strategic driving force for the development of each region, determining its competitiveness (Lach et al., 2023). Such establishment of priorities is consistent with the idea and concept of ensuring energy security at the national and European Union level, as well as the development conditions and endogenous potential of a given region (Winarski, 2012). Considering that, according to many researchers, the deficit of energy resources will, over time, become a current problem for most regions of the European Union (EU) countries (Michalik, Zieliński, 2024). The available literature emphasizes that the acceptance of renewable energy sources is not only justified in the sphere of climate protection but is now a revolutionary undertaking. technology fit for the 21st century. It is intended to build a broadly understood green economy with a green industry (Sinsel et al., 2020). Therefore, entrepreneurs should not only participate in this process on an equal basis with other market participants but at the same time their position on this topic should be monitored.

As observations of market realities indicate, the current share of renewable energy in the Polish energy mix is still incomparable to the EU average. With the reservation that Poland is one of the EU countries where the generation capacity from renewable sources is growing the fastest. In practice, the implementation of this plan for the acceptance of renewable energy sources through economic policy instruments is associated with several challenges related to changes in the awareness not only of entrepreneurs themselves but also of the legal system regarding the production, use and sale of energy itself and possible surpluses (Więckowski et al., 2024). The authors of the study believe that several important factors contributed to the slow pace of change in the awareness of the demand side represented by entrepreneurs. It should be emphasized that, as other researchers point out, in times of uncertainty regarding companies' financial situation, there is a noticeable phenomenon of greater control of investment expenditure (Rapacka, 2024). Thus, the purchase of a renewable energy installation, the cost of which is high, is postponed time. Moreover, market experts emphasize that the current regulations are so unfavourable for renewable energy producers that many entities are cautious

about investing in renewable energy sources or abandoning them altogether. When discussing the barriers facing investors in the renewable energy market, it is also necessary to point out the maximum energy price introduced at the end of 2023, which covered, among others, larger producers of energy from renewable energy sources. Revenues obtained from the sale of renewable energy above the designated level must be returned to the so-called Price Difference Payment Fund. The authors support the experts' thesis that taking protective measures for households cannot affect electricity producers (Katarzyński, Przekota, 2024). Current solutions cause significant losses, especially among enterprises that generate electricity from renewable energy sources, and this situation may consequently lead to an increase in energy prices, causing a domino effect. Consequently, this mechanism adversely affects current energy producers renewable energy may in the future constitute a negative market signal to undertake new investments in renewable energy sources throughout the country.

In terms of benefits and threats to the development of renewable energy sources, the authors' research has shown that the greatest benefit is the ability to reduce the costs of energy supply. This fact was indicated by over 62% of respondents. Available reports and research in the field of renewable energy research confirm this line of thought (Michalik, Zieliński, 2024), which is related to the belief that producing your energy will reduce the costs not only of energy supply but also of consumption. However, in the case of threats, as many as 45% indicated fear of an increase in financial outlays for the energy transformation. According to the study authors, this state of affairs is influenced by the fear that entrepreneurs will bear most of the costs related to the energy transformation. Moreover, an important concern in the opinion of entrepreneurs, indicated by 28%, is the expected increase in electricity prices. On this issue, the author shares the opinion of experts (Katarzyński, Przekota, 2024) that artificial regulation of energy prices and the introduction of protective tariffs for individual users may lead to a situation that may translate into an increase in prices for entrepreneurs.

When it comes to indicating which of the economic policy instruments may have the greatest impact on the acceptance of renewable energy sources by entrepreneurs in Poland, the demand side indicated the need for changes in the scope of legal instruments. and changes in the area of economic instruments. As many as 87% of respondents indicated the role of these two instruments. As observations of the economic environment indicate, this problem has been noticed by the state authorities. Advanced work is underway on the act on investments in wind farms and on the amendment of the RES Act. Based on the results presented above, the authors agree with the thesis promoted by other researchers (Rapacka, 2024) that the increase in the pace of development and acceptance of renewable energy sources by entrepreneurs themselves depends on favourable legislative changes.

When it comes to economic instruments in the area of economic policy that may have the greatest impact on the acceptance of renewable energy sources by the demand side - entrepreneurs in Poland. According to respondents, the most effective tools will be reducing market and official prices for the use of energy from renewable energy sources in production,

as well as direct subsidies and subsidies for renewable energy installations (Egmond et al., 2006). The authors of the research thesis that the implementation of this solution may lead to wider acceptance of transformation processes by entrepreneurs themselves, especially those who have not yet made the final decision.

However, when it comes to non-economic instruments in the area of economic policy that may have the greatest impact on the acceptance of renewable energy sources by entrepreneurs in Poland, two instruments should be mentioned: administrative and legal. According to the authors of ordinances and resolutions of authorities of an imperative nature, i.e. orders can force entrepreneurs unanimously to accept renewable energy sources. In particular, normative acts in the area of technical standards regarding the construction and operation of individual fixed assets. They can significantly speed up the energy transformation acceptance processes

In conclusion, the authors support the postulate made by other researchers (Dębicka et al., 2024; Michalik, Zieliński, 2024; Tarasova, 2024) that in the current reality we are dealing with a complicated geopolitical and economic situation. Today it is necessary to outline the direction of development in the field of renewable energy, not only for the next years but also for decades. It should be emphasized that Poland is a member of the European Community, which plans to be climate-neutral by 2050. Therefore, all economic policy instruments should be used to convince entrepreneurs to implement this plan. Given that the European Union allocates huge amounts of money to finance green investments. The fundamental task is to properly use financial resources so that the cost of energy transformation is evenly distributed among all EU countries, and does not only burden the demand side and entrepreneurs from our country.

The presented research focused on assessing the impact of economic policy instruments on the process of acceptance of renewable energy sources by entrepreneurs in Poland. Against the background of scientific considerations, the question must be answered whether the presented research conclusions can be directly applied to the entire country. It should be noted that the West Pomeranian Voivodeship region is the national leader in the development of renewable energy sources. Therefore, duplicating common assumptions and patterns for regions where energy obtained from traditional sources dominates is not advisable. Given the fact that different destinations are based on different initial assumptions, e.g. terrain or lack of access to sea areas. This does not change the state of affairs that even those areas that do not see the potential for development in renewable energy sources today will be forced to undergo energy transformation. Therefore, managing the process of acceptance of these changes in the sector entrepreneurs will certainly have the same dimension as in the example of the West Pomeranian region analyzed by the authors. However, the question remains unanswered which of the economic policy instruments will have the greatest impact on the process of acceptance of renewable energy sources by entrepreneurs in Poland shortly.

This study used data from a survey conducted on a specific research sample of approximately 250 respondents - entrepreneurs from a selected geographical area of Poland, which is a leader in the development and use of renewable energy sources. Much broader

research and analysis is certainly needed, especially in geographical areas where the economy is still based on traditional energy sources. Moreover, further research in this area should focus on economic aspects related to inevitable energy transformation processes and the risks associated with changes in individual industries and sectors of the economy and the entrepreneurs themselves (Dusiło, 2024). A future element of further research in this matter should also be the forecast and analysis of energy prices resulting from the abandonment of traditional energy sources in favour of renewable ones.

To summarize the presented research on the assessment of selected economic policy instruments in managing the process of acceptance of renewable energy sources by the demand side in Poland, they do not fully exhaust the essence of the issue. They only serve as an incentive for further research in this area. Certainly, this topic requires further in-depth analysis and research. To identify both the essence of the impact of economic policy on energy transformation plans in Poland, as well as the role played by individual economic policy instruments in this process. Therefore, such analyses will be the subject of future work to identify and identify key factors for renewable acceptance plans energy sources by the demand side in Poland.

References

1. Bera, M., Lewicki, W. (2023). The Municipal Plan for Adaptation to Climate Change and Its Role in the Strategic Management of the Local Authority. *Scientific Papers of Silesian University of Technology. Organization & Management [Zeszyty Naukowe Politechniki Śląskiej. Seria Organizacji i Zarządzanie]*, 184, pp. 7-9.
2. Bonfert, B. (2024). We like sharing energy but currently, there's no advantage: Transformative opportunities and challenges of local energy communities in Europe, *Energy Research & Social Science*, vol. 107, 103351.
3. Coban, H.H., Lewicki, W. (2023). Flexibility in power systems of integrating variable renewable energy sources. *Journal of Advanced Research in Natural and Applied Sciences*, 9(1), pp. 190-204.
4. Czepło, F. (2022). Realizacja celów polityki energetycznej poprzez odnawialne źródła energii. *Przegląd Budowlany*, 93, pp. 9-10.
5. Dębicka, A., Olejniczak, K., Radomski, B., Kurz, D., Poddubiecki, D. (2024). Renewable Energy Investments in Poland: Goals, Socio-Economic Benefits, and Development Directions. *Energies*, 17(10), 2374.
6. Dragan, W., Zdyrko, A. (2023). The spatial dimension of coal phase-out: Exploring economic transformation and city pathways in Poland. *Energy Research & Social Science*, Vol. 99.

7. Drożdż, W., Bilan, Y., Rabe, M., Streimikiene, D., Pilecki, B. (2022). Optimizing biomass energy production at the municipal level to move to low-carbon energy. *Sustainable Cities and Society*, Vol. 76.
 8. Dusiło, M. (2024). *Transformacja energetyczna w Polsce. Edycja 2024*. Warszawa: Forum Energii, <https://www.forum-energii.eu/transformacja-edycja-2024>
 9. Egmond, C., Jonkers, R., Kok, G. (2006). Target group segmentation makes sense: If one sheep leaps over the ditch, all the rest will follow. *Energy Policy*, Vol. 34.
 10. Herudziński, T., Swacha, P. (2022). Transformacja energetyczna w Polsce—perspektywa sieciowej analizy dyskursu programów partii politycznych oraz społecznej percepcji zmian sektora energetycznego. *Studia Politologiczne*, 64.
 11. Husin, H., Zaki, M. (2021). A critical review of the integration of renewable energy sources with various technologies. *Protection and control of modern power systems*, 6(1), pp. 1-18.
 12. Katarzyński, D., Przekota, G. (2024). Wpływ cen nośników energii na ceny produktów i usług. *Kwartalnik Nauk o Przedsiębiorstwie*, 71(1), pp. 71-92.
 13. Lach, Ł., Mus-Frosik, M., Kopeć, S., Faryj, K. (2023). Obserwatorium Transformacji Energetycznej (OTE) jako narzędzie wspierania rozwoju społeczno-gospodarczego w Polsce. *Energetyka Rozproszona*, 9, pp. 25-33.
 14. Łucki, Z. (2010). Instrumenty polityki energetycznej. *Polityka Energetyczna*, 13, pp. 5-21.
 15. Mastalerska, M. (2011). Znaczenie efektywności energetycznej dla bezpieczeństwa energetycznego kraju. *Polityka Energetyczna*, 14(1), pp. 281-296.
 16. Michalik, S., Zieliński, D. (2024) *Transformacja energetyczna w Polsce w świetle strategicznych dokumentów rządowych i analiz badawczych*. Warszawa: Sieć Badawcza Łukasiewicz – ITECH Instytut Innowacji i Technologii.
 17. Ministerstwo Klimatu i Środowiska (2024). *Krajowy Plan w dziedzinie Energii i Klimatu do 2030 r. (aktualizacja KPEiK z 2019)*. Warszawa
 18. Ministerstwo Rozwoju i Technologii (2024). *Nabór wniosków dot. instalacji OZE realizowanych przez społeczności energetyczne – inwestycja B2.2.2 wsparcie przedinwestycyjne*, <https://www.gov.pl/web/rozwoj-technologia/nabor-wnioskow-dot-instalacji-oze-realizowanych-przezspolecznosci-energetyczne--inwestycja-b2222023IIpo>
 19. Pultowicz, A. (2009). Przesłanki rozwoju rynku odnawialnych źródeł energii w Polsce w świetle idei zrównoważonego rozwoju. *Problemy ekorozwoju*, 4(1), pp. 109-115.
 20. Rapacka, P. (2024). Czyste Powietrze, pompy ciepła i OZE-zwrot w stronę jakości i nowe wymagania. *Chłodnictwo i Klimatyzacja*, 3, pp. 32-34.
 21. Rybacz, M. (2024). Transformacja energetyczna jako katalizator zmian strukturalnych w gospodarce. *Bulletin of The Mineral & Energy Economy Research Institute of the Polish Academy of Sciences [Zeszyty Naukowe Instytutu Gospodarki Surowcami Mineralnymi Polskiej Akademii Nauk]*, 112.
 22. Sathindrakumar, R. (2003). Greenhouse emission reduction and sustainable development. *International Journal of Social Economics*, Vol. 30, No. 12, pp. 1233-1248.
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23. Seroka, A. (2022). Odnawialne źródła energii jako element zarządzania bezpieczeństwem energetycznym państwa. *Zeszyty Naukowe Politechniki Częstochowskiej. Zarządzanie*, 46, pp. 88-100.
 24. Sinsel, S.R., Riemke, R.L., Hoffmann, V.H. (2020). Challenges and solution technologies for the integration of variable renewable energy sources—a review. *Renewable Energy*, 145, pp. 2271-2285.
 25. Sokołowski, J., Frankowski, J., Mazurkiewicz, J., Lewandowski, P. (2022). Hard coal phase-out and the labour market transition pathways: The case of Poland. *Environmental Innovation and Societal Transitions*, Vol. 43, pp. 80-98.
 26. Szymańska, E.J., Mroczek, R. (2023). Energy Intensity of Food Industry Production in Poland in the Process of Energy Transformation. *Energies*, 16(4), pp. 1843.
 27. Tarasova, E. (2024). Rethinking justice as recognition in energy transitions and planned coal phase-out in Poland. *Energy Research & Social Science*, Vol. 112.
 28. Tomaszewski, K. (2020). Rola czynnika ludzkiego w kształtowaniu polityki energetycznej współczesnego państwa. *Środkowoeuropejskie Studia Polityczne*, 1, pp. 147-169.
 29. Tomaszewski, K., Sekściński, A. (2020). Odnawialne źródła energii w Polsce—perspektywa lokalna i regionalna. *Rynek Energii*, 4(149), pp. 10-19.
 30. Voytyuk, O. (2012) *Potencjał energetyczny państw Unii Europejskiej*. Wydawnictwo Uniwersytetu w Białymstoku, pp. 328-329.
 31. Więckowski, J., Kizielewicz, B., Sałabun, W. (2024). A multi-dimensional sensitivity analysis approach for evaluating the robustness of renewable energy sources in European countries. *Journal of Cleaner Production*, 143225, pp. 1174-1183.
 32. Winiarski, B. (2012). *Polityka gospodarcza*. Warszawa: PWN.
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