From adoration to damnation? Exploring role of media in shaping low-carbon economy in times of the COVID-19 pandemic

Justyna Chodkowska-Miszczuk1 · Tomasz Starczewski1 · Krzysztof Rogatka1 · Aleksandra Lewandowska1 · Stanislav Martinat2

Received: 24 August 2021 / Accepted: 6 May 2022 / Published online: 4 June 2022
© The Author(s), under exclusive licence to Springer Nature B.V. 2022

Abstract
The leverage of the public narrative created and maintained by the media as a highly influential social actor is decisive, but also sensitive, in bringing about the energy transition and advancing towards a low-carbon economy. The outbreak of the COVID-19 pandemic has potential to slow down and deform the public acceptance of the above-mentioned processes as it is likely that the priorities of individual governments will be revisited and tailored to tackle the ongoing health crisis. We are replying to such a threat with this study that aims to reflect on the immense role of media in shaping a low-carbon economy in transitional economies. We are using Poland as an illustrative example to demonstrate how wide, colourful, and sometimes even confusing the low-carbon narrative might be. By means of employing the horizon scanning of the diverse types of media, we detected that media overwhelmingly affect and deform the ongoing discussions about the nuances of energy transition and benefits a low-carbon economy. We argue that political preferences of individual journalists (and publishing houses) in Poland tend to influence the style, depth, extent, and quality how the topic is covered and narrated.

Keywords Media effects · Low-carbon economy · Narrative · Horizon scanning · COVID-19 pandemic · Poland

✉ Justyna Chodkowska-Miszczuk
jchodkow@umk.pl

Tomasz Starczewski
tomaszstarczewski1@wp.pl

Krzysztof Rogatka
krogatka@umk.pl

Aleksandra Lewandowska
amal@umk.pl

Stanislav Martinat
stanislav.martinat@hutton.ac.uk

1 Department of Urban and Regional Development Studies, Faculty of Earth Sciences and Spatial Management, Nicolaus Copernicus University in Torun, Lwowska 1, 87-100 Torun, Poland

2 Present Address: Social, Economic and Geographic Sciences Group, The James Hutton Institute, Craigiebuckler, 8, Aberdeen AB15 8QH, UK
1 Introduction

The transformation of the current economic models towards the environmentally more sensitive economy and society is currently one of the fundamental challenges of our civilisation, whose future should be defined by the sustainable development idea (Chodkowska-Miszczuk et al., 2021a, b). The document “Transforming our World: the 2030 Agenda for Sustainable Development” signed by world leaders, including Poland, points to the most important Sustainable Development Goals (SDGs) to be achieved in near future. A number of these goals clearly corresponds with the needs for decarbonisation and advancing with a low-carbon economy (Bali Swain & Karimu, 2020; Háč et al., 2016) and consequent principles.

SDGs include introducing of a type of energy management aimed at reducing the emission of pollutants into the atmosphere, relieving anthropopressure, limiting the loss of biodiversity and the impact of the emitted pollutants on human health while maintaining economic growth (Kassenberg, 2014; Lewandowska et al., 2020; Świąder et al., 2020). The chance to achieve these goals surely lies, among others, in abandoning the usage of fossil fuels in favour of the utilization of more sustainable renewable energy sources (RES) and systems (Chodkowska-Miszczuk, 2019). There is no doubt that the global economy and its regions are slowly shifting towards a low-carbon path at a pace that varies between both continents and individual countries, depending on their level of development, demographic, social, cultural factors (Frantál & Nováková, 2019) and progresses achieved in advancing currently available energy technologies and its efficiency, as well as on the ability to maintain sustainable financing of this transition (Cowell, 2020). Central European countries, including Poland, are to participate in this process both as the members of the international community, signatories to the Climate Convention agreed in Madrid in 2019 and as the member states of the European Union (EU) under the Community regime of energy and climate regulations (Böhringer & Rutherford, 2013; Lewandowska & Szymańska, 2021; Piwowar, 2019; Schwartzkopff & Schulz, 2017; Wiśniewski & Kistowski, 2017). The transition toward a more sustainable low-carbon economy requires indeed radical changes in the systems supplying energy for individuals, communities, and businesses (Chappell et al., 2020). Furthermore, it necessitates modifications of our current practices in the usage of energy, substantial innovation and deployment of a range of low-carbon technologies, and a wider change in the structure of industries in national and global economies (Lewis, 2019; Owen et al., 2018). These modifications must at the same time contribute to maintaining and expanding economic prosperity in a more socially just way (Jenkins et al., 2016; Sovacool & Dworkin, 2015) while ensuring that these socioeconomic systems remain within ecological boundaries (Foxon, 2011) and do not harm the environment. These public policy issues are of interest to enormously diverse set of actors and stateholders, including the information media.

1.1 Media as a public actor

The media themselves, such as the press, television, or the Internet, are the result, or product of human creativity and are guided by the dominant informational function while maintaining Jakobson’s communication scheme, including the sender and recipient of the transmitted information (Drożdż, 2014). We also know very well that apart from the informational and communicational functions, the media have an overwhelming influence...
on society, co-create people’s attitudes, choices, and behaviour (Reed, 2020). The media decide in a very plastic and effective, or even in a “programmed” way, about how they shape views, opinions, observations, and regularities in many areas of life (Goban-Klas, 2005; Ryan, 2001). Therefore, in the democratic world, they are usually labelled as the Fourth Estate which enormously affects the society in a similar way as the legislation, executive, and judicial powers do (Torczyńska, 2008). This is the reason why it is important to carefully and critically select the information provided by the media and to recognise which of the proposed piece of information is objective and which is an attempt to manipulate reality.

The narrative is undoubtedly formed by the media as a configuration of events. It requires creating the space for mutual understanding and involvement of the people with high narrative competence (Brown, 2017; Moezzi et al., 2017; Ryan, 2006). A specific variation of the narrative is the public narrative. It goes beyond the sphere of the individual and concerns the diverse social groups; it is integrally related to the development of social networks and institutions. We are also aware that changeability of the public narrative is a truly inherent characteristic of this phenomenon. The complexity of social relations and information exchange causes the occurrence of various frequently competing versions of a particular public narrative (Baker, 2006). The media as an influential social actor significantly affect (both positively and negatively) the public narrative (Ganowski & Rowlands, 2020; Szot, 2020) that is, in the case of this study, crucial in bringing about a sustainable energy transition and the development of a low-carbon economy. The narrative consists of constructing and disseminating information on climate change and sustainable development (Horsbøl, 2013). On the one hand, the media are surely able to cement the national social and technological regimes and path dependencies, strengthen systemic blockages and structural changes of the energy system (Lyytimäki et al., 2018); on the other hand, the media might be a suitable driving force and catalyst for the change. For instance, the dominance and power of the fossil fuel companies contribute to their hegemony in the policy sphere and consequently form the public narrative concerning the future of the energy sector (Cochechi et al., 2019; Frantál, 2016). It is indisputable that particular interests of mining and carbon-rich industries create a public narrative (Svobodova et al., 2021) that strengthens the dependence on fossil fuels (Horsbøl, 2013). On the contrary, the media can contribute to the destabilisation of established energy regimes by proposing potential new paths of development and the transformatory directions (Lyytimäki et al., 2018), thus building an opportunity to develop a low-carbon economy and a fair transformation (Healy & Barry, 2017) by promoting cross-sectoral and multi-actor cooperation and mobilising grassroots activities (Evans & Phelan, 2016). Popular and professional media can provide plentiful information and raise awareness about the new energy technologies among the public, entrepreneurs, and decision-makers. The social importance of the presented issues is a result of many factors, including the level of professional knowledge and education of the person responsible for the content, the values they hold, their emotions, institutional conditions, and individual preferences. Media presentations highlighting not well-grounded uncertainties and threats may even discourage the audience and build up prejudice against the pro-ecological actions. Publishing partial knowledge, questioning the proved facts or complete omitting information about the development of certain, more sustainable energy technologies, as well as directing the attention to other, non-energy-related issues surely strengthens the social unawareness (Lyytimäki et al., 2018).
1.2 The objective of the study

Having the above-mentioned conceptual framing in mind, the aim of this study is to reflect on the role of the media in shaping a low-carbon economy. In order to achieve the main objective of the study, the authors formulate three specific objectives for analysis: (O1): to observe the media to see whether they create space for objective debate that is based on unbiased, scientifically-grounded facts about the low-carbon economy, and thus remains beyond political influence; (O2) to diagnose the situation as to whether and how the media inform the community about ongoing processes concerning the low-carbon economy; (O3) to identify the role of the media in mobilising communities to actively participate in changes related to the development of renewable energy and dissemination of pro-environmental activities.

The analysis was carried out with reference to Poland as a country undergoing energy transformation, with a past of almost half a century of centrally planned economy, and characterised by the hegemony of entities related to coal mining (Szpor & Ziółkowska, 2018). The authors are aware that nowadays media are the subject of a process of convergence, as well as that the new forms of media communication are constantly developing (Koroczyński, 2012). With all this in mind, this paper examines three selected types of media: television, press, and the Internet.

The first part of the article focuses on understanding the role of the media in the development of a low-carbon economy. The second part is devoted to a comparative analysis of the narrative created by selected nationwide information media entities in Poland. Finally, some recommendations are made about the ongoing public discourse on energy transition.

2 Literature review

2.1 Polish coal mining

The empirical analysis on the role of media in shaping a low-carbon economy was carried out for Poland. The main energy characteristic of Poland as a country in the ongoing energy transition is its past defined by almost half a century of the centrally planned economy under the Communist regime, including the centralisation of the energy sector and hegemony of entities related to coal mining (Baran et al., 2018). It seems that the main barriers to the transition from fossil fuels to renewable energies are, on the one hand, the monoculture of fossil fuels in Poland, dependence on fuel imports, and the dominance of outdated energy infrastructure. On the other hand, the growing demand for energy is determined by the socio-economic development of the country (Szabo & Fabok, 2020). Growing energy demand is largely met by the vast utilization of fossil fuels, including their imports. Poland is the largest hard coal producer and the second-largest lignite producer in the EU (Brauers & Oei, 2020).

In other words, coal mining in Poland is firmly rooted in the national economy. The exploitation of hard coal on an industrial scale began in the second half of the eighteenth century in the two most important coal mining regions in Poland, i.e., Lower Silesia in 1743 and Upper Silesia in 1748, which spurred a gradual development of mining. A period of economic prosperity began in the 1830s, resulting in 91 active mines in Upper Silesia in 1840, producing 539,000 tons of coal annually, and 59 mines operating in Lower Silesia, supplying every year 266,000 tons of coal (Frużyński, 2012). Dynamic development of
mining took place during the times of the People’s Republic of Poland (PRL—the official name of the Polish state from 1952 to 1989; the period of socialism in Poland) when a lot of mines were built, and old ones were systematically expanded at the expenses of the environment. It was during that time that record amounts of coal were extracted and mining has had incredible impact on migration of labour force and social structure of mining regions. Shortly after the World War II, the annual domestic production of coal was about 47 million tons, and in 1971 it was already 145.3 million tons. The highest production levels were reached in the early 1980s (over 195 million tons). Since the beginning of the 1990s, Poland experienced the process of limiting and closing mines and firm reduction of hard coal mining. In the year 2000, the output was about 100 million tons which translated into a reduction of nearly 50 million tons in 10 years (Kasztelewicz, 2012). The trend has prevailed, with the amount of coal mined already below 80 million tons in 2011 and dropping to 61.6 million tons in 2019. All this also means a dramatic decline in employment in the mining sector and consequent socio-economic changes of mining and post-mining regions.

Mining, like no other economic sector in Poland, was given considerable autonomy at the beginning of the systemic transformation process in the 1990s that was accompanied by simultaneous state support and close supervision (Rosicki, 2018; Szpor & Ziółkowska, 2018). Despite the decline in coal mining, opposition against the limiting of coal production and consumption has been voiced by diverse stakeholders. These groups include coal corporations, trade unions, influential social groups, and central and regional administrations. Their opposition revolves around the prospect of losing business, historically negative experience with the processes of the economic restructuring in the 1990s, the fears of rising energy prices, the concerns about the country’s energy security, and potential increased unemployment in the regions almost entirely dependent on coal (Brauers & Oei, 2020). The coal regime remains protected because jobs, as well as political and corporate power, depend on it (Żuk & Szulecki, 2020). As a result, the EU legislation and regulations that weaken the already poor economic health of the coal industry, and policies that support alternative industries are the prime transformational efforts. The only group of actors actively working for the development of a low-carbon economy in Poland are non-governmental organisations. Their ventures revolve around reducing air pollution or, in some cases, other environmental issues (Brauers & Oei, 2020).

The media discourse on coal indicates that Polish media are primarily concerned with describing the economic challenges to the coal industry and their potential impact on the country’s economy, social situation, and energy security (Osička et al., 2020). Such emphasis corresponds with the widespread securitisation of energy issues in the country. As the study by Osička et al. (2020) indicates, Polish media repeat the communist-era slogan “Poland stands on coal” and present the problem mainly through the narrative of “Continuity of coal”. It suggests that coal cannot be retired and that its continued use is inevitable.

2.2 Polish media

In general, climate change is not considered an important topic for public debate in Poland compared to social issues (Schwartzkopff & Schulz, 2017), despite the fact that the Polish broadcasting market is the largest among the new EU Member States, and thus should be more diverse in the subjects it tackles. Nevertheless, this feature—related to the size of the market—did not protect the public broadcasters from difficulties typical of Central and Eastern European countries, namely pressure from the main political forces. The transformation process of the late twentieth century also affected the media market. State media
were transformed into public media, and new players—private broadcasters with a public domain—also entered the market. In the case of former state broadcasters, the established funding system of collecting user licence fees has proven to be unstable. This has resulted in the growing importance of commercialisation of their activities (Stepka, 2010). Both of these factors: the strong political connections and the commercialisation of activities also determine the scope of the content presented (Voltmer, 2013).

According to the legislation adopted in Poland, public media should carry out a social mission (Sztot, 2020). With the change of regime, the nature of the media changed, moving away from the views represented by the socialist authorities to independent and reliable information, not supported by party dictates (Mielczarek, 2013). Currently, the media landscape in Poland is dominated by private organisations that represent various political, social, and economic views. In recent years, media in Poland have been polarised into those that criticise the current government and those that favour the ruling parties. This affects the climate and the energy journalism. Reliable information supported by scientific research is mingled with populist texts that do not present any substantive value (Mielczarek, 2017).

In the countries of Central and Eastern Europe, and thus also in Poland, there are few signs of socialisation of energy transformation (Braun, 2014). Media coverage of climate change points to coal as the basis for building national energy security. According to Brauers and Oei (2020), it is necessary to identify and map the role of the media, especially now, in times of the increasing use of social media and fake news. The key here is to undertake actual initiatives that help protect the environment, rather than those that merely preserve external recognition, showcasing greenwashing (Cislak et al., 2020). Notably, Polish public broadcasters have a rather strong position, which makes this system unique compared to other Central and Eastern European countries (Stepka, 2010). Therefore, this article is an attempt to address the identified research gap and to reflect on the presence of low-carbon economy issues in the public discourse carried out by nationwide media, both the one characterised by the legacy of state media as well as the newly created one in the Polish media landscape. Indeed, this could be an important aspect of future efforts within the politics of climate and energy, as evidenced by examples from other countries (Voltmer, 2013).

3 Research methods and materials

3.1 Methods

In order to achieve the aim of the paper, a qualitative study was used comprising a case study and horizon scanning. Individual stages of the research procedure are presented in Fig. 1.

The analysis was based on the case study of Poland. The implementation of global megatrends related to transnational policies requires taking into account the local context (Chodkowska-Miszczuk et al., 2019). Therefore, referring to case studies is extremely valuable in view of identifying key similarities and differences between individual national contexts and finding the most important media issues that shape the development of national energy systems (Lyytimäki et al., 2018).

Horizon scanning is a method consisting in tracing (scanning) information or a series of events that lead to the creation of a database. That base is to help identify problems
and assign them as opportunities and threats for specific actions (Baumgartner & Farsi-jani, 2017). This method is used to look for knowledge gaps at the boundaries of rapidly changing phenomena. It also allows for setting strategic priorities for decision-makers or researchers (Foulds et al., 2019; Van Rij, 2010). The first step in the horizon scanning procedure is to identify a research problem that should represent current issues (Sutherland & Woodroof, 2009). In line with this principle, the authors selected the highly topical issue of the low-carbon economy which relates to, among other things, global climate change and energy transition. The dynamics of the horizon scanning method allows for broad coverage

| CO2 emissions | Eco-innovation | Electromobility | Energy, electricity | Energy efficiency |
|--------------|---------------|----------------|---------------------|------------------|
| Energy security | EU | Grants and government environment programmes | Green economy | Low-stack emission |
| Mining | Nuclear power plants | RES | RES Directive | Smog |

Fig. 1 Scanning process designated for the study. Source: Own study

Fig. 2 Keywords taken into account during horizon scanning. Source: Own study
of energy issues, which in their essence represent a wide range of topics. Therefore, it can be successfully used to trace the narrative created by the media in relation to the pivotal public issue of the low-carbon economy. The scope of tasks and the boundaries of horizon scanning were determined through selected 15 keywords that identify the leading areas related to a low-carbon economy. They served to develop the framework of the analysis according to the principle of problem-oriented scanning. One of the methods used in this scanning approach is text mining according to pre-formulated keywords (Amanatidou et al., 2010) (Fig. 2). The procedure of selecting the keywords was preceded by literature studies and an analysis of strategic documents in the field of the low-carbon economy at the European and national level, as well as moderated public discussions with representatives of Generation Y—students of environmental management studies. According to Amanatidou et al. (2010), choosing the best research procedure depends on the local context and the content analysed. In this study, we adopted a procedure that included the preparation of a keyword set as a reference system because, from an empirical point of view, the study was carried out in an area dominated by fossil fuels and a centralised energy sector. In addition, the analysis was conducted during the pandemic. Both issues impinge significantly on the direction of public discussion, so it was essential to use a pre-designed research framework to properly identify and assess emerging signals and possible gaps in the narrative.

3.2 Description of materials

The above-mentioned issues allowed us to trace media information on the low-carbon economy published in three different types of sources in Poland: press, television, and the Internet (three examples from each category with nationwide coverage and information profile). The category of press included three titles: Gazeta Wyborcza, Dziennik Gazeta Prawna, Rzeczpospolita. As regards television, the three main channels were considered, i.e.: Polish Television (TVP), Polsat, TVN. In the case of the Internet, the following public services were analysed: cire.pl, 300gospodarka.pl, www.energetyka24.com. The selection of media was made according to a transparent quantitative key characterised by the broadest possible impact of the selected media on society (Pienias, 2010). In this way, the authors were able to conduct a reliable study. The authors selected such media that are considered the most influential and opinion-forming, covering the largest audiences in the country (Dobek-Ostrowska, 2004; Mocek, 2017). More than 14% of Poles admit to reading Gazeta Wyborcza on a regular basis, which gives it a pole position in Poland. The daily Rzeczpospolita is read by 4.18% of Poles and Dziennik Gazeta Prawna by 3.13% (https://www.wirtualnemedia.pl/artykul/kto-tutyla-prasowe-maja-najwiece-czytelnictwo). A quantitative key was also used to select the three major television stations: TVP, Polsat, TVN, which have the highest viewership in Poland: 9.68%, 9.84%, and 8.54%, respectively (https://www.wirtualnemedia.pl/artykul/ogladalnos-televizji-2020-tvp1-tvn-ranking-170-stacji-rekord-tvn24-tvp-info-i-polsat-news). They are therefore the ones that shape the media message about the energy transition, environmental issues, or the decarbonisation process. Moreover, the choice of sources was determined by the subject matter of their activity and credibility on the media market (Table 1). It was also important for each channel to present up-to-date and factual information in an understandable way. In the case of television, one public and two private stations were selected. This makes it possible to compare information from sources that are both dependent on and independent of the national authorities. As far as the choice of the press is concerned, the focus is on dailies, due to the high frequency with which information is published. The choice of the Internet
sources was dictated by the industry—the websites deal with economic and business issues in varying degrees of detail.

The authors selected media that are internally diverse in terms of their publishing nature. In the case of newspapers, titles with different perspectives on economics, economy, and social issues were juxtaposed. Gazeta Wyborcza is an opinion-making daily with a liberal-left profile that traces its origins to the systemic transformation of Poland in 1989. According to Filas (2008), Gazeta Wyborcza does not stick to its profile and takes different worldview positions in its texts. Dziennik Gazeta Prawna is a typical legal and economic newspaper that focuses on the legal, tax, economic, and social situation in Poland and abroad. The views presented by the aforementioned dailies are complemented by the last newspaper chosen for the analysis—Rzeczpospolita. It is an economic and legal journal with a conservative-liberal profile. In addition to economic and legal issues, Rzeczpospolita also covers regional issues in its ‘Życie Regionów’ [Life of the regions] section.

For the television analysis, the authors chose two private stations (TVN and Polsat) and one public broadcaster (TVP). In terms of political views, TVP’s audience is the reverse of TVN’s. Polsat, on the other hand, is a centrist broadcaster that does not explicitly advocate a particular side of the political scene. Polsat is rated as the most objective news channel (Maciejewska-Mieszkowska, 2020).

The authors chose websites that deal strictly with the economy and energy as professional and reliable sources of information. These sites do not require a paid subscription, so they can be freely accessed. The primary audience for the websites will be people who are interested in energy, energy transition, and alternative energy sources. In addition to

### Table 1: Characteristics of the media outlets selected for testing.

| Media outlet | Status | Average viewership over the period considered* | Circulation over the period considered | Number of views** |
|--------------|--------|---------------------------------------------|----------------------------------------|-------------------|
| **Television** |        |                                             |                                        |                   |
| TVP Public   |        | 1,154,585                                   |                                        |                   |
| TVN Private  |        | 1,002,288                                   |                                        |                   |
| POLSAT Private |      | 822,020                                     |                                        |                   |
| **Press**    |        |                                             |                                        |                   |
| Gazeta Wyborcza Private |    | 72,620                                      |                                        |                   |
| Dziennik Gazeta Prawna Private |    | 33,544                                      |                                        |                   |
| Rzeczpospolita Private |    | 38,437                                      |                                        |                   |
| **Internet** |        |                                             |                                        |                   |
| cire.pl (2020) Private |    | 230,000                                     |                                        |                   |
| 300gospodarka.pl (2020) Private |    | 280,000                                     |                                        |                   |
| energetyka24.com (2020) Private |    | 290,000                                     |                                        |                   |

*Average viewership is given for groups of channels (TVP1, TVPInfo for TVP; TVN, TVN24 for TVN; POLSAT, POLSAT NEWS for POLSAT)

**As of May 2020, no data for the period under consideration
their industry-specific character, the websites will be used by people who are just getting acquainted with the energy sector, including the low-carbon economy.

The cire portal (Energy Market Information Centre) is a website that focuses mainly on topics related to the energy sector and the energy market, both nationally and internationally. Another online source of information on the low-emission economy is 300gospodarka.pl. The site is not only oriented towards topics in the broad field of energy but also presents current information related to the economic and environmental situation in Poland and worldwide. This portal is a popular science information source that does not focus on one industry. Its content takes a holistic approach to the topics presented. energetyka25.com is a typical sectoral source of information on broadly understood climate neutrality and processes taking place within the energy market. It presents information in the field of electromobility, the electric power industry as well as mining and renewable energy sources.

The fact that the above-mentioned media were selected for horizontal analysis allowed for an in-depth analysis of the forms of low-carbon communication based on different worldview profiles (newspapers), political profiles (television), and industry scopes (Internet).

### 3.3 Scope of analyses

The scan was carried out for 1 month—from 4 March 2020 to 3 April 2020. It is worth stressing here that the scanning period depends on the subject under consideration, its complexity, etc. In cases where horizontal scanning concerns phenomena or processes with relatively rare information intensity, quarterly or annual scanning is recommended. On the other hand, when, as in this study focused on the low-carbon economy, the issues analysed are frequently present in the public debate, a shorter scanning period of one month is preferred (Cuhls, 2020; Rowe et al., 2017).

The research period, i.e., the turn of the second quarter of 2020, was selected in relation to the fact that 2020 was set as the horizon for the implementation of Directive, 2009/28/EC of the European Parliament and the Council (Official Journal of the European Union L 140/16) with regard to the increase in the share of RES in energy production, increase in energy efficiency and reduction of greenhouse gas emissions in the EU member states, i.e., also in Poland. Moreover, this period coincided with the beginning of the COVID-19 pandemic in Poland and the forced social isolation resulted in the society’s increased media exploration. This made it possible to identify discrepancies in information between the sources, the level of cross-referencing of one source to another, the frequency of the topic and the extent to which information was discussed. The authors used the ATLAS.ti 8 software during the analysis.

As an important element of the research procedure, five types of narratives were determined. Four out of the five types were found in the course of the research: narrow, broad, single-, and multi-actor narrative. If during the period under study few keywords occurred in a particular media type, we can speak of a narrow narrative. Such a narrative, due to the low number of keywords considered in the horizontal scanning process, has a weak opinion-making function. The coverage produced by media characterised by a narrow narrative is limited. They do not present the whole of the studied issue but only focus on selected elements, areas. Broadly speaking, a narrow narrative takes place when keywords appear infrequently in the horizontal scanning of a given media type.
The opposite of a narrow narrative is a broad narrative. It occurs when a given media type includes most of the keywords that informed the horizontal scanning procedure. Such a narrative helps to present the problem in question in a holistic way, taking into account many different aspects that, if ignored, may influence the shape of reality created by the media. Other types of narratives that can be distinguished based on horizontal scanning are single-actor and multi-actor narratives. They help determine whether, for a given media type, the narrative is created by a single entity or multiple entities. The single-actor narrative involves the creation of media reality by a single entity that is the main opinion-maker for the problem, issue, or phenomenon being studied. In the case of a multi-actor narrative, media discourse is created by multiple actors who have different perspectives and views on the phenomenon under analysis. A multi-actor narrative introduces pluralism of opinion which, as in the case of the broad narrative, allows for a detailed and multi-faceted look at the issue of, e.g., the low-carbon economy. Single- and multi-actor narratives are determined on the basis of the narrative ratio. The first step in determining the narrative ratio is to determine how many times keywords appear in a given newspaper, a given television channel, and a given website during the study period. Then, once the keyword counts have been determined, they need to be ranked against one another across media types, e.g., in Gazeta Wyborcza the keywords appeared 8 times, in Dziennik Gazeta Prawna 6 times and in Rzeczpospolita 4 times. Thus, the narrative ratio is 8:6:4, and in an irreducible form at gcd = 2 it is 4:3:2. If the sum of the two lower narrative ratio factors is greater than the value of the highest factor, or all factors are equal, we are dealing with a multi-actor narrative. If the sum of the two lower narrative ratio factors is smaller than the highest factor, we will call such a narrative single-actor. On the other hand, if the sum of the two lower factors is equal to the higher factor, we are talking about an intermediate narrative, between single- and multi-actor.

Determining the narrative ratio allows us to learn the ratio of keywords taken up by the media analysed. Based on these values, the type of narrative is determined according to the number of actors that compose it. The authors’ own method of separating narratives based on the number of keywords considered and the number of actors creating the narrative allows us to present, firstly, the scope of the research problem addressed in particular types of media (narrow narrative and broad narrative) and the overall background to the low-carbon economy in Poland. Secondly, this method will show whether the topic of low-carbon economy in the context of the examined media types is shaped by one or many actors, and therefore whether we are dealing with information monopoly or opinion pluralism.

4 Results

4.1 The power of keywords

The results of the media scan proved that the vast majority of keywords, i.e., 14 out of 15 appeared at least once during the period considered. Most observations were recorded for ‘RES’ (22). The second most frequently registered keyword was ‘CO₂ emissions’ (10), and the third place was taken by subsidies from government programmes related to the replacement of individual furnaces and the national ‘Clean Air’ programme (8). However, it is significant that there was not detected even one mention of the RES Directive (Directive 2009/28/EC). This may indicate that the media ignore the problematic issues related to
Fig. 3 Frequency of the keywords in the study. Source: Own study

Fig. 4 The most common keywords in the press and on the Internet. a Press; b Internet. Source: Own study
the need for Poland to achieve the 2020 targets which this document sets in terms of RES growth, energy efficiency, and CO₂ reduction (Fig. 3).

### 4.2 The results of horizon scanning of the media triad

In total, the keywords were recorded in the studied period 77 times, of which 4 times on TV (5%), 16 times in press (20%) and 57 times on the Internet (75%). Only three of them were present on television: furnace replacement/clean air, RES, and energy security. The most prominent keywords in the press were the following: RES, smog, and CO₂ emissions. On the other hand, the Internet most frequently contained mentions of RES and CO₂ emissions, as well as green economy and electromobility (Fig. 4).

The subject of energy transition, including the abandonment of fossil fuels in favour of RES, has been one of the most emotional issues in Poland for years (Chodkowska-Miszczuk, 2021; Chodkowska-Miszczuk et al., 2021a; Foltyn-Zarychta et al., 2021; Perlaviciute et al., 2018; Pietrzak et al., 2021; Wagner et al., 2016). Carelessly communicated information on this subject can lead to conflicts or deepen social divisions. This is extremely important especially in a country dependent on coal, characterised by a top-down-defined coal culture and the extraordinary prestige of the mining profession (Szpor & Ziółkowska, 2018). Analysing the results of horizon scanning in the context of RES, we found discrepancies in the narratives of individual media outlets. In the period under examination, the topic of RES in television was presented only once and in a rather controversial light. Public television referred to the topic of biogas plants. It showed this issue in the form of a socio-spatial conflict (Wójcik et al., 2014) between inhabitants and city authorities. What was presented was the unwillingness of the local authorities of the area where the biogas investment was planned to talk to the residents. The potential costs for the locals and the environment resulting from the construction of the biogas plant were also articulated. The presented narrative was generally negative, focusing mainly on conflicts and disputes rather than on the reliable presentation of the opportunities and threats resulting from new RES investments.

Contrary to the narrative created by TV broadcasters, in the press, the topic of RES was one of the most frequently addressed issues. The press presents a positive approach to RES facilities. Among all RES installations, issues concerning wind and photovoltaic power plants are most frequently discussed (Balamut, 2017). According to the narrative presented by the press, wind energy brings profits for the economy and the environment. Political issues related to energy transition are not overlooked. Photovoltaics is singled out as a viable alternative to coal (Kochanek, 2021). The timeliness of published news is an extremely valuable feature. The press discusses issues related to the interventions of national authorities in relation to counteracting the economic effects of the pandemic (anti-crisis shields). According to experts’ views, the introduced shields should support the RES sector in Poland. With this approach, the press narrative merges with that presented on the Internet, where the topic of the COVID-19 pandemic and its effects on RES is also considered (Eroğlu, 2021).

The Internet is the medium that refers to the vast majority of RES types. The CIRE website leads the way in providing information. The narrative presented on the Internet presents an objective and holistic approach to RES. The topics that did not appear in other media were included in the coverage (Świątkiewicz-Mośny & Wagner, 2012). These are more detailed issues, often of a technical nature, allowing interested persons to acquire professional and full knowledge about RES investment opportunities. The websites widely

---

 creditorname: Springer
Table 2  Results of cross-analysis of the narrative conducted by the media. *Source:* Own study

|              | Television                                                                 | Press                                                                 | Internet                                                                 |
|--------------|-----------------------------------------------------------------------------|----------------------------------------------------------------------|--------------------------------------------------------------------------|
| Television   | The narrative in the press is centred mainly around wind power and photovoltaics. One important element consists in the catchy emotional headlines. The narrative is based on expert statements. A positive message prevails. The narrative created by the press has a much broader thematic scope than the narrative developed by television. It can be classified as an intermediate narrative, between narrow and broad. Considering the number of actors forming it, it is a multi-actor narrative. |                                                                      |                                                                          |
| Press        | The narrative produced by the press and the Internet contains most references to the analysed keywords. The narrative of the Internet is broad in subject matter, but single-actor as far as the scope of influence of the individual entities is concerned. The narrative produced by the press is not dominated by one entity. The share of individual newspapers is close to equal. The narrative created by the press has a narrower scope, but it cannot be said to be a narrow narrative. It is multi-actor in terms of its constituent entities. |                                                                      |                                                                          |
| Television | Press | Internet |
|------------|-------|----------|
| Internet  | Television provides information and facts supported by data and figures. There is a dichotomous narrative showing both a positive impact, e.g. improvement of air quality, and a negative impact—a social conflict concerning a biogas plant. The narrative on television and the Internet is based on the ecological approach to the economy. Nevertheless, the television coverage is superficially focused on presenting a “green image” of the country, while the narrative on the Internet is professional in nature, aimed at mobilising people to actively participate in the energy transition. The narrative created on television is considered to be narrow and multi-actor |
comment on unpopular topics related to the current energy policy of the country, including RES auctions or the activity of Polish Waters (national water management authority) in the RES sector, i.e., its attempted market entry. The web portals also present the topic of biofuels and biogas, still neglected by Poland (Chodkowska-Miszczuk, 2021). Similarly to the press, the Internet highlights the issue of the coronavirus pandemic but goes further in stating that the pandemic may stop, and certainly harm, the energy transition of the Polish economy (Zobeidi et al., 2021).

Another element of the horizon scanning analysis is the cross-referencing of the narratives presented by television, the press, and the Internet. This resulted in distinguishing two basic types of narrative: narrow and broad (Table 2). Generally speaking, a narrow narrative comes down to narrowing down the presented content. It is tantamount to putting a given issue first in a programme to attract the attention of the audience, or to convey the importance of a certain way of acting as a form of pressure to adopt a specific political solution. A broad narrative, on the other hand, is the presentation of the complexity of a specific issue, a proposal to consider a wider range of views and opinions (Davidson, 2017).

A narrow narrative refers to a very small number of keywords; it does not present the subject under examination as a whole but rather focuses more superficially and fragmentarily on conflict situations. A broad narrative takes into account most of the analysed slogans. The second type of distinguished narrative takes into account the number of entities involved. This narrative can be divided into a single-actor narrative—one TV channel, one newspaper, one portal dominates the narrative, and a multi-actor narrative—created equally by all analysed entities. Considering the types of the narrative presented above, the analysed media can be classified as follows:

1. Television—narrow, multi-actor (two keywords on TVP and Polsat; none on TVN).
2. Press—it is not possible to determine whether the narrative is narrow or broad due to the scope of the keywords mentioned; it can be indicated that the press narrative is an intermediate one, trending towards a broad narrative. Considering the number of entities forming the narrative, the narrative of the press is multi-actor. The narrative ratio of Gazeta Wyborcza, Dziennik Gazeta Prawna, and Rzeczpospolita is 4:3:2 (gcd = 2).
3. Internet—broad, single-actor; the narrative ratio of CIRE, 300gospodarka.pl, and energetyka24.com is 18:7:9 (gcd = 2).

5 Discussion

Freezing economies during the pandemic resulted in positive environmental changes, an apparent reduction in emissions and energy intensity of economies (Le Quéré et al., 2020). Despite a deep pandemic crisis, the calls to accelerate the decarbonisation of the economy were still visible (Chiaramonti & Maniatis, 2020). This is the case in Poland too, where the pandemic had a striking impact on the debate on coal mining. As a result of the high incidence of COVID-19 among miners, Polish authorities decided to temporarily halt coal mining. This situation resulted in the rise of negative public attitudes toward miners (Żuk et al., 2021). It should be added here that a higher rate of morbidity among miners results from the nature of their job, but also due to a high population density, damaged environment and extreme urbanisation of the mining regions (Krzysztofik et al., 2021). There were even voices in the public debate arguing that the coronavirus pandemic accelerated the
exposure of the economic, environmental, and social problems associated with continued support for a carbon-based economy (Żuk et al., 2021).

Widely accessible media started shaping public opinion in the post-WWII period. The era of the industrialisation and after-war reconstruction of the country, which began in the 1950s, was also the time when Communist propaganda promoted Soviet-style patterns of social and economic development based on coal. Those days, the national public television and press would play a priority role here in terms of form and content (Łęcicki, 2013). The public message was dominated by the affirmation of the coal culture, which was accompanied by a deeply rooted conviction that the carbonisation of the economy is the only way to economic success (Rosicki, 2018). The systemic changes that took place in Poland after the year 1989 constituted a new start for Poland and its inhabitants. The opening to the West, new media, including mainly the Internet and private media, made the topics of environmental degradation, ecology or new forms of energy generation known more to every Polish citizen, who in 2004 also became a citizen of the European Union (Churski, 2018; Dyląg, 2014). The media can play an important role in the energy transition both by presenting information in a specific way and by omitting it (Lyytimäki et al., 2018).

When analysing the triad of television, press and the Internet, we should consider the Internet the medium whose message about the low-carbon economy is the broadest and, in principle, the most substantive. Despite the fact that each of the information channels conveys messages containing the keyword RES, the context of their presentation is different. The Internet also reacts very quickly to information fluctuations and megatrends—it highlights, for example, the COVID-19 pandemic and its negative impact on the energy transformation. This advantage of the Internet over traditional media in providing information about the low-carbon economy may also be perceived as a threat. The Internet is mainly used by young, educated people, often coming from urban centres. In this context, elderly people without appropriate infrastructure (laptop, fixed Internet connection or WIFI network) may suffer from digital and, consequently, informational exclusion (Hirszowicz, 2007). Such a state of affairs may deepen social divisions, emphasising the class dimension of inequality or, ultimately, deepening the division of the country into a ‘two-speed Poland’ (Janicka, 2010; Kochan, 2011). It is worth noting that the Directive defining the 2020 target for the share of RES, an increase in energy efficiency, and a reduction of greenhouse gas emissions for each EU member, including Poland, was not mentioned even once in any of the analysed types of media during the entire research period. The omission of these problematic issues only reinforces the lack of awareness of (Lyytimäki et al., 2018) national obligations resulting from the fact that Poland, as a member of the international community, is a signatory to the EU energy policy.

Moreover, when analysing the origin, development, and trajectories of renewable energy sources (RES) use in Poland, a certain mechanism becomes visible from the very beginning. The vast majority of information, policies, and subsidy programmes that encourage investment and participation in renewable energy generation are typical. Relatively often, this means supporting selected energy sources without taking into account the local context that predestines a given area to use a variety of RES (Chodkowska-Miszczuk, 2019; Kazak et al., 2020). However, it should be noted that current attempts by the media to improve knowledge of the low-carbon economy are promising. It is crucial now because capital accumulation ensures ecological destabilization (Caraway, 2017). An example is the enrichment of the public television programming offer with a programme devoted exclusively to RES. Similarly, the press is addressing low-carbon economy issues in the form of cyclical articles.
6 Conclusions

The aim of this study was to reflect on the role of the media in shaping a low-carbon economy. By means of media analyses conducted during March and April 2020 on selected newspapers, TV stations, and web pages in Poland, we found that (concerning the first specific objective of the study) media create a space for debate on energy transition and the low-carbon economy. Nevertheless, the substantive part of the discourse is characterised by the political connections of individual media broadcasters. The knowledge about obvious political preferences of individual media and publishing houses is particularly important when interpreting the results. It seems that growing environmental awareness is gradually included in the vast majority of political agendas, however, differences might be found primarily in the urgency and the ways how the low-carbon economy should be enhanced. Concerning the second research objective, it was ascertained that the media inform the public about ongoing processes. However, the context and scope of the presented content vary between media types, from a narrow narrative characteristic of television to a broad one produced on the Internet. As for the third research objective, we discovered that the media mobilise the community to actively participate in identified transformations related to the development of the RES sector and dissemination of pro-environmental activities. This activity was identified primarily in the Internet media.

This result signals an enormously growing impact of the Internet media that was even increased during the COVID-19 pandemic. It is highly likely this unprecedented situation will surely affect both the timing and dynamics of how the low-carbon economy measures will be introduced and developed. There is no doubt that the priorities defined in the pre-COVID 19 era will be reconsidered. In the case of the research conducted, the incipient COVID-19 pandemic may have been a phenomenon affecting the intensity of keyword appearances in the media. Therefore, the horizontal scanning analysis was also carried out in relation to the Internet, i.e., the medium that plays a major informational role in the pandemic era due to the transfer of many traditional activities to the online sphere. The question of whether the COVID-19 pandemic has influenced the framing of the low-carbon economy narrative in the media will be answered through a comparative study conducted over a similar period, but at a time when the pandemic is in remission. The overall support for the increase of public participation in renewable energy projects is a highly optimistic (although surprising) result. We already know that the successful implementation of the energy transition is deeply rooted in the participation of various groups of stakeholders (Stober et al., 2021). This is massively important especially in Central Europe, where the tradition of public participation in public matters is lower due to its tangled recent history.

We are aware of the fact that only carefully selected media were utilized for our analysis. If more and other media sources are taken into account, probably slightly different media picture would be ascertained. It would be extremely interesting for our further media studies to focus on media in active coal-mining regions where the narrative on the low-carbon economy will be probably different. Our study covered the initial stage of the COVID-19 pandemic when global effects and implications were not known. Thus, it is likely that if a wider period was covered, even more fears and scepticism as to the implications for the development of the low-carbon economy would be expressed. In our future studies, it would be also necessary to focus on comparative media analyses from different Central European countries so that different trajectories in the levels of media perceptions of the low-carbon economy could be traced.
Acknowledgements We would like to express our gratitude to support Nicolaus Copernicus University Center of Excellence “Interacting Minds, Societies, Environment (IMSErt).

Funding This research was funded by National Science Centre, Poland, Project No. 2016/21/D/HS4/00714: Biogas enterprises from the perspective of the embeddedness concept. We would like to thank you for support from the Project No. 2015/19/N/HS4/02586: Ecologization of cities in Poland in the light of selected parameters of sustainable development.

References

300gospodarka. (2020). Retrieved March 4–April 3, from https://300gospodarka.pl/
Amanatidou, E., Butter, M., Carabias, V., Könnölä, T., Leis, M., Saritas, O., Schaper-Rinkel, P., & van Rij, V. (2010). On concepts and methods in horizon scanning: Lessons from initiating policy dialogues on emerging issues. *Science and Public Policy, 39*(2), 208–221. https://doi.org/10.1093/scipol/scs017
Baker, M. (2006). *Translation and conflict: A narrative account*. Routledge.
Balamut, A. (2017). Tematyka bezpieczeństwa energetycznego w mediach na przykładzie Polski. *Bezpieczeństwo. Teoria i Praktyka*, 4, 49–64.
Bali Swain, R., & Karimu, A. (2020). Renewable electricity and sustainable development goals in the EU. *World Development, 125*, 104693. https://doi.org/10.1016/j.worlddev.2019.104693
Baran, J., Lewandowski, P., Szpor, A., & Witajewski-Baltwiks, J. (2018). Coal transition in Poland: Options for a fair and feasible transition for the polish coal sector. *IDDRI and Climate Strategies*. Retrieved March 7, 2021, from https://coaltransitions.org/publications/coal-transition-in-poland/
Baumgartner, M., & Farsijani, B. (2017). Horizon scanning and analysis of techno-scientific trends. *European Parliamentary Research Service, Scientific Foresight Unit (European Parliament).*
Böhringer, C., & Rutherford, T. F. (2013). Transition towards a low carbon economy: A computable general equilibrium analysis for Poland. *Energy Policy, 55*, 16–26. https://doi.org/10.1016/j.enpol.2012.11.056
Brauers, H., & Oei, P. Y. (2020). The political economy of coal in Poland: Drivers and barriers for a shift away from fossil fuels. *Energy Policy, 144*, 111621. https://doi.org/10.1016/j.enpol.2020.111621
Braun, M. (2014). EU climate norms in east-Central Europe: EU climate norms in East-Central Europe. *Journal of Common Market Studies, 52*(3), 445–460. https://doi.org/10.1111/jcms.12101
Brown, P. (2017). Narrative: An ontology, epistemology and methodology for proenvironmental psychology research. *Energy Research & Social Science, 31*, 215–222. https://doi.org/10.1016/j.erss.2017.06.006
Caraway, B. R. (2017). Literal media ecology: Crisis in the conditions of production. *Television & New Media, 9*(5), 486–503. https://doi.org/10.1177/1527476417712459
Chappell, E. N., Parkins, J. R., & Sherren, K. (2020). Climax thinking, place attachment, and utilitarian landscapes: Implications for wind energy development. *Landscape and Urban Planning, 199*, 103802. https://doi.org/10.1016/j.landurbplan.2020.103802
Chiaromonti, D., & Maniatis, K. (2020). Security of supply, strategic storage and Covid19: Which lessons learnt for renewable and recycled carbon fuels, and their future role in decarbonizing transport? *Applied Energy, 271*, 115216. https://doi.org/10.1016/j.apenergy.2020.115216
Chodkowska-Miszczuk, J. (2019). *Przedsiębiorstwa biogazowe w rozwoju lokalnym w świetle koncepcji zakorzenia*. Wydawnictwo Uniwersytetu Mikołaja Kopernika.
Chodkowska-Miszczuk, J. (2021). A new narrative for sustainability: Exploring biogas plants as ‘first movers’ in raising energy awareness. *Australian Journal of Environmental Education*. https://doi.org/10.1017/aeec.2021.17
Chodkowska-Miszczuk, J., Martinat, S., & Cowell, R. (2019). Community tensions, participation, and local development: Factors affecting the spatial embeddedness of anaerobic digestion in Poland and the Czech Republic. *Energy Research and Social Sciences, 55*, 134–145. https://doi.org/10.1016/j.erss.2019.05.010
Chodkowska-Miszczuk, J., Martinat, S., & van der Horst, D. (2021a). Changes in feedstocks of rural anaerobic digestion plants: External drivers towards a circular bioeconomy. *Renewable and Sustainable Energy Reviews, 148*, 111344. https://doi.org/10.1016/j.rser.2021.111344
Chodkowska-Miszczuk, J., Rogatka, K., & Lewandowska, A. (2021b). The Anthropocene and ecological awareness in Poland: The post-socialist view. *The Anthropocene Review*. https://doi.org/10.1177/20530196211051205

\[Springer\]
Churski, P. (2018). Międzynarodowa integracja gospodarcza w procesie współczesnych przemian czynników rozwoju w Europie. Rozwój lokalny i regionalny, 184, 29–42.

Cire. (2020). Retrieved March 4–April 3, from https://www.cire.pl/

Cisłak, A., Cichocka, A., Wojcik, A., & Taciano, M. (2020). National narcissism, national identification, and support for greenwashing versus proenvironmental campaigns. Journal of Environmental Psychology, 74, 101576. https://doi.org/10.1016/j.jenvp.2021.101576

Cochechi, R. M., Iañoš, I., Sárba, C. N., Sorensen, A., Saghin, I., & Secăreanu, G. (2019). Assessing environmental fragility in a mining area for specific spatial planning purposes. Moravian Geographical Reports, 27(3), 169–182. https://doi.org/10.2478/mgr-2019-0013

Cowell, R. (2020). The role of place in energy transitions: Siting gas-fired power stations and the reproduction of high-carbon energy systems. Geoforum, 112, 73–84. https://doi.org/10.1016/j.geoforum.2020.03.009

Cuhls, K. (2020). Skanowanie horyzontalne w foresight—dlaczego skanowanie horyzontu jest tylko częścią gry. Futures & Foresight Science, 2(1), e23. https://doi.org/10.1002/ffo2.23

Davidson, B. (2017). Storytelling and evidence-based policy: Lessons from the grey literature. Palgrave Communications, 3, 17093. https://doi.org/10.1057/palcomms.2017.93

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 and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. Official Journal of the European Union (L140/16/5.6.2009).

Dobek-Ostrowska, B. (2004). Media masowe i aktorzy polityczni w świetle studiów nad komunikowaniem politycznym. Wydawnictwo Uniwersytetu Wrocławskiego.

Droźdź, M. (2014). Mediacyjno-integracyjna rola mediów w osobowych relacjach komunikacyjnych. Studia Socialia Cracoviensia, 1(10), 29–41. https://doi.org/10.15633/ssc.753

Dyląg, A. (2014). Świadomość ekologiczna i energetyczna młodzieży dużego i małego miasta w województwie łódzkim. Bezpieczeństwo energetyczne. Rynki surowców i energii—teraźniejszość i przyszłość, 401–420.

Energetyka24. (2020). Retrieved March 4–April 3, 2021, from www.energetyka24.com

Eroglu, H. (2021). Effects of Covid-19 outbreak on environment and renewable energy sector. Environment, Development, Sustainability, 23, 4782–4790. https://doi.org/10.1007/s10668-020-00837-4

Evans, G., & Phelan, L. (2016). Transition to a post-carbon society: Linking environmental justice and just transition discourses. Energy Policy, 99, 329–339. https://doi.org/10.1016/j.enpol.2016.05.003

Filas, R. (2008). Polski rynek prasy codziennej w I dekadzie XXI wieku (w szczególności po roku 2003). Zheszyty Prasoznawcze, LII(3–4), 12.

Foltyn-Zarychta, M., Bula, R., & Pera, K. (2021). Discounting for energy transition policies—Estimation of the social discount rate for Poland. Energies, 14, 741. https://doi.org/10.3390/en14030741

Foxon, T. J. (2011). A coevolutionary framework for analysing a transition to a sustainable low carbon economy. Futures & Foresight Science, 1, e23. https://doi.org/10.1002/ffo.23

Frantál, B. (2016). Living on coal: Mined-out identity, community displacement and forming of anti-coal resistance in the Most region, Czech Republic. Resources Policy, 49, 385–393. https://doi.org/10.1016/j.resourpol.2016.07.011

Frantál, B., & Nováková, E. (2019). On the spatial differentiation of energy transitions: Exploring determinants of uneven wind energy developments in the Czech Republic. Moravian Geographical Reports, 27(2), 79–91. https://doi.org/10.2478/mgr-2019-0007

Frużyński, A. (2012). Muzeum Górnictwa Węglowego w Zabrzu.

Ganowski, S., & Rowlands, I. H. (2020). Read all about it! Comparing media discourse on energy storage in Canada and the United Kingdom in a transition era. Energy Research & Social Science, 70, 101709. https://doi.org/10.1016/j.erss.2020.101709

Goban-Klas, T. (2005). Media: Od “czwartej” do “pierwszej” władzy? In M. Magoska (Ed.), Media, władza, prawo (pp. 19–28). Wydawnictwo UJ.

Hák, T., Janoušková, S., & Moldan, B. (2016). Sustainable development goals: A need for relevant indicators. Ecological Indicators, 60, 565–573. https://doi.org/10.1016/j.ecolind.2015.08.003

Healy, N., & Barry, J. (2017). Politicizing energy justice and energy system transitions: Fossil fuel divestment and a “just transition.” Energy Policy, 108, 451–459. https://doi.org/10.1016/j.enpol.2017.06.014

Hirszowicz, M. (2007). Skąd, ale dokąd? Społeczeństwo u progu nowej ery. Wydawnictwo Sic!
Perlaviciute, G., Steg, L., Contzen, N., Roeser, S., & Huijts, N. (2018). Emotional responses to energy projects: Insights for responsible decision making in a sustainable energy transition. *Sustainability, 10*, 2526. https://doi.org/10.3390/su10072526

Pienias, M. (2010). “Mediów obraz własny” na przykładzie wybranych tygodników. *Acta Universitatis Lodzianensis. Folia Litteraria Polonica, 13*, 423–441.

Pietrzak, M., Igliński, B., Kujawski, W., & Iwański, P. (2021). Energy transition in Poland—Assessment of the renewable energy sector. *Energies, 14*, 2046. https://doi.org/10.3390/en14082046

Piwowar, A. (2019). Low-carbon agriculture in Poland: Theoretical and practical challenges. *Polish Journal of Environmental Studies, 28*(4), 2785–2792. https://doi.org/10.15244/pjoes/92211

Reed, M. (2020). Scientific citizens, smartphones and social media—Reshaping the socio-spatial networks of participation: Insects, soil and food. *Moravian Geographical Reports, 28*(1), 61–67. https://doi.org/10.2478/mgr-2020-0005

Rosicki, R. (2018). *Kultury energetyczne Unii Europejskiej*. Wydawnictwo Naukowe Wydziału Nauk Politycznych i Dziennikarstwa.

Rowe, E., Wright, G., & Derbyshire, J. (2017). Wzmocnienie skanowania horyzontu poprzez wykorzystanie wcześniej opracowanych scenariuszy: Analiza obecnej praktyki i specyfikacja usprawnienia procesu w celu pomocy w identyfikacji ważnych „słabych sygnałów. *Prognozy technologiczne i zmiany społeczne, 125*, 224–235. https://doi.org/10.1016/j.techfore.2017.08.001

Ryan, M. L. (2001). Beyond myth and metaphor—The case of narrative in digital media. *University of Minnesota Press.*

Ryan, M. L. (2006). *Avatars of story*. University of Minnesota Press.

Schwartzkopff, J., & Schulz, S. (2017). Climate & energy snapshot: Poland. The political economy of the low-carbon transition. *E3G. www.jstor.org/stable/resrep17776*

Sovacool, B. K., & Dworkin, M. H. (2015). Energy justice: Conceptual insights and practical applications. *Applied Energy, 142*, 435–444. https://doi.org/10.1016/j.apenergy.2015.01.002

Stepka, P. (2010). Public service broadcasting in Poland: Between politics and market. In P. Iosifidis (Ed.), *Reinventing public service communication* (pp. 233–224). Palgrave Macmillan. https://doi.org/10.1057/9780230277113_19

Stober, D., Suškevičs, M., Eiter, S., Müller, S., Martinát, S., & Buchecker, M. (2021). What is the quality of participatory renewable energy planning in Europe? A comparative analysis of innovative practices in 25 projects. *Energy Research & Social Science, 71*, 101804.

Sutherland, W., & Woodroof, H. J. (2009). The need for environmental horizon scanning. *Trends in Ecology and Evolution, 24*, 523–527. https://doi.org/10.1016/j.tree.2009.04.008

Svobodova, K., Owen, J. R., & Harris, J. (2021). The global energy transition and place attachment in coal mining communities: Implications for heavily industrialized landscapes. *Energy Research & Social Science, 71*, 101831. https://doi.org/10.1016/j.erss.2020.101831

Świąder, M., Lin, D., Szewrański, S., Kazak, J. K., Iha, K., van Hoof, J., Belčáková, I., & Altiok, S. (2020). The application of ecological footprint and biocapacity for environmental carrying capacity assessment: A new approach for European cities. *Environmental Science & Policy, 105*, 56–74. https://doi.org/10.1016/j.envsci.2019.12.010

Świątkiewicz-Mośny, M., & Wagner, A. (2012). How much energy in energy policy? The media on the low-carbon transition. *znanstwiodzieniakwiecien-2020-fakt-przegląd-sportowy. Accessed 15 November.*
Wirtualne media. (2021b). Retrieved April 1–April 7, 2021, from https://www.wirtualnmedia.pl/artykul/ogladalnosc-telewizji-2020-tvp1-tvn-ranking-170-stacji-rekord-tvn24-tvp-info-i-polsat-news

Wirtualne media. (2021a). Retrieved April 1–April 7, 2021, from https://www.wirtualnmedia.pl/artykul/ktore-tytuly-prasowe-maja-najwiecez-czytelnictwo

Wiśniewski, P., & Kistowski, M. (2017). Carbon footprint as a tool for local planning of low carbon economy in Poland. Rocznik Ochrona Środowiska, 19, 335–354.

Wójcik, M., Dmochowska-Dudek, K., & Traczyk, A. (2014). Konflikty społeczno-przestrzenne na obszarach wiejskich województwa łódzkiego. Biuletyn Krajowej Sieci Obszarów Wiejskich Województwa Łódzkiego, 4, 8–11.

Zobeidi, T., Komendantova, N., & Yazdanpanah, M. (2021). Social media as a driver of the use of renewable energy: The perceptions of Instagram users in Iran. Energy Policy, 161, 112721. https://doi.org/10.1016/j.enpol.2021.112721

Żuk, P., & Szulecki, K. (2020). Unpacking the right-populist threat to climate action: Poland’s pro-governmental media on energy transition and climate change. Energy Research & Social Science, 66, 101485. https://doi.org/10.1016/j.erss.2020.101485

Żuk, P., Żuk, P., & Pluciński, P. (2021). Coal basin in Upper Silesia and energy transition in Poland in the context of pandemic: The socio-political diversity of preferences in energy and environmental policy. Resources Policy, 71, 101987. https://doi.org/10.1016/j.resourpol.2021.101987

**Publisher’s Note** Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.