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# THE IMPORTANCE OF RESOURCES IN ACHIEVING THE GOALS OF ENERGY COMPANIES

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## ABSTRACT

The fundamental transformation of the global energy sector challenges Polish energy companies to define new organisational goals. To a large extent, these objectives determine an energy company's competitive position and ability to develop in the long term. However, achieving the set goals requires adequate resources. This paper mainly aims to identify and assess the resources used to achieve organisational goals in Polish energy companies. Based on a literature review and data collected from 110 Polish energy companies, the authors identified and assessed resources for achieving their organisational goals. The study confirmed that the organisational goals pursued by energy companies are interrelated. Analysis of the results of the basic organisational goals postulated by Polish energy companies showed that economic goals, such as "market share growth", "implementation of innovative solutions", and "quality of products/services", are among the most important. The study showed that the resources held by energy companies are important for implementing separate organisational goals. Human resources received the highest rating and were considered of the greatest importance for the implementation of the goals of "sector development", "uninterrupted energy supply", and "sustainable development". The paper assesses and discusses the characteristics of Polish energy companies' organisational resources and organisational goals. The contribution of this study is the highlighted importance of resources in achieving the organisational goals of Polish energy companies. The main practical implication of this article is to stress the existence of links between the individual goals of companies in the energy sector and to highlight the importance of the different resource categories they possess for achieving specific objective bundles.

## KEY WORDS

**organisational resources, organisational goals, energy sector companies****10.2478/emj-2023-0020****Katarzyna Mierzejewska**Poznań University of Economics  
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## INTRODUCTION

The energy sector is undergoing critical reforms resulting from changes in international regulations, which are shaping a new framework for the functioning of the market (Angelopoulos, Kontakou & Polla-

lis, 2019). In 2014, the European Union formulated a clear strategy for the energy sector, assuming a safe and effective transformation meeting the requirements related to changes in the climate and energy (Efimova, Ruchkina & Tereshina, 2018). Polish legislation has responded to European Union regulations in the field of energy and climate policy. However, the

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transformation process is demanding due to the specificity and condition of the Polish energy sector (Kaczmarek, 2022).

Poland's energy supply continues to be dominated by fossil fuels (85 % of total energy supply in 2020), of which coal (40 %) has the largest share, followed by crude oil (28 %) and natural gas (17 %). Coal continues to play a key role in the energy system and the Polish economy. Among the 31 member states of the International Energy Agency (IEA), in 2020, Poland had the highest share of coal in energy production, total energy supply, total marginal consumption and electricity production and the second largest share in heat production. The trajectory of the energy sector in 2021 (growing demand, higher fossil fuel consumption and rising emissions) is not in line with the objectives needed to support the transformation of the energy system and combat climate change (International Energy Agency, 2022).

Despite the continued dominance of coal, Poland has achieved significant success in energy transformation in terms of renewable energy sources (RES) and has become one of the fastest-growing photovoltaic markets in the EU (Instytut Energetyki Odnawialnej, 2021). According to the Energy Market Agency's (Agencja Rynku Energii, 2023) data, multi-billion investments in RES and distribution are planned in the coming years. Moreover, in October 2022, the Polish government announced an investment programme for Polish nuclear energy (Popczyk, 2022).

Energy sector researchers highlight the need to transform energy production models resulting from European Union regulations (Vasilakos, 2019). Therefore, research is being conducted on the goals of different stakeholder groups (Matos and Silvestre, 2013) and value capture (Bryant et al., 2018). In Poland, energy companies face the challenge of adapting to new positions (Nogalski et al., 2016b). Considering the postulates and legal regulations of the European Union (European Commission, 2008; Komisja Europejska, 2014), the global political situation affecting the supply of energy around the world (Korosteleva, 2022), and observing current trends in the transformation of energy companies' business models in the context of dynamic changes in the environment (Giones et al., 2019), energy sector companies in Poland face the challenge of shaping new business models, and thus looking at their organisational goals anew. As a result of a literature review on the subject, the authors identified a research gap in the realisation of the organisational goals of energy companies. The considerations account for

the perspective of organisational resources, which are an important factor in achieving various goals within an organisation. Resources affect the level of an enterprise's competitiveness, and when used effectively, they contribute to its development. Company goals should, therefore, consider the level and quality of resources and determine ways to improve them by acquiring new resources and developing existing ones. In addition, they should also consider the resource gap and propose ways to reduce it (Kunasz, 2006).

The general condition of the technical infrastructure of the Polish energy sector is unsatisfactory. Transmission grids, transformer stations and electrical power plants require modernisation, while the density of transmission lines is insufficient to implement innovative solutions (Zakrzewska et al., 2020). The modernisation of the energy sector, in which the postulates of energy and climate policy will be implemented, is associated with the need to implement advanced digital solutions and the use of ICTs (Hilty et al., 2009; Lange et al., 2020). Most technologies also require employees to acquire new competencies and the energy sector staff to be retrained (Smokvina et al., 2019). The dynamically growing interest in green energy among energy consumers is forcing a change in the attitudes and behaviours of energy producers towards being more pro-ecological (Liakhovych et al., 2021). Innovations in the energy sector require huge financial outlays. The Polish Energy Policy 2040 highlights significant investments in the modernisation of the energy system across the country and in fixed assets in energy companies in the coming years, which involves high expenditure on capital goods (Lisowski et al., 2021).

Given the above, it would appear highly appropriate to research the relationships between the organisational goals of energy companies and the resources held by these companies. The article aims, therefore, to identify and assess the resources used by Polish energy companies to achieve their organisational goals. This article is part of a wider research project on the business models followed by energy sector companies in Poland. With reference to the main objective of the paper, the following research questions were formulated:

- What are the organisational goals of energy companies in Poland?
- Which categories of organisational goals are interrelated in Polish energy sector companies?
- What is the resource base of energy sector companies in Poland?

- How important are organisational resources from the perspective of the main goals of energy companies in Poland?

The paper is structured as follows. Section 2 presents the theoretical background, discussing organisational goals, categories of resources in Polish energy sector companies, and the importance of the resource base from the perspective of energy companies' goals. Section 3 includes the methods and the research sample. The research results are then introduced and discussed in section 4, and the final part of the paper provides conclusions, limitations and further research directions.

## 1. LITERATURE REVIEW

### 1.1. ORGANISATIONAL GOALS OF ENERGY SECTOR COMPANIES

Organisational goals are a key issue in management science; however, the question of formulating goals and their consequences has many ambiguities (Linder & Foss, 2018). Organisational goals refer to determining the direction of an organisation's activities (Simon, 1964). Kotlar et al. (2018) noted that organisational goals are the result of negotiations between different stakeholder groups. Consequently, the set goals relate to various dimensions, such as production, inventory, sales, market share and profitability. Lee, Costello and Lee (2021), referring to the balanced scorecard, considered an organisation's goals in terms of internal business goals, financial goals, the customer perspective, and learning and growth. They also pointed to the category of goals related to the IT perspective.

Hall and Lobina (2004) suggested that organisational goals do not always coincide with public goals. While discussing the companies' operation in the energy sector in recent years, the issue of sustainability goals received much attention (Latapí Agudelo et al., 2020). This paper, however, attempts to determine the importance of various goals of energy companies in Poland. Although the list of goals set and pursued by energy companies remains open, the article presents goal categories as they emerge from literature analysis on the subject, which also identifies the main areas addressed by energy companies' goals.

The first area is contributing to the development of the energy sector in Poland. The business models of contemporary energy companies are undergoing significant changes due to, among other things, a sig-

nificant increase in the level of varied sources of renewable energy (Bryant et al., 2018). The need to transform energy companies' business models also arises from the changing technological environment (Chasin et al., 2020) and the consequent need to adjust the activities carried out as a part of operations to Industry 4.0 concept assumptions (Schaeffer, 2015). The business models of energy companies in Poland are characterised by a traditional configuration (Brzówska, 2016), and it is these traditional characteristics that need to evolve to fit the changing environment (Nogalski et al., 2016a).

The second area is profit maximisation and market share growth. Such general organisational goals as strengthening market position and improving performance are also characteristic of energy companies (Westerman et al., 2020). Maintaining an adequate market share emerges as the next necessary course of action for energy companies. For example, in the past, the success of German power plants was based on centralised ownership and mass production. Today, growing environmental awareness, the increasing liberalisation of the energy market, and the decentralisation of production require companies to take appropriate measures to maintain or strengthen their market position (Dellermann et al., 2017).

The third area is investing in renewable energy sources and sustainable development. The energy sector needs to increase its commitment to diversifying energy sources, including renewable energy (Bryant et al., 2018). Zolfaghari Ejlal Manesh and Rialp-Criado (2017) analysed the business models of nine companies involved in renewable energy; however, they pointed out that the Spanish electricity market is dominated by large "incumbent" companies with a better financial situation and technological background. As a result, small start-ups focused on renewable energy innovations are seen as a market threat and are being taken over by large market players. The concept of sustainability requires the attention of energy companies because it raises social, economic and environmental issues that should be considered in the sustainable business models of today's energy companies (Matos & Silvestre, 2013). Kolk and van den Buse (2012) suggested that energy companies should engage in efforts to provide sustainable energy. Changes in energy production models result from European Union regulations (Vasilakos, 2019) or global energy policies oriented towards ensuring a sustainable energy path, as set by the UN Sustainable Development Goals (Kim, 2019).

The fourth area is the customer perspective (providing the highest possible level of quality of products/services offered; providing customers with products/services at the lowest possible price; ensuring uninterrupted energy supply to customers). The customer perspective is one of the key elements of the business model. Energy companies' service and customer orientation are among the key factors in their success (Meyer et al., 2021). Chasin et al. (2020) pointed out that energy companies' relationship with their customers tends to be limited to issuing-receiving bills and meter readings. Responsible pricing by energy suppliers is an important element of viable social responsibility measures (Weder et al., 2019). The importance of energy for economic development and society as a whole is indisputable (Kolk and van den Buuse, 2012). Thus, the role of energy companies in ensuring uninterrupted energy supply is important.

The fifth area is the implementation of innovative solutions. Although the energy sector appears to be one of the most closely regulated and thus resistant to change, including digital transformation (Bradley et al., 2015), the literature raises issues of innovation in energy sector companies. Munsamy et al. (2019) highlighted the variety of technology tools used in energy management, including business process automation. Nogalski, Szpitter and Jablonski (2016) raised the importance of innovative solutions/new technologies from the perspective of business models. Exploring the importance of virtual power plants (related to the Internet of Things), Dellerman, Fliaster and Kolloch (Dellermann et al., 2017) stressed the importance of managers being able to identify elements of the business ecosystem.

## 1.2. ORGANISATIONAL RESOURCES IN THE POLISH ENERGY SECTOR

This section of the article analyses the categories of resources included in the empirical research carried out among companies in the energy sector.

The resource-based view has remained one of the most popular perspectives for conducting empirical research related to organisations (Nason & Wiklund, 2018; Zhao & Pan, 2021). As Wernelfeld (1984) emphasised, a company's resources are all the physical assets, intangible assets and organisational capabilities that the company owns and controls. According to the resource-based view, above-average corporate performance, achieving a certain competi-

tive position and sustainable competitive advantages are explained by focusing on the company's internal resources and prioritising them over external factors. The theory assumes that the organisation is a bundle of resources and skills (Amit & Schoemaker, 1993). Companies within a sector may differ in the resources they possess. Barney (1991) postulates that resources are valuable if they have strategic value, are rare, have no substitutes and are difficult to imitate. Such qualities are characterised by intangible resources, which are diverse in nature, unique, immobile and relatively resistant to imitation (Othman et al., 2015).

The resource-based-view of the company assumes the division of resources into various categories, among which the most frequently mentioned and those recurring in the proposed classifications are (Amit & Schoemaker, 1993; Barney, 1991; Grant, 1991; Wernerfelt, 1984): human, physical, financial and technological. Therefore, these resource categories will be analysed in the context of energy sector enterprises.

Regarding human resources in the energy sector, it can be noted that according to empirical studies, employment in the energy sector is gradually increasing all over the world, including in Poland (Czako, 2020). The reported increase in employment is primarily related to the so-called green transformation and the development of such fields of energy as solar, wind and hydroelectric power, and the increase in the use of biogas or biomass. This makes it necessary to transform the energy system into a post-carbon system and, consequently, introduce technological and technical changes. The financial support offered by the European Union in this area is also important (Martinez-Rodriguez & Vera-Martinez, 2020). All these factors contribute to modernising the existing energy system and offering new products and services. Progressive change requires, on the one hand, an increase in employment (the creation of new jobs and positions) and, on the other, the formation of entirely new skills and competences. These include multidimensional, interdisciplinary and specialised competences, but also social competences. Employees with both technical, investment and team management competences are required. There is also the problem of retraining, education and vocational training of current human resources in the energy sector, as well as the recruitment of new employees (Černý et al., 2021; Ram et al., 2022). Graduates from secondary technical schools and professionals with higher education, including engineers, are needed.

For this reason, the Sectoral Qualification Framework for the Energy Sector was developed to ensure that the education system is better aligned with the actual market needs. Based on the above considerations, it can be concluded that human capital is one of the key resources determining the effectiveness of the transformation of the energy sector (Kacprzak et al., 2022).

Another category of resources that plays an important role in the energy sector is financial resources. This sector requires significant investments in both financial and infrastructural areas. This is because most of the energy sector, including in Poland, is owned by large companies with the participation of the State Treasury. As in other European countries, the Polish energy sector takes the form of an energy oligopoly, with participants predominantly producing and distributing domestic electricity. No changes are expected in the coming years in relation to the concentration of capital in the sector. The most relevant regulations for the energy sector are created at the EU and national levels, with project funds distributed top-down among member countries (Lipiński, 2021). The high capital intensity of the sector is also because Poland stands at a crossroads related to the choice of a decarbonisation pathway to reduce greenhouse gas emissions. This path would involve introducing fundamental changes to the current coal-based production structure and shifting the focus towards renewable energy sources. Such changes would require a downsizing of the coal sector, which would translate into significant costs for the economy and society, especially since, in 2021, the sector employed 78 900 workers (Antosiewicz et al., 2020). In addition to the classic ways of financing renewable energy sources associated with EU subsidies, there is also the alternative of crowdfunding, i.e., raising finance for a particular project from private individuals. This is possible because renewable energy sources are often local in nature, which means that local developers, municipalities and residents finance a particular energy installation themselves and become its shareholders (Wojtkiewicz, 2021).

The analysis of the physical resources of the Polish energy sector, particularly the infrastructure, indicates that the Polish energy sector faces significant challenges due to an increase in electricity demand accompanied by a low level and quality of production and transmission infrastructure. A characteristic feature of the Polish energy sector is the specific configuration of the sources from which electricity is generated. Compared to other European

countries, Poland is characterised by a high share of coal and lignite. In the context of actions aimed at climate protection and reduction of carbon dioxide emissions, significant investment expenditures are required to reconstruct the production system. In addition, a weakness of the Polish power system is the age of the production units, which are old and have low efficiency or require modernisation or dismantling due to the end of their operational life (Lipski, 2016). Despite the above global trends, in Poland, the main source of stable and continuous energy supply is still coal power plants, and due to a lack of energy storage capacity, their maintenance is becoming a priority issue (Szczerbowski, 2018).

One of the basic types of resources in the functioning of a company in any sector is technological resources, especially in the context of the ongoing fourth industrial revolution related to the process of digitalisation, the implementation of disruptive innovations, automation and the development of communications understood as the use of multiple means of communication (Schaeffer, 2015; Miśkiewicz, 2019). A similar trend is visible in the energy sector, where the consequences of technological change can be observed, despite the industry being considered one of the more resistant to digitalisation processes (Morkisz, 2019; Giones et al., 2019). The use of new technologies enables greater customer focus through the personalisation of products and services using specific technologies, such as the Internet of Things, Big Data analytics, cloud computing, machine-to-machine communication, machine-to-human automation, VR and AR (virtual reality and augmented reality), a simple changeover of production to a variable assortment, and 3D printing (Bašová, 2020).

The energy sector is transforming as new technologies and innovations contribute to changes in existing business models. The global energy industry is shifting from a system based on centralised companies using traditional energy conversion, transmission and distribution technologies towards distributed, digital and low-carbon businesses (Martin et al., 2017). The digitalisation of the energy sector involves many challenges but also creates numerous opportunities. The amount of processed information and the number of performed transactions in the sector is constantly increasing. It is, therefore, necessary to increase the efficiency, transparency, profitability and security of digital platforms in the energy sector. This can be achieved through increased innovation and the development and use of modern tech-

nologies. In addition, digitalisation will enable energy suppliers to establish a direct relationship with the end customer, who will be able to identify intelligent ways to manage their energy resources (Goosen et al., 2020). Other aspects related to the digital transformation process in the energy sector, such as the implementation of integrated smart energy systems, particularly smart information and telecommunications technologies, should also be considered (Voropai, 2020). In conclusion, technological resources are key in transforming the energy sector by increasing efficiency, profitability and security. Therefore, they require continuous investment and development.

A special category within technological resources is information and communication resources. The current dynamic development in this area is changing existing business models and industry ecosystems. This trend is also evident in the energy sector with new emerging services, such as end-to-end inspection, protection and control of energy distribution, and smart consumption, which contribute to the smart grid's management, construction and transformation. With increasing digitalisation, it is necessary to ensure consistency between IT applications and communication technology infrastructures (Sun, 2021). The ICT use in the energy sector can contribute to the transition to a low-carbon electricity system that will enable customers to make more rational energy decisions. A key technology in ICT is the smart meter, which is part of an advanced metering infrastructure that enables the measurement and storage of high-resolution electricity data. This makes it possible to provide data to both consumers and energy companies almost in real-time. The use of this technology enables home energy management, battery management, distributed renewable generation management, demand forecasting and the subsequent reallocation of energy (Yildiz et al., 2017). This can contribute to optimising and increasing the efficiency of household electricity use and, consequently, reducing the carbon footprint of electricity production (Bastida et al., 2019).

### 1.3. RESOURCE BASE FROM THE PERSPECTIVE OF ENERGY COMPANIES' GOALS

The effectiveness of any company's goals depends, among other factors, on the level and quality of its resources. Depending on the nature of the goals (economic, environmental, social), they will be more or less correlated with the different types of resources (human, financial, infrastructural or technological).

The same applies to companies in the energy sector. The question arises as to which resources play a significant role in implementing the goals adopted by companies in the Polish energy sector. To answer this, it is first necessary to identify the goals formulated within this sector.

To implement its climate and energy policy, the European Union imposes an obligation on Member States to reduce and, in the long term, completely abandon coal and lignite as the primary electricity generation source. A pro-ecological solution to this — considering concern for the climate and an attempt to stop global warming — would seem to be investments in renewable energy sources. In light of the United Nations Climate Change Conference findings and the subsequent European Union legal regulations related to reducing emissions of climate-damaging gases, investments in the conventional energy sector development are decreasing significantly (Szczerbowski, 2018). Poland remains one of the few European countries where the importance of coal in the economy is still maintained as a result of political decisions. The Polish energy system requires transformation, the main goal of which should be to reduce the use of coal and ultimately close the mines. These actions should consider economic aspects, such as resources and the profitability of mining, and social aspects in connection with job reductions in the mining sector (Lipski, 2016; Malec, 2022; International Energy Agency, 2022).

In October 2009, the Ministry of National Economy published the Energy Policy of Poland until 2030. Its basic objective, with regard to the production and transmission of electricity and heat, is to permanently cover the demand for electricity, considering the maximum possible use of domestic resources with the application of environmentally friendly technologies. According to the assumptions, this goal is to be achieved, through: (1) the construction of new capacities to meet domestic electricity demand and maintain a capacity surplus from domestic conventional and nuclear generation sources; (2) the development of the national transmission network, which will ensure the reliability of electricity supply, as well as the collection of electricity from areas with a high saturation of planned and newly built generation units, with particular emphasis on wind farms; (3) the development of cross-border connections coordinated with the development of the national transmission network, and with the development of the systems of neighbouring countries (Ministerstwo Gospodarki Narodowej, 2009).

Another document concerning the vision for the energy system development in Poland is the project Energy Policy of Poland until 2050, also developed by the Ministry of National Economy. The main goal formulated in the project concerns the creation of conditions for the energy sector's continuous and sustainable development. This development is necessary for energy security and to meet the energy needs of businesses and households. It is assumed that the above goals will be realised by (1) ensuring an adequate level of generation capacity; (2) diversifying the structure of energy generation; and (3) maintaining and developing transmission and distribution capacities (Ministerstwo Gospodarki Narodowej, 2015).

The above goals relating to the development of the Polish energy sector will first require financial resources to build new and modernise the existing infrastructure (increase the density and modernise the grid and number of transformer stations). In addition, the implementation of the goals will be related to the use of new technologies, the purchase and operation of which will involve further investments. The use of new technologies will depend on having staff with the appropriate skills to use them effectively. This, in turn, generates additional costs associated with developing the competencies of energy sector employees or acquiring new highly specialised staff. In summary, it can be seen that the implementation of the set objectives in the coming years in the Polish energy system will be associated with using all types of resources, but the key role in this aspect is likely to be played by financial resources.

Summarising the considerations in the theoretical background regarding the organisational goals and resources of energy sector companies, it can be noted that although organisational goals relate to different dimensions, such as production, inventory, sales, market share, customer perspective, profitability and sustainability, they are interrelated in some way, forming a coherent set of goals (Kotlar et al., 2018; Lee et al., 2021). Furthermore, it can be assumed that there is a correlation between the possessed resources and the choice and achievement of specific categories of organisational goals (Deligönül & Çavuşgil, 1997). On this basis, the following research hypotheses were formulated:

H1: Different categories of organisational goals of Polish energy companies are interrelated.

H2: Resource types of Polish energy companies determine the choice and achievement of each goal category.

## 2. RESEARCH METHODS AND SAMPLE

The paper mainly aimed to identify and assess the resources used to achieve organisational goals in Polish energy companies. The validation procedure described by Fatma et al. (2014) was used to develop a new tool in the form of a questionnaire. The procedure consisted of five following steps.

### 2.1. FIRST STEP. LITERATURE REVIEW

An in-depth literature review allowed for identifying and defining the importance of the goals and resources of energy companies in Poland. Based on critical literature analysis (Amin & Rahman, 2019; Andoni et al., 2019; Bogomolova et al., 2018; Bryant et al., 2018; Jankiewicz, 2018; Kolk & van Tulder, 2010; Lipiński, 2021; Nogalski et al., 2016a; Parida et al., 2016; Smokvina et al., 2019; Teece et al., 1997; Westerman et al., 2020; Wojtkiewicz, 2021; Wu et al., 2006; Zakrzewska & Gil-Świdarska, 2018; Zuppo, 2012), five goal-categories we identified, contributing to the development of the energy sector in Poland: (1) profit maximisation and market share growth; (2) investing in renewable energy sources (RES) and sustainable development; (3) customer perspective: providing the highest possible level of quality of products/services offered, providing customers with products/services at the lowest possible price, ensuring uninterrupted energy supply to customers; (4) implementation of innovative solutions; (5) uninterrupted energy supply and sector development. Also, three categories of resources (human, financial, and infrastructural) were identified to be investigated in the research (Amin & Rahman, 2019; Andoni et al., 2019; Bogomolova et al., 2018; Lipiński, 2021; Smokvina et al., 2019; Teece & Pisano, 1994).

### 2.2. SECOND STEP. EXPERT SURVEY

In the second step, which consisted of scale development, invited 13 experts were invited, twelve of whom participated in the expert survey. The experts were business practitioners working in managerial and decision-making positions in different energy sector companies. At this stage, the experts suggested that the category of technological resources should be more precise and detailed. Considering

that the research was carried out as part of the Regional Initiative for Excellence programme of the Minister of Science and Higher Education of Poland, at this stage of scale development, six items were excluded, eight items were added, and 19 items were re-formulated.

### 2.3. THIRD STEP. GROUP DISCUSSION

The re-formulated questionnaire was discussed with the group of twelve academic researchers working on energy sector-related issues. After consultations with the academic researchers, who supported the experts in the need to specify technological resources, it was decided to consider “technological resources” in this study under three separate and more specific categories (technological, ICT, and infrastructural resources). Also, the academic researchers encouraged to investigate the organisational goals of energy companies in as much detail as possible. For this purpose, the goal categories were divided into nine different goals. As a result of the discussion, six items were removed from the research questionnaire, and 14 items were re-formulated.

### 2.4. FOURTH STEP. PILOT TESTING

In the penultimate stage, four pilot surveys were conducted in 16 companies with a view to ensuring the clarity of the formulated questions. As a result of this step, the whole survey was enriched with three new items, eleven other items were removed, and seven items were re-formulated.

### 2.5. FIFTH STEP. MAIN SURVEY

The actual research was carried out as the last part of the scale development process on a sample of 110 companies, including 55 small, 27 medium-sized, and 26 large enterprises.

Statistica software was used to conduct the analyses (descriptive statistics, correlations and cluster analysis). As a final result of the scale development process, the following list of variables was established to be tested in the research (Table 1). The variables are provided with descriptive statistics.

Respondents were asked to choose statements on a 7-point Likert scale (1 — very bad, 7 — very good) corresponding to the degree of importance of achiev-

Tab. 1. Descriptive statistics of variables (n = 110)

VARIABLE	DESCRIPTIVE STATISTICS					
	AVERAGE	MODE	NUMBER OF MODE	MINIMUM	MAXIMUM	STANDARD DEVIATION
<b>OBJECTIVES OF ENERGY COMPANIES</b>						
Sector development	5.54	6	39	1	7	1.44
Profit maximisation	5.54	6	37	1	7	1.35
Market share growth	5.91	6	51	3	7	0.91
Investments in RES	5.35	6	36	1	7	1.45
Quality of products/services	5.80	6	42	3	7	1.03
Low price	5.76	6	50	3	7	0.91
Uninterrupted energy supply	5.68	6	36	2	7	1.09
Implementation of innovative solutions	5.84	6	47	2	7	1.05
Sustainable development	5.76	6	44	2	7	1.01
<b>ORGANISATIONAL RESOURCES</b>						
Human resources	5.69	6	42	1	7	1.19
Financial resources	5.63	6	42	1	7	1.15
Infrastructural resources	5.63	6	39	2	7	1.11
Technological resources	5.51	6	40	2	7	1.07
ICT resources	5.38	5	44	3	7	1.03



Tab. 2. Characteristics of the energy companies (n=110)

EMPLOYMENT	NUMBER OF COMPANIES
10 - 49	55
50 - 249	27
>250	28
AGE OF THE COMPANY	NUMBER OF COMPANIES
< 2 years	1
2 - 5 years	4
6 - 10 years	27
11 - 25 years	50
> 25 years	28
2 - 5 years	4
6 - 10 years	27
11 - 25 years	50
> 25 years	28

ing the stated goals in their company and to assess the availability of the organisational resources.

The research was performed in June 2021 by a research company. The study used the single-respondent method, and the respondents were managers working in different companies in the energy sector. The competence of the respondents in the field of the research ensured greater credibility and reliability in completing the questionnaires. The research used the computer-assisted web interview (CAWI) method, as this made it possible to obtain a relatively large sample of respondents and, above all, to conduct quantitative research, which was necessary to achieve the aim of the study. Table 2 presents the characteristics of the Polish energy companies studied.

Due to the specific feature of micro-enterprises, i.e., limited human resources, they were excluded from the study. The population of energy sector enterprises in Poland, excluding micro-enterprises, is estimated to be around 180 companies.

### 3. RESEARCH RESULTS AND DISCUSSION

The correlation analysis allowed for concluding that the organisational goals pursued by energy companies are interrelated. Thus, hypothesis H1 was confirmed. The fact that organisational goals are interrelated is not always obvious. For a long time, the theory of management, which is also confirmed by practice, has pointed to the contradiction of goals in the organisation (Rosen, 1970).

First, the study observed that an orientation towards quality assurance is supported by an approach

aimed at providing customers with the lowest possible prices. A responsible attitude to pricing by energy suppliers is one of the key areas for implementing a socially responsible strategy. However, the issue of energy pricing is also a challenge in this area. Relatively high energy prices in relation to consumer income limit the ability to engage (for companies) as well as the willingness (for consumers) to pay to engage in renewable energy production or to seek innovation in this area (Campbell, 2007; Pätäri et al., 2014; Weder et al., 2019). Furthermore, Kowal and Kustra (2016) noted that the profitability of Polish energy companies is constrained by relatively low energy prices compared to costs. This study concluded that the aim to ensure the lowest possible prices and quality does not strongly correlate with profit maximisation. The differences in attitudes are also shown by the cluster analysis (Fig. 1). Referring to the issue of pricing and the above discussion; it is also worth noting that the orientation towards RES investment is rather different from the approach to achieving other goals, including those related to pricing policy.

The approach to achieving the goals of implementing innovation most closely coincides with the approach to achieving sustainable development. Mezhner, Tabbara and Al-Hosany (Mezher et al., 2010) noted that an attitude of social responsibility can play an important role in enhancing the innovative potential of the energy sector. However, Streimikiene, Simanaviciene and Kovaliov (Streimikiene et al., 2009) pointed out that the implementation of sustainable development policies in the energy sector can be hampered by low levels of innovation. The results of this survey suggest that companies in the energy sector in Poland are not currently oriented towards goals in the triad innovation-sustainability-investment in RES. One explanation for the lack of consistency in the activities in these three areas is the traditional nature of the energy sector, based on traditional energy sources (Szczerbowski, 2018; International Energy Agency, 2022), and such a state of affairs calls for in-depth research in this area. Considering the perspective of renewable energy sources seems to be important, as the issue of renewable energy sources is sensitive to aspects of social responsibility (González Ramos et al., 2018).

Hypothesis H2 was also confirmed. Each of the resource categories correlates statistically significantly with the choice and achievement of individual goals (Table 3). The first observation that emerges is about the co-occurrence of the importance of human

resources with an orientation towards sector development (correlation of 0.62), ensuring uninterrupted energy supply (correlation of 0.62), and an orientation towards sustainability (correlation of 0.61). As indicated earlier, insufficient human resources are one of the factors inhibiting the implementation of the concept of social responsibility (Pätäri et al., 2014). Referring to individual objectives covered in the survey, the following observations were made. For the “sector development” goal, only infrastructure resources are below the correlation of 0.5, which may indicate a low level of infrastructure resources, thus requiring significant expenditure on reconstruction and modernisation. Most of the Polish energy sector infrastructure has not been modified since the 1980s and is close to the end of its operational life. The power grid was built to different energy standards than today due to the fact that it was intended for large electricity producers. As a result, energy supply security and transmission grid reliability are becom-

ing increasingly problematic (Jankiewicz, 2018; Zakrzewska & Gil-Świdorska, 2018).

For the realisation of the “profit maximisation” goal, financial resources are of key importance, which would seem to be a natural phenomenon; the other resource categories have a relatively weak correlation. The lowest correlation in the ICT resource category (0.27) may result from using modern communication and information technologies and involves investments related not only to the purchase and use of these technologies but also to the need for qualified staff to operate them. Research points to the need to upgrade the skills of energy sector employees in the area of both technical and business skills and to recruit new staff (Černý et al., 2021).

For the “market share growth” goal, human resources (correlation of 0.57) and financial resources (correlation of 0.55) are the most important. For the “investments in RES” orientation, a lower level of correlation was observed with each category of

Tab. 3. Correlation analysis

VARIABLE	CORRELATION, P-VALUE: P < .05000 N=110													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Sector development	1.00													
2. Profit maximisation	0.49	1.00												
3. Market share growth	0.51	0.49	1.00											
4. Investments in RES	0.40	0.25	0.40	1.00										
5. Quality of products/services	0.49	0.38	0.64	0.40	1.00									
6. Low price	0.59	0.48	0.59	0.34	0.68	1.00								
7. Uninterrupted energy supply	0.58	0.39	0.57	0.36	0.52	0.61	1.00							
8. Implementation of innovative solutions	0.57	0.45	0.66	0.41	0.67	0.68	0.57	1.00						
9. Sustainable development	0.62	0.51	0.63	0.38	0.61	0.63	0.67	0.80	1.00					
10. Human resources	0.62	0.35	0.57	0.40	0.55	0.54	0.62	0.57	0.61	1.00				
11. Financial resources	0.62	0.51	0.55	0.42	0.47	0.55	0.49	0.49	0.52	0.72	1.00			
12. Infrastructural resources	0.46	0.37	0.46	0.36	0.49	0.46	0.36	0.46	0.48	0.62	0.72	1.00		
13. Technological resources	0.56	0.33	0.42	0.34	0.42	0.48	0.44	0.50	0.49	0.72	0.65	0.73	1.00	
14. ICT resources	0.50	0.23	0.40	0.36	0.39	0.44	0.38	0.44	0.46	0.65	0.62	0.65	0.74	1.00

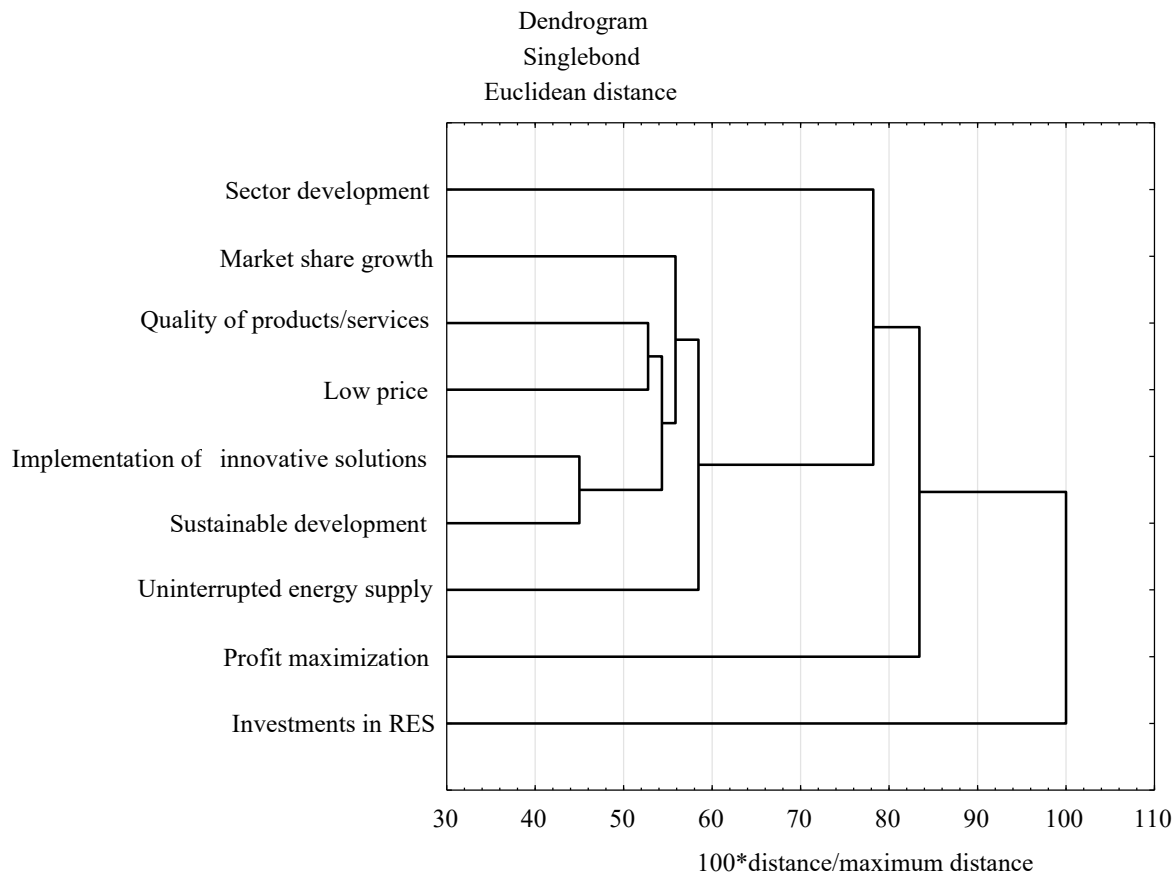


Fig. 1. Cluster analysis for organisational goals of energy sector companies in Poland

resources. On the other hand, for the “quality of products and services”, it turns out that human resources are important (correlation of 0.55), which are also relatively strong in relation to the “low price” orientation (correlation of 0.54). In this perspective, a correlation above 0.5 was also observed with the financial resources category (0.55). The category of human resources also appears to be relevant for the other three goals (“uninterrupted energy supply”, “implementation of innovative solutions”, and “sustainable development”). For the “sustainable development” orientation, a relatively strong correlation is also observed with the financial resources category (0.52).

The cluster analysis (Fig. 1) shows the levels of similarity in the orientation toward the achievement of various goals considered in the research. The chart shows the aforementioned inconsistency of orientation to RES investments.

The highest similarity was observed between the implementation of the goals “implementation of innovative solutions” and “sustainable development” (at levels above 50 %), as well as “quality of product and services” and “low price” (slightly below 50 %).

These four goal categories cluster with the “market share growth” and “uninterrupted energy supply” orientations at around 40 %.

## CONCLUSIONS

The paper aimed to identify and assess the resources used to achieve organisational goals in Polish energy companies. This aim was achieved by answering four research questions at a theoretical and empirical level. The hypotheses formulated in the paper were positively verified.

The analysis of the results concerning the basic organisational goals postulated by Polish energy companies showed that economic goals, such as “market share growth”, “implementation of innovative solutions”, and “quality of products/services”, are at the forefront, which seems justified also for companies in the energy sector (Westerman et al., 2020). Such goals as “low price”, “sustainable development”, and “uninterrupted energy supply” were rated relatively highly. The least important in the opinion of respondents was the goal related to “investments in

RES”, which can be explained by the fact that the basic source of energy production in Poland remains hard coal and lignite. Poland’s power plants are still coal-fired and remain a stable source of energy supply. Given the lack of infrastructural possibilities to store energy, the maintenance of conventional sources determines the country’s energy security. In the coming years, the Polish energy system will continue to rely primarily on conventional energy, with a growing share of renewable energy sources (Szczerbowski, 2018; Attia et al., 2022).

Regarding the level of resources held by energy companies, human resources received the highest rating. They were followed by financial and infrastructural resources. The lowest ratings were given to the quality and level of technological resources and information and communication technology. This can be explained by the digital transformation process in the Polish energy sector. Notably, the energy sector is extremely resistant to the digitalisation process. Companies in this sector should adapt quickly to the requirements of digital transformation, especially in the case of incumbent companies, for which it can ensure survival. It is postulated that the use of new technologies, including ICT, is an opportunity to guarantee a reliable, resilient, cost-effective and low-carbon energy system (Efimova et al., 2018; Angelopoulos et al., 2019; Morkovkin et al., 2020).

The empirical verification of H1 allows for concluding that the organisational goals pursued by energy companies are interrelated. The analysis of the results showed that the focus on quality assurance is supported by an approach focused on providing customers with the lowest possible price. Maintaining a high-quality energy supply with rising prices is a particular challenge today. However, it should be noted that a responsible attitude among energy suppliers in shaping quality and setting prices is one of the key areas of implementing a social responsibility strategy. In addition, it is worth considering that the very low correlation (0.25) level between RES investment and profit maximisation suggests possible inconsistency between various goals of energy companies. Thus, decisions to invest in RES may not take high priority. Polish energy companies are not oriented towards implementing goals in the triad innovation-sustainable development-investments in RES. This may be because the Polish energy sector is still largely based on conventional and, at the same time, non-renewable energy sources (International Energy Agency, 2022; Szczerbowski, 2018).

The verification of H2 confirmed that the resources held by energy companies are important for implementing separate organisational goals. Human resources are of the greatest importance for implementing the goals of “sector development”, “uninterrupted energy supply”, and “sustainable development”. It is still people, not technologies, that are the initiators of development, and it is their competence that determines the efficiency of operation and the implementation of activities with future generations in mind (Chams & García-Blandón, 2019). The lowest correlation strength of the “sector development” objective is noted with infrastructural resources. This fact can be explained by the outdated condition of the Polish energy infrastructure (Jankiewicz, 2018; Zakrzewska & Gil-Świdarska, 2018). Financial resources are key for achieving the “profit maximisation” goal, while ICT resources are the least important. The use of ICT is related not only to the purchase of technologies but, above all, to their use. This generates the need to provide the energy sector staff with digital competences (Smokvina et al., 2019).

It is also important to consider that the business models of energy companies are embedded in the legal framework of the economies in which they operate (Burger & Luke, 2017). Consequently, the goals of energy companies appear to some extent to be derived from the past decisions and directions of individual entities.

The main study’s contribution is the highlighted meaning of resources for achieving organisational goals in Polish energy companies. Expanding knowledge in the field of the resources required for the implementation of organisational goals brings added value not only for the development of management and quality sciences but also for business practice. For managerial practice, it is also important to define the links between the individual goals of companies in the energy sector.

This research has several limitations; however, these limitations may become the basis for further research. The limitations of the research procedure can be reduced to four basic issues. First, adopting the single-respondent method in research increases the likelihood of subjectivism bias. Therefore, it would be worth inviting several respondents from each entity. In this way, the perspective of the researched problem could be broadened. Second, the study was conducted on small, medium-sized and large energy companies. Although the study assumed that micro-entities should be excluded due to their specificity of resource

management, the inclusion of micro-enterprises in the study could have provided a fuller picture of energy companies' goals and resources across the sector. Third, research on organisational goals that fit into the contemporary business models of energy companies requires a deeper and broader insight into individual categories of resources. Fourth, the specificity of management in the energy sector is conditioned by political and economic decisions. Hence, this research may be biased by the conditions prevailing in the Polish economy. It would be worth conducting similar research in the energy sector of other countries to gain a broader, international perspective and capture possible differences.

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