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Critical Success Factors of the Energy Sector Security Strategy: The Case of Poland

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Abstract: The aim of this article is to identify important factors that determine the strategy of the energy sector. It has been assumed that the determinants of this strategy are goals related to the energy security of a European Union member state and the reduction of environmental pollution and anthropogenic pressures. Therefore, this article uses the method of the strategic analysis of critical success factors (CSFs), applied to the energy sector. As the name implies, in this method, factors that determine energy strategies, relating to the economic, technological, political, social and ecological spheres, were identified. Poland served as a case study. Research was carried out by experts in the energy sector and people working with this sector in order to determine the significance of the most important CSFs related to the energy security strategy. This approach is based on an evolutionary approach to creating a security strategy. The proposed analysis is a new proposal for a sectorial analysis based on the application of benchmarking, taking into account, in particular, the current conditions for the development of the energy sector. Our findings indicate that: European Union countries have different energy strategies, resulting from an evolutionary approach. The member states of the European Union create individual solutions in the field of energy strategies, which are conditioned by many factors, the most important of which are the geographic and physical location of a country on the European continent, economic and social contexts, and environmental as well as political conditions. According to Polish experts, the key success factors in building an energy strategy stem mainly from the economic and political areas, followed by the technological area, while the environmental and social areas are the least important. The authors hope that the article will serve to popularize the use of CSFs in scientific research, which can then translate into improved government policies for the energy sector.

Keywords: security strategy; energy sector; critical success factors (CSFs); Poland

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1. Introduction

After the end of the Cold War, the conceptual scope of national security was limited. It was no longer associated solely with military threats, but was combined with other areas. The liberal approach to national security emphasizes the protection of the state's interests as a whole, including society and its components, as well as other entities. Ensuring security can therefore be defined as the elimination of external threats and weaknesses within the state and satisfying of more broadly defined needs, and the rights and aspirations of the society regarding its way and quality of life, systemic and cultural identity, and development opportunities. Today's national security strategies are largely focused on non-military aspects of security, such as environmental protection, energy and economic security, the protection of critical infrastructure, cyberspace, health, and the family, and the migration policy as a result of identified threats (Figure 1). However, it can be assumed that, due to the war in Ukraine, the focus will (again) shift towards the military aspects; however, in this aspect, there are also clear direct or indirect links with the energy security of countries dependent on conventional Russian energy sources. In such a case, it is difficult to separate military and non-military factors. The conflict in Ukraine has caused such identified areas to become interrelated. Both separate themes are within the remits of those entities that deal with the issues of energy supply for the modern battlefield [1].

1st	Climate action failure	6th	Infectious diseases
2nd	Extreme weather	7th	Human environmental damage
3rd	Biodiversity loss	8th	Natural resource crises
4th	Social cohesion erosion	9th	Debt crises
5th	Livelihood crises	10th	Geoeconomic confrontation

Figure 1. Identification of the most severe risks on the global scale over the next 10 years. Source: own study based on [2]. Areas analyzed: economic, geopolitical, societal, environmental.

The European energy sector is in a transition phase. The energy sectors of individual countries are no longer merely separate national markets, but do not yet constitute a common European market. Regional markets (e.g., the Scandinavian market) are playing increasingly important roles and are often perceived as an intermediate step preceding the target single European market. The strive to reduce CO_2 emissions and, at present, ensure energy security affects the changes in the business model of the energy sector on a national scale [3].

The EU's energy policy is based on three pillars: competitiveness, security of supply, and sustainability. Policies are built using regulatory tools, legally based on four normatively identified goals [4]:

- Ensuring security of supplies;
- Promoting the interconnection of energy networks;
- Energetic efficiency;
- The development of new and renewable forms of energy.

This article focuses on the determinants of the strategies relating to energy security of the country and the EU region, bearing in mind the environmental challenges that are important to the Poles [5,6]. The energy sector in Poland, in light of the implementation horizon in 2050, was analyzed. This allowed us to diagnose the achievement of the sector's goals based on international and national documents. Such an approach required analyzing the success factors for the new model of the energy sector, as well as verifying their significance by consulting national experts.

In order to define Poland's energy security strategy, the authors conducted a three-stage study. In the first stage of research, a group of factors affecting the development of the energy sector in Poland was generated, taking into account the energy security of Poland, the European Union, and the protection of the natural environment on the international scale. For this purpose, an analysis of the energy sector was carried out. The generated analytical areas of energy security were defined on the basis of the modified PEST method, using ETPSE (economical, technological, political, social, and environmental) factors [7], and Maslow's hierarchy of needs [8]. The second stage of the research concerned the 21 selected key factors, based on the analysis of the strategic CSFs and using the sequence of the QUEST analysis method (quick environmental scanning technique) [9]. The team meetings were held every day for five days online. In the third stage of the research, the selected factors were assessed based on a questionnaire survey using the CAWI technique, which was given to a group of deliberately selected experts. Experts participating in the study were people employed in governmental administration (functionaries), universities (professors with achievements in the field of energy), and energy market entities of the renewable and non-renewable energy sectors (post-holders). In total, 28 study areas were generated, 7 from each of the 4 groups. The research was conducted at the turn of October and November 2021 [3].

Due to the recent changes in the analyzed sector covering all EU countries, it can be assumed that, for most countries, well-developed energy sector CSFs will be similar. The research prepared by the authors can be transferred to any other national or regional energy market. The presented methodology for the identification of CSFs can be implemented in any country. The performance of similar studies on another market would enable comparative analyses.

The framing the problem of the energy sector's development through the prism of CSFs in the subject literature is extremely rare (with reference to the state's energy security). Only theoretical studies related to the factors influencing renewable energy development can be found [10]. However, the literature provides us with knowledge about the impacts of factors on sustainable development [11–16]. The authors hope that this article will serve to popularize the use of CSFs in empirical research, which can enable the creation of national benchmark compilations and then translate into improving the policies of EU member states for the development of the energy sector.

2. Methodological Approach

2.1. Energy as a Security Sector

Considering the issue of security in the context of a significant set of political, social, and technological conditions, it was necessary to take into account, and thus opt for, a specific theory of security and strategic outlook. Among the basic approaches to internationally responsive security, the research team suggested focusing on the Copenhagen School, which, in addition to securitization and regional security complexes, views the framing of security sectors as key. Moreover, it is precisely energy security that should be considered as one of these real security sectors. Security sectors and complexes have been recognized as key concepts relating to energy security. Energy security, to a large extent, should be seen as conglomerates or complexes which result from a significant degree of interconnection between individual elements of the system forming a natural network. The current dilemmas and problems of the European Union in the context of the energy sanctions undertaken make this concept a reality. The sector, in turn, should be perceived as a set of characteristic (specific) conditions of functions, entities, and the research methodologies used in relation to specific types of security subjects. Therefore, the authors of this article try to indicate the specificities and elements that may be common to other sectors. The attention given to energy security as a security sector is also the result of its growing importance in Europe today and its very close relations (and consequences for) with military security. Similar sequential relationships between these two vital security sectors, which we can see now in Central and Eastern Europe, have emerged previously in history, if only during the 1973 oil crisis. In that case, too, political and military events gave rise to a whole range of economic decisions, including those mainly related to the fuel and energy sectors. The consequence of the military crisis was the fuel crisis [17,18]. The response to the crisis of the 1970s was the use of scenario planning [19,20].

Therefore, the question arises: what new methodology or method can characterize the specificity or repeatability of the current energy crisis in Europe? The answer to this question is the proposed method and type of energy security strategy. Already, at this stage of formulating research assumptions, two levels of the examination of theories were specified, which needed to be amended.

At the first level of the innovation of the theory used, the research team faced the problem of defining the energy security sector [21]. In the sectorial approach, the founders of the Copenhagen School did not take this type of security into account [22], although, on the other hand, they opted for a constructivist approach. This approach, apart from conveniently manipulating the gradation of important elements, allows researchers to take into consideration the issues of local, national, regional, and civilizational identities, which again fits perfectly with the concept of regional security complexes. The consequence of this decision, on the epistemological level, was the selection of a methodology based on polls and response questionnaires. The constructivist approach made it possible to use the opinions of a wide group of experts, covering all the essential links of the energy system. Constructivism allowed us to draw attention to Maslow's hierarchy pyramid, where human needs are considered according to the gradation of the sentiments attached to them, their realization, and their shaping [23].

The second level of innovation in the proposed approach to energy security consisted of translating the content of Maslow's hierarchy of needs into a form applicable to this security sector. Our attention to this pyramid resulted from our distinguishing of several levels of security needs, perceived from the point of view of a human being and citizen.

Maslow's hierarchy of needs is a classification of human needs developed by the American psychologist Abraham Maslow [24], which is the best-known theory concerning the issue of the needs and motivations driving human behavior. According to Maslow, there are five categories of needs (physiological, safety, love and belonging, esteem, and self-actualization), each having its own place in the hierarchy [24].

In this work, the authors focused on the analysis of human needs in the area of security, leaving the remaining needs indicated by Maslow out of the analysis. On the basis of Maslow's original hierarchy of needs, and on the basis of the analysis carried out by Maslow himself [24] and his followers [25,26], a pyramid of needs for the area of energy security was created (Figure 2). The fulfillment of the needs of each successive level of the hierarchy (levels of the pyramid in Figure 2) is possible only after satisfying the needs of the lower level. Moreover, if one of the more important needs is threatened, a person will try to fight for its satisfaction. However, if we lose any of the lower needs, we do not care as much about satisfying the higher needs; e.g., when we starve (a threat to human safety and survival), the recognition of others (security related to building a sense of prestige or social position) is not important to us. A satisfied need no longer motivates us; thus, when we satisfy one need located lower in the hierarchy, we become aware of the existence of new ones that begin to motivate us. The functioning of man and his development inform the implementation of the next levels of the "pyramid" of needs. Maslow [24] further divided the needs into two groups: the needs of deficiency and the needs of growth. We can divide the needs into needs of a lower and higher order. Lower-order needs should be met first [23,24]. They are important for the biological survival of man. Higher needs are of less important for biological survival. Their satisfaction may be delayed or even omitted. Moreover, they may be difficult to identify. Satisfying higher needs leads to greater biological efficiency, longevity, fewer diseases, and a greater appetite [24].

The pyramid of needs in the area of energy security built by the authors is based on 5 levels (tiers of the pyramid):

I. Security needs related to the basic needs of human survival—as the lowest in the hierarchy, these are primarily economic needs, which are necessary for keeping people alive and providing them with economic resources, not excluding their participation in conscious decisions at the higher levels of the pyramid. The needs at this level should be met first. This will enable the achievement of higher goals.

II. Security needs related to the technical and infrastructural spheres—these are, first of all, the needs related to ensuring the necessary technology and infrastructure allowing us to build local, regional, and national energy security. Meeting these needs rests on the ability of the energy system to provide the infrastructure needed to deliver smart solutions in the energy sector.

III. The security needs related to the legal, political, and regulatory spheres can be defined as the need to create appropriate legal regulations related to the energy sector and the need for politicians to deliver a responsible policy and to create regulatory solutions in the field of energy policies.

IV. Security needs related to the socio-cultural sphere—these are non-material needs of a higher order, allowing people to understand their role in the social and cultural areas, which are related to the area of social awareness and the broadly understood social culture of the energy sector. By meeting these needs, man is able to understand his role in creating a "green" society and economy.

V. Safety needs related to the environmental and ecological spheres—these are the highest in the hierarchy. Environmental and ecological needs emerge after previous needs are satisfied. They are the only ones that belong to the needs of growth (meta-needs), in contrast to the needs of scarcity (basic) [27]. The more needs for growth are met, the better they can provide positive emotions and help the person to focus on the object of the need. Their implementation is a long-term process relatively independent from the environment, and they ensure physical and mental health.

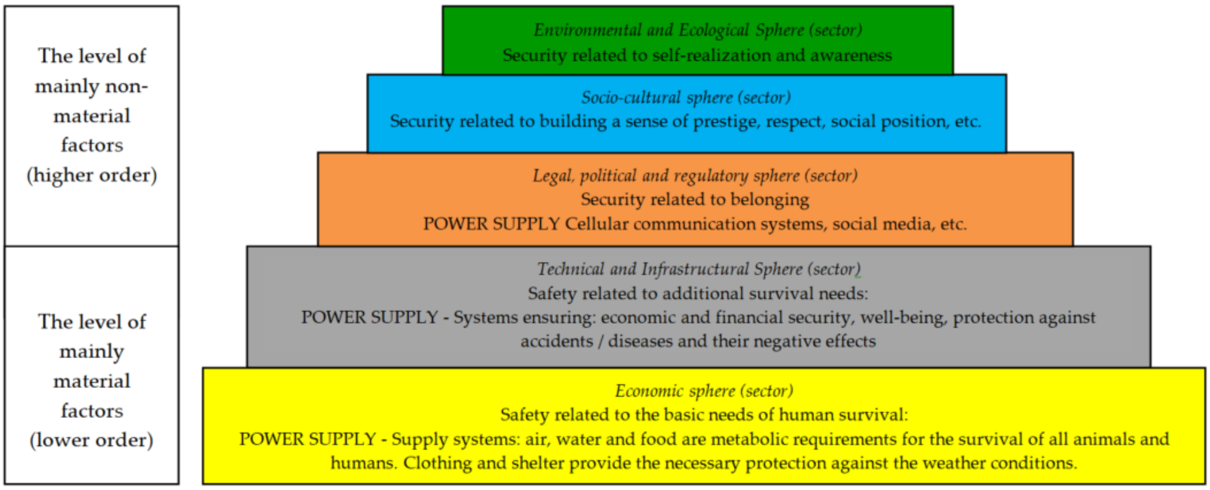

Figure 2. The pyramid of needs of security types based on the concept of the hierarchy of needs proposed by Maslow. Source: own study. **Green color**—**environmental** sphere of the energy market. **Blue color**—**social** sphere of the energy market. **Orange color**—**political** sphere of the energy market. **Gray color**—**technological** sphere of the energy market. **Yellow color**—**economical** sphere of the energy market.

In opposition to such a process in the development of energy systems—which is mainly based on renewable energy sources—one should also note a different way of perceiving this area, from the point of view of the state, as a subject of international politics. In this case, the emerging duality of such a view—with the point of view relating to the interests of the state on one hand, and the point of view of the citizen, as a human individual, on the other—should not be underestimated [28]. Rather, these interests diverge, leading to a specific dualism in (our perceiving and understanding of) the development of energy systems. Yet, perhaps this is not such a discrepancy, as noted by Machiaweli [29] when he wrote about two types of morality and values, including those of the individual and those of the state (politics), which, when transferred to the economic level, are differences between economic interests [30]. This can probably explain the turbulence in the energy market, which is not only due to military crises (resulting from political crises) but also due to the duality causing the loss of energy, time, and focus on "tearing the rope" between the two systems of needs, resulting in the uneven development of the energy system. The energy security strategy is obliged to take into account such conditions.

The energy sector strategy must meet the typical requirements for building sectorial strategies that are based, inter alia, on the CSF methodology. The authors' team made innovative considerations at this level, grouping the CSFs into logical sets constituting what is widely considered in security as the center of gravity (CoG) [31,32]. The concept of CoG is already in use in energy security; it may, for example, include transport routes for crude oil [33]. Therefore, the authors assumed that CSFs should constitute milestones in the process of performing various analyses for the purpose of developing assumptions for the creation of a strategy and for building the strategy itself.

The concept of success factors was developed by D.R. Daniel of McKinsey & Company [34]. Then, it was perfected by J.F Rockart [35], and J.A. Johson and M. Friesen applied it to analyses in many sectors [36]. Soheili Rad stated that CSFs are formed by an organization to reach their goals, and the top-level management plays an important role in the organization to inspect their situation in order to implement the CSF technique [37].

CSFs are competences, as well as skills and resources, that create a competitive advantage in a given market today and may determine the possibility of achieving success in the future. The CSF method is based on the "80–20" rule, stating that only 20% of events determine 80% of the effects, and vice versa; the remaining 80% contribute to 20% of the effects. Depending on the industry, the proportions of the competences may be different (90/10 or 70/30). These assumptions show that not all factors should be analyzed, but only the most important ones that are responsible for success (Table 1). The identification of factors is important with respect to the rationality of the actions undertaken (normative goal). The degree of acquisition of these competences allows us to explain the reasons for the different developmental paces of the analyzed entities (diagnostic goal).

Table 1. CSF fields of analysis.

Category	Critical Success Factors
External challenge	Economic environment, social environment, political environment, physical environment, regulatory/legal environment (ESPPL)
Beneficial knowledge and experience	Nature of finance; experience; organization size; emphasis on cost, quality, and time; ability to brief; decision making; roles and contribution; expectations and commitment; involvement and influence
Top-level management support	Support given to project head, support for critical activities, understanding of project difficult and stakeholder influence

Source: own study, based on: [37–41].

The list of key successes for a given sector may contain anything from a few to a dozen or more items of varying levels of importance. Various studies have shown that these factors significantly depend on the specificity of the sector, as well as the region and country in which the company operates [42–44].

In addition, the life cycle phase of the sector/industry is important. It is assumed that, in the birth phase, the dominant factor is technology, in the development phase it is assessing the market, and in the maturity phase, the main concerns are productivity and reducing costs [45]. In the energy sector, we deal with companies in the maturity phase (conventional energy producers), and in the birth (energy storage) and development phases (energy producers).

2.2. Strategies of the Energy Sector

Economic development, in recent years, has resulted in a large increase in the demand for electricity in the European Union countries. Its size is determined by the combination of various direct and indirect factors, which include, first of all, the growing number of people and the level of energy consumption per capita. In the European Union countries, from 2001–2019, the total number of people continued to grow. While in 2000 this number was 307.3 million, in 2004 459.2 million, and in 2008 497.6 million, it grew to 513.5 million in 2019. This increase resulted from the process of the European Union's enlargement, liberal migration policy, and higher birth rates. Electricity consumption per capita in the European Union increased from 2000–2018; while in 2000 it was 5215.3 kWh/capita, in

2019 it rose by 19.8%, and it has already reached 6247.9 kWh/capita [46]. It is assumed that the electricity consumption per capita reflects the level of economic development of a country and the quality of life of its inhabitants. Economic development results in greater mechanization of the production processes, distribution, consumption, and the scope of the use of goods, resulting in an increased demand for electricity [47]. Moreover, the demand for energy depends on a number of other factors, such as climate, the way people live their lives, the level of technical and technological development, the level of urbanization, and the structure of the economy, especially with respect to the roles of industry and services. These factors vary across most of the European Union countries.

The schemes for obtaining energy in the analyzed EU countries result, inter alia, from the state of the economy, geographic location, the country's own resources of energy raw materials, and political conditions. In the overall balance of electricity produced in the EU, thermal power plants play the largest role, based on nuclear and hydrocarbon burning. Hydroenergetics and RES are far behind at present, though they are showing an upward trend (RES). In 2021, 2746.3 TWh of electricity was produced by all 27 EU member states. Of this, approx. 2200 TWh was produced from traditional sources (nuclear energy, hydropower, and the combustion of hydrocarbons) and 547 TWh [48] from renewable energy sources (sun, wind, biomass, and hydrogen energy). Since 2019, the value of RES in the electricity market has increased by 11%. Wind farms and solar parks are the main contributors to this growth. Similar developments were observed in Poland, where the increase in the consumption of green energy from wind and sun technologies in the same period amounted to 12.5%. The share of RES in the EU electricity market at the end of 2021 amounted to 22% [49].

Taking into account the list included in Table 2, three groups of countries can be distinguished based on the criterion of the basic sources of obtained energy:

1. Countries of the conventional energy system (beige countries —12);
2. Countries of the nuclear energy system (red countries —5);
3. Countries of the RES system (Germany, Sweden, and Finland: green countries —10).

One of the main concerns of the Europe 2020 strategy is the share of energy produced from RES in the gross final energy consumption. The goal of this strategy is to achieve a share of approximately 20% of energy produced from RES in the final energy consumption in 2020 and a share of at least 32% by the end of 2030 [50]. The direction set by the European Union, indicated in the strategy "The European Green Deal" [51], which is even more focused on the development of RES, and the legislative package "Fit to 55" [52], adopted as part of this initiative, entails the necessity to adopt different sectors' evolution strategies for all three groups. Their construction requires us to take into account a number of factors that determine this choice, which primarily include geographical conditions and natural resources at the disposal of these countries, demographic factors, and economic factors (the value of energy production in relation to GDP). One of the most important, however, appears to be the environmental factor and the environmental policy implemented from this perspective, which is the basic strategic determinant of the developmental direction of both the European Union and the evolution of the individual energy systems of its member states. This field of research is well suited for the analysis of changes in the policy directions of individual countries in the context of their energy composition, which can be measured by investment expenditures for their development, thus highlighting changes in the investment policies of individual countries. The input values measured according to the compound annual growth rate (CAGR) clearly reflect the fulfillment of the obligations adopted by the EU member states in the field of energy policy.

Table 2. List of electricity production data of EU countries at the end of 2021, with the indication of the dominant source.

N.	Country	Electric Energy Production in TWh	Nuclear	Fossil Fuels	RES
				% Share	
1	Germany	597	12.6	36.5	50.9
2	France	501	70	9.5	20.5
3	Italy	301	0	80	20
4	Spain	259	22	34	44
5	Poland	158	0	80	20
6	Sweden	153	31	1	68
7	The Netherlands	109	4	69	27
8	Belgium	80	49	33	18
9	Czechia	77	33.6	56.6	9.8
10	Finland	67	28.5	27.7	43.8
11	Romania	62	19.5	56	24.5
12	Austria	61	0	18	82
13	Portugal	57	0	17	83
14	Greece	52	0	78.3	21.7
15	Bulgaria	42	34.5	42.2	23.3
16	Hungary	30	48	38.1	13.9
17	Denmark	30	0	38	62
18	Ireland	29	0	83.8	16.2
19	Slovakia	25	56	20	24
20	Slovenia	15	40	35	25
21	Croatia	13	0	49	51
22	Estonia	12	0	69.8	30.2
23	Latvia	6	0	47	53
24	Cyprus	4.6	0	80	20
25	Lithuania	4.5	0	70	30
26	Malta	1	0	89.3	10.7
27	Luxemburg	0.2	0	34	66
	Overall	2746.3			

Beige color—states of the conventional energy system. Red color—states of the nuclear energy system. Green color—states of the RES energy system. Source: own study, based on [53].

According to the analysis of the European Commission on the number of subsidies devoted to fossil fuels after 2015 (Table 3), the assessment of the current state of their withdrawal by each member state is as follows [54]:

- A total of 8 member states announced or are already implementing phase-out plans for fossil fuel subsidies—**implementation strategy**;
- A total of 8 member states are considering subsidy withdrawal or are in the process of developing decommissioning plans—**evolution strategy** (ready-for-implementation strategy);
- A total of 11 member states have not announced plans to phase out fossil fuel subsidies—**stagnation strategy**.

Table 3. Status of MS commitments to phase out fossil fuel subsidies and changes (in CAGR) in subsidy volumes for 2010–2015 and 2015–2019.

Status	Country	CAGR Fossil Fuel Subsidy Volume [%]	
		(2010–2014)	**(2015–2019)**
Announced or in progress	Finland	9	14
	France	3	8
	Germany	−2	−1
	Ireland	5	−7
	Lithuania	28	−11
	Luxembourg	4	−7
	Portugal	10	7
	Spain	−7	0
Being considered or under development	Austria	−13	−2
	Belgium	−3	5
	Denmark	−3	−2
	Greece	1	−7
	Italy	−3	−3
	Latvia	11	−15
	Slovenia	−14	−5
	Sweden	4	−8
No plans	Bulgaria	−2	18
	Croatia	0	8
	Cyprus	6	19
	Czechia	−8	8
	Estonia	−10	−13
	Hungary	8	2
	Malta	−2	−13
	The Netherlands	−6	9
	Poland	−3	−27
	Romania	−10	−4
	Slovakia	4	3
EU27		−1	0

The color scale indicates how low (green) or high (red) the increase in subsidies is in correlation with other member states at the same time. The dark green color indicates the lowest value (minimum), yellow color refers to the middle point (median), and red color indicates the highest value (maximum). Source: [54].

In order to place the analyzed political announcements in the analyzed context, we also verified how the number of subsidies devoted to fossil fuels changed before and after 2015. The color scale in Table 3 indicates how low (green) or high (red) the increase in subsidies in a member state was compared to other member states during this period. Green color refers to the lowest value (minimum). Yellow indicates the midpoint (median). Red color refers to the highest value (maximum). The anticipated directions of the changes and the subjects of these changes are presented in Table 4.

Table 4. The direction of changes in the energy sector strategies (with reference to the colors of the dominant energy sources in Table 2).

Country	Directions of Change (Subsidies)
Austria	Replacement of heating infrastructure—individual recipients.
Belgium	Supporting the international competitiveness of specific sectors of the economy (industry, heavy road transport, agriculture). Phasing out fossil fuel subsidies, taking into account, inter alia, the need to guarantee the security of the energy supply in the country.
Bulgaria	It does not provide energy subsidies, including those for fossil fuels.
Croatia	It supports fossil fuels in transport and agriculture, and there are no plans to phase them out.
Czechia	The main area where the government intends to support fossil fuels is co-financing the transition of heat cogeneration units (for heating) from being powered by coal to being powered by natural gas.
Denmark	The goal is to become independent from fossil fuels by 2050. Energy and heat consumption should be fossil-free by 2035.
Estonia	A lower excise duty rate applies to diesel oil used in agriculture, and the support also covers the production of electricity from peat or oil shale processing of retort gas in an efficient cogeneration mode. Estonia does not plan to change these two measures, as the lower excise duty rate on diesel fuel supports the competitiveness of the agricultural sector, and the Estonian government does not intend to promote the commissioning of additional fossil fuel cogeneration plants.
Finland	It will support energy companies moving away from coal by 2025 by providing incentives for investments to replace coal. It will withdraw from the use of heating oil in heating by the beginning of 2030. Meeting these goals appears to imply an opposition to subsidizing fossil fuels.
France	There is no clear plan for the phasing out of fossil fuel subsidies. The government announced a reduction in tax expenditures on fossil fuels, but it has not yet been implemented, as evidenced by the cancellation of the planned reduction in tax expenditures on diesel used for off-road purposes (June 2021). A special fund was introduced into the budget law for 2020 (budget 2021) to support the closure of coal power plants (Cordemais, Gardanne, Le Havre, and Saint-Avold) and provide social support for the closure of these power plants.
Germany	There is a federal law that sets a deadline for the complete departure from coal (Kohleausstiegsgesetz), initiated by the present government (via the "Kommission Wachstum, Strukturwandel und Beschäftigung (KWSB)"). The government views itself as having a strong responsibility to support closures, using financial resources (direct payments from the budget) to avoid network imbalances and negative effects on local/regional development (due to job losses). In addition, the government views natural gas as an important bridge technology, which explains its continued support for the expansion of gas infrastructure and supply systems (primarily NordStream).
Greece	The intention to phase out fossil fuels, especially lignite, is mostly expressed at a high level, but at the same time, the report briefly describes policies and actions that continue to support the production and consumption of fossil fuels. Some of the measures that favor fossil fuels are aimed at combating energy poverty and therefore appear in the context of the country's social policy.
Hungary	Fossil fuels do not receive direct subsidies in Hungary but, in fact, fossil energy receives several hundred billion forints per year in the form of direct and indirect support.
Ireland	There is a general drive to end subsidies for fossil fuels. For example, the Public Service Obligation, previously used to also support domestic peat energy production, is now entirely dedicated to supporting renewable energy.
Italy	The government presented its intentions to reform the tax system for environmental reasons. This enables, as a key aspect, the phasing out of environmentally harmful subsidies ("sussidi ambientali dannosi").
Latvia	There is no target date for the phasing out of fossil fuels. Latvia's current energy composition still includes a high share of fossil fuels (natural gas accounted for 23.5% of the gross energy consumption in 2019 and oil products accounted for 40%); thus, Latvia's dependence on energy imports is still significant. Heat and electricity production in Latvia also relies heavily on fossil fuels, notably natural gas (which accounted for 55.6% of the energy consumption at the transition to 2019). In terms of sectors, transport (31.0%), households (28.4%), and industry (21.9%) had the largest shares in the total final energy consumption in 2019.
Lithuania	The country aims to reduce polluting and wasteful energy use by 2025, as well as fossil fuel tax incentives that lead to market distortions. Based on the NECP, it plans to gradually phase out some of the subsidies for fossil fuels, especially those originating from the Excise Duty Act. In detail, lasting until 2025, quotas and licenses for labeled diesel oil used in agriculture will be gradually reduced; from 2022, the reduced excise duty on heating diesel will be gradually phased out; from 2024, the reduced excise duty on coal will also be withdrawn; and a year later, the subsidy for natural gas used as heating fuel for economic purposes will also be abolished. From time to time, there are discussions in the political arena about the elimination of subsidies in the form of a reduced VAT rate for heating residential premises, but they do not receive public support and, therefore, the subsidies have not yet been withdrawn.

Table 4. *Cont.*

Country	Directions of Change (Subsidies)
Luxembour	There are bonuses for the replacement of fossil fuel heating systems (a fossil fuel phase-out program). The supported technologies are heat pumps and wood fuel boilers. In addition, Luxembourg is committed to ending all support for fossil fuels, although no specific target dates have been given.
Malta	It does not plan to withdraw any energy subsidies at the moment, but is still involved, inter alia, in encouraging the implementation of technologies that can help to reduce greenhouse gas emissions.
The Nether-lands	There are still some financial benefits associated with the use of fossil fuels in energy-intensive industries, including some energy tax exemptions and rebates. Moreover, the energy tax system has a degressive structure, which means that larger consumers are taxed much less than smaller ones. A recent policy evaluation of the Dutch energy tax recommended adapting this regressive structure in such a way as to provide greater incentives for energy savings. Moreover, the assessment recommended the phasing out of the energy tax relief for cogeneration installations, as the climate benefits of cogeneration installations may decline in an energy system with an increasing share of renewable energy. In its NECP, The Netherlands states that "in The Netherlands there are no direct subsidies for fossil fuels in the sense that resources are made available to stimulate the use of fossil fuels".
Portugal	Coal tax exemptions are in force, which, according to the Act on the State Budget for 2018, are to be abolished by 2030. Gas will continue to play an important role in Portugal's energy composition to ensure its security and flexibility until at least 2040. Support for fossil fuel consumption in agriculture and fisheries is likely to continue.
Sweden	Fossil fuels are to be eliminated and renewable energy is to be promoted. However, this is not always the case. The Swedish Society for the Protection of Nature published a report in 2018 which stated that the tax cut on fossil fuels was SEK 12.4 billion. The subject of ending fossil fuel subsidies and decarbonizing is (as in any country) a difficult one, and Sweden has many internal challenges. Sweden, for example, has vast geographic areas that are sparsely populated and heavily dependent on cars. Finding the right balance in how to move from fossil fuels to renewables while taking into account as many viewpoints as possible is therefore a complex policy challenge. However, there is a decline in fossil fuel subsidies, and there is no room for any fossil fuels in Sweden's long-term climate strategy.
Poland	No data
Romania	No data
Slovakia	No data

Source: [54,55].

The strategies adopted by the EU countries in terms of the energy sector's operation have been developed taking into consideration the strategic resources of the state, the region, the roles resulting from the mission, the vision of the project, and the goals to be achieved. The method of adapting to the changes taking place in both the regulatory and technological environments was adopted. Priorities for the future were also formulated, namely the intensification of the EU's internal resources and the creation of conditions for competition and the ensuring of external supplies. Considering that Europe is becoming more and more dependent on external supplies of energy resources (taking into account the obligations under the Kyoto Protocol [56]), it may react by promoting energy saving in the household or transport sectors, which it has already announced.

The New Energy Policy adopted by the European Commission places the main emphasis on promoting the production of the so-called "clean energy", ensuring the continuity of supplies with the prospect of diversifying the origins of energy resources. By focusing its activities on the reduction of CO_2 and GHG (greenhouse gas emissions), the policy directly influences the electricity generation sector in terms of production and technology and induces the reorientation of the power generation industry in terms of the reduction of the use of high-emission raw materials, such as oil or coal [57]. The implementation of the new ecological regulations (including the aforementioned reduction of CO_2 by 55%) requires the acceleration of the process of dismantling and closing the existing oil and coal installations in favor of small, dispersed installations, largely belonging to the RES sector. At present, the determinants of investments in other generation technologies (new low-carbon technologies) are the price of CO_2 emissions and the costs of CCS (carbon capture and storage). However, these assumptions are becoming less important due to restrictions resulting from the blockage of the supply of raw materials from the Russian Federation. The announced return to coal is a new reality for modern Europe, in which the above-mentioned directions of changes in the strategy will have to find their place.

2.3. Key Success Factors for the Energy Sector

The energy sector, as a determinant of the functioning of the economy, fundamentally affects the standard of living of the society and the political position of the country. In an era of globalization and the related interdependence of organizations and countries, the availability of energy sources and their costs, as well as the political and social acceptability of specific technological solutions, have impacts. All this means that both the nature and level of energy consumption in the modern world are subject to constant change, determined by the mutual influences of many factors.

The energy market is a place for balancing the interests of its individual participants, with the interests of the state as an institution ensuring the security of the economy. Electricity is a strategic product for each country. Therefore, great importance should be attached to the analysis of this sector. Many strategic analysis methods are used for this purpose, including sector CSF analysis. The quality of the analysis depends on the accurate selection of a list of strategically important competencies in the analyzed sector. This varies from sector to sector and changes over time. Determining such a list is one of the most difficult and important elements of strategic analysis.

Based on the analysis of the literature on the subject, a long list of factors influencing energy security, while maintaining proper environmental protection, was generated. These factors were grouped using the ETPSE method (Table 5). This is in line with the EU's strategy to achieve the 2050 climate neutrality goal. The European Green Deal and its legislative package, "Fit for 55" [52], will contribute towards making the EU's environmental ambitions a reality. This program is supposed to be implemented in four dimensions: the political, social, economic, and technological [58]. Changes in the sector are driven mainly by three areas: technology development, the environmental awareness of customers, and regulatory pressures [59]. We identified similar areas, shown in Table 1.

The ETPSE approach was developed using Maslow's Pyramid, adapted for the purposes of defining the national energy security priorities. The analyses were based on economic, technological, and then political conditions. At the top of the pyramid, there are determinants of social and ecological needs. This was the first stage of the research.

The economic sphere (Table 5—yellow color) is crucial in terms of supporting the energy transformation. It is obvious that the size of the energy sector in individual countries is determined by the size of GNP, DN, and the pace of changes to both. Important factors are also the geographical location and raw material resources, determining the directions of the possible import and export of energy resources.

It is worth mentioning the influence of stakeholders on the shaping of the energy sector strategy. In the discussed region, the greatest supplier of energy resources to the European Union is Russia, which dominates in terms of the EU imports of solid fossil fuels (with a 40.9% share in this raw material import), gas (37.7%), and crude oil (23.1%). Significant suppliers of raw materials to the EU are also the United States, Norway, Algeria, and Saudi Arabia [60]. The increase in the prices of non-renewable energy sources related to, inter alia, the Ukrainian crisis, the reduction of fossil fuel sources, and environmental protection, has had a negative impact on world economies [61]. Renewable energy sources seem to be an alternative for future economic development [62]. However, there is no shortage of countries looking backwards and seeking a solution to the energy situation in domestic fossil fuels (Poland, Germany).

Table 5. Key success factors of the energy market in the context of ensuring energy security (ETPSE method).

Group	Factors
Environmental	Climatic factors; environmental safety of raw material extraction; safety of storage and transport of raw materials; diversification of energy production; availability and use of natural resources; level of environmental pollution; structure and geographical location of the region; sensitivity to environmental protection; application of new ecological technologies for all energy sources; compliance with standards in the construction/operation of production plants/installations and supply/distribution lines; not extending the resources of "old" energy producers; proper disposal of sewage and post-production waste.
Social	Globalization; consumer lifestyle; attachment to used solutions; consumer needs and desires; demographic conditions; lifestyle changes; level of education; level of social awareness; requirements and expectations of end-users; social attitude to changes in alternative energy production technologies; ability and motivation with respect to new challenges; an approach to investing in the future; the ability to adapt to circumstances.
Political	Stabilization of power; European integration; state policy; pressure groups/lobbying; regulations regarding foreign trade; unity of action of the authorities and society; conducting activities at the same time and in the same environment, aiming to achieve similar or the same goals; regulations resulting from EU membership; legal environment; principles of the organization's functioning; property law; labor law; consumer rights and obligations; European Green Deal Strategy; regulations introduced by regulatory authorities; quality standards/ISO certification; information availability.
Technological	Involvement in new technologies (technology transfer); implementation of solutions/patents; clean technology (introduction/operation); degree of computerization (production/transmission); modernity and safety of means of transport and transmission lines; modernity and safety of plants and installations; investments in new projects energy and their impacts on economic, social and territorial development; possibilities of developing conventional and renewable energy source infrastructure; effectiveness of EU regional funds in supporting the development of energy infrastructure; responsibility of entities involved in the creation of infrastructure and support management; possibilities of cross-border cooperation and macro-regional strategies in creating energy infrastructure; productivity related to production technology.
Economical	Structure of the economy; availability of energy resources and energy sources; cost intensity of energy carriers; budget income; GDP; GDP per capita/wealth of society; government support/protectionism; macroeconomic trends (economic growth, inflation level); creating economic and social value; coherence of chain member values; level of fulfillment of energy needs; "supplier portfolio" and possibilities of receipt; strengthening cooperation; profitability of production depending on the type of source; level of industrialization of the country.

Green color —environmental sphere of the energy market. Blue color —social sphere of the energy market. Orange color —political sphere of the energy market. Gray color —technological sphere of the energy market. Yellow color —economical sphere of the energy market. Source: own study, based on: [6,63–70].

In the economic field, the importance of financers of the sector is shifting from government institutions to dispersed investors [71]. Dispersion is one of the major changing trends in the energy sector. In addition, the energy production sector is decentralized. This is due to, inter alia, the projected decline in the costs of renewable energy production (according to market forecasts, by 2040 the costs of generating energy from onshore wind farms will decrease by 41%, and from photovoltaic installations by 60%) [72] compared to fossil fuels [73]. (It should be remembered, however, that in a crisis, the role of government institutions in economic processes strengthens. The current crisis is caused mainly by the Russian–Ukrainian war.) Examples of economic factors influencing the development of renewable energy sources include investment costs, production costs, and operating costs in relation to generated revenues. The management of the green energy supply chain will provide economic benefits in the form of a competitive advantage of the state [74]. The development of renewable energy requires financial support, loans, and subsidies [75]. However, the level of complexity and variability of the regulations hampers investments in the development of this part of the energy sector [76,77]. This factor applies to another of the distinguished areas—the political area. As an aside, it should be noted that the profitability of RES investments has increased during the Ukrainian crisis.

The necessary funds for the construction of modern energy systems and improvement of energy efficiency by reducing energy consumption also require time and access to technologies that are still in the implementation phase in many areas. Currently, around 2% of the EU's GDP is invested in the energy system and related infrastructure. For a zero-greenhouse gas economy to emerge, this investment must increase by 2.8% per year (i.e., from around EUR 520–575 billion). Compared to the baseline, this means additional investments of between EUR 175 and 290 billion per year. Additional investment needs depend on a number of factors. For example, a rapid transition towards a circular economy or changes in the behavior of actors could reduce investment needs [78]. Another problem may be the availability of certain raw materials used, for example, for the production of fuel cells that enable the use of hydrogen as an energy source.

The second perspective (Table 5—gray color) **is the determination of the technical ability to obtain, transmit, and consume energy**. The development of this sector is related to the conditions of installations, transmission infrastructure, technological progress, software for management optimization, consumption, and the possibility of energy storage. Technology aims to improve performance [79]. For example, blockchain technology enables the direct sale of energy from microgeneration suppliers to individual customers, enabling the creation of the so-called peer-to-peer networks and energy trading-bypassing centralized trading companies. The CSFS in this area are research and development, technological innovation, information technology, and practice improvement [79,80].

An important technical aspect is also the development of the carbon capture and utilization (CCUS) sector as part of a global trend towards more ambitious climate goals. Projects concerning the management of CO_2 should cover, in particular, heavy industry, hydrogen production, and energy that can remodel the use of natural gas as part of a wider concept of CO_2 management, or the use of hydrogen or biomethane [81].

The **political (legal)** sphere of the energy market (Table 5—orange color) should be understood through the prism of the multi-level political system of the EU and its institutions. At the international level, this sphere is determined by treaties and agreements. Strategic documents issued at the European Union level are directives [82,83], regulations [84–86], and resolutions [87] adopted and issued by the European Parliament and the EU Council. There are plans and specific goals at the national level. They relate, inter alia, to the location of production installations, type of sources, and energy distribution models. It is important that the developmental strategies of companies in the energy sector are consistent with the developmental strategy of the energy sector in the country [88]. In many countries, new legislative solutions have been introduced to achieve a sustainable energy system [89–91].

An important legal determinant is the use of appropriate financial arguments justifying changes in the energy sector, both in Europe and in individual countries, and in the case of RES in the early stages of its development [79]. This is connected with profits or possible losses due to introduced changes. It is an exemplification of the state policy pursued. Governments using feed-in tariffs (FiT) or tenders as a form of RES support may affect the volume of the energy supply. The proposed requirements established by banks for companies also determine the development of the distributed energy. For example, the European Investment Bank (EIB) will become the first "climate bank" with ambitious goals for financing the energy and climate transition. Already on November 14, 2019, the bank's Board of Directors announced that. by the end of 2021. the EIB would completely withdraw from financing investments in fossil fuels, including natural gas.

Social preferences (Table 5—blue color), with regard to the shape of the energy market and with a focus on clean energy, constitute needs of a higher order. Social factors include opinions and attitudes towards renewable technologies. A good example of such a perspective is the Polish energy sector, conditioned by strong traditions based on the conventional energy sources, including hard coal and lignite. From this perspective, the issue concerns the determinants of changes in the education and labor market and the transformation of the structure of energy production from one based mainly on coal use to a more diversified one. It is obvious that both of these processes must involve far-reaching changes, correlated with changes in consciousness and identity at the national and supranational levels. Viewed through the prism of public interest, creating new jobs, social trust, and the involvement of the private sector are the essential conditions for the transformation of the energy sector. These changes are taking place because customers are willing to pay more for electricity that is produced from renewable sources [92].

The private sector is involved in the production of goods that result from using renewable sources, enabling the diversified development of the sector.

The **ecological** area (Table 5—green color) was also included in the needs of a higher order. It affects the health of man and other living things, such as plants and animals [93]. The will to live in a healthy environment is strengthened by pressures to implement investments in renewable assets. Protests organized by communities, noticing the accelerating climate change and pointing to the need for a greater reduction in various types of pollution, additionally strengthen this pressure. Social pressures to take effective measures to limit the scope of climate change are more and more common and may have an impact on the belief that it is right to set high emission reduction targets and implement green legislation. A growing trend among consumers is the willingness to meet energy needs with energy produced and used in a way that minimizes or reduces to zero the impact on the environment. This will require energy producers and their distributors to rely on energy carriers and technologies that can provide the required service to customers [69,73,94]. As these factors gain strength, many of the world's leading energy and mining companies are announcing strategies to reduce CO_2 emissions by harnessing renewable energy and addressing climate risks. Some of them are doing this in response to legislative guidelines, but some view energy changes as a development opportunity for their companies [95].

Another important aspect in the context of CSFs is the influence of stakeholders in the form of management boards and their leadership skills, project managers, and flexible project groups [96], or the supervision of ownership in the form of, for example, the Ministry of State Assets of the Republic of Poland. Relations between the actors in the energy system, as well as with energy consumers, especially in the case of RES, are also one of the determinants of the sector's success.

3. Results

3.1. Level of Significance of the Critical Energy Security Factors

Due to the multiplicity of factors, representatives of the four study groups were asked to generate the most important CSFs (**Stage Two**). The experts were to be guided by:

1. Strategic goal: Poland's energy security;
2. Strategic goal: the energy security of the European Union;
3. Strategic goal: protecting the environment internationally.

They identified 21 key factors that included economic (6 factors, yellow), technological (5 factors, gray), political (5 factors, orange), social (4 factors, blue), environmental factors (2 factors, green)—Table 6, col. 2.

Table 6. CSFs significance level in the arrangement of the energy security needs pyramid.

Lp.	Critical Success Factors for Energy Market Development	Aggregate Average	Scientists	Government Administration	State-Owned Company	RES
1	*2*	*3*	*4*	*5*	*6*	*7*
1.	Awareness of the energy market position and responsibility of the end-user in the energy consumption process (size of the consumer, culture of energy use, access to information, and environmental awareness)	**2.67**	3.00	2.37	2.44	2.62
2.	Attitudes of consumers and end-users towards changes to alternative energy generation technologies (level of public acceptance of investments in wind, nuclear, and bioenergy)	**2.85**	2.89	2.75	2.44	3.00
3.	Brand strength (manufacturer size/monopoly position, trademark recognition, etc.)	**2.18**	1.89	2.25	2.11	2.37
4.	International conditions in the area of energy consumption (international development trends in global awareness of change, responsible production, eco- and bio-trends in consumption)	**2.79**	2.55	3.12	2.55	2.62
5.	Cooperation in the energy system (networking: capital groups, clusters, and cooperatives; level of dependence on a grid entity, etc.)	**2.85**	2.55	2.87	3.00	3.12
6.	Senior management commitment (knowledge, competence, motivation, vision, innovation, tenure, networking skills, etc.).	**2.94**	2.78	3.00	3.33	2.62
7.	The level of revenue from energy sales (guaranteed prices, guaranteed price period, etc.).	**2.79**	2.67	2.75	2.78	2.87
8.	Economic policy (target 2050) (level of diversification of energy sources, development of extractive industries, regulatory solutions, institutional systems, green technologies, industry lobbies...).	**3.42**	3.67	3.00	3.55	3.25
9.	Laws (national, European, international) in the field of environmental protection (emission limits, including CO_2, environmental protection, financing of energy transition...).	**3.48**	3.44	3.25	3.55	3.50
10.	Energy security of the country (continuity of supply, energy self-sufficiency of the country, level of dependence on foreign suppliers, possibilities to diversify energy sources and suppliers...).	**3.70**	3.44	3.75	3.67	3.87
11.	Quality of energy supply (technical parameters; continuity of supply to the end users: enterprises, households, institutions; level of service, including speed of repairs, downtime, etc.).	**3.09**	3.00	2.75	3.33	2.87
12.	Production capacity (technical production capacity, including machinery, equipment, and automation; human resources; generational replacement, level of dependence in the network; access to resources; etc.).	**3.09**	3.11	2.87	3.11	3.12
13.	Power system management (types of management systems, IT resources, efficiency of management systems, safety systems in power grids).	**3.21**	3.22	3.00	3.33	3.12
14.	Availability of energy storage facilities (spatial distribution of storage facilities, types of storage facilities, storage resources, efficiency of storage facilities, safety systems in storage facilities).	**3.30**	3.44	3.62	3.22	3.62
15.	Directions of scientific and technological progress (innovations in the industry, changes in technique, technology, and production organization, and development trends: ecological, social, etc.).	**3.36**	3.44	3.50	3.33	3.00
16.	Current structure of the economy (year 2021) (departmental and branch structure of the energy economy, distribution of elements of the energy system, ownership and ownership arrangements, regulatory arrangements...).	**3.00**	3.11	2.87	3.00	2.87
17.	Energy transmission costs (types and resources of infrastructure, efficiency of transmission infrastructure, transmission security systems...).	**3.33**	3.22	3.25	3.33	3.62
18.	Energy price for end-users: businesses and citizens.	**3.48**	3.44	3.25	3.55	3.12
19.	Energy demand in the country (specific needs, level of industrialization of the country, level of energy poverty of households, export resources, etc.).	**3.42**	3.44	3.12	3.67	3.25

Table 6. *Cont.*

Lp.	Critical Success Factors for Energy Market Development	Aggregate Average	Scientists	Government Administration	State-Owned Company	RES
20.	Availability of energy sources in Poland (terrain predisposition, including open terrain and forest cover; generic conditions, e.g., number of windy days and days with sunshine; raw material base; import possibilities...).	**3.42**	3.55	3.25	3.67	3.50
21.	The cost intensity of energy production in Poland (cost intensity of technology, time-consuming energy acquisition, useful life of technology and energy infrastructure, continuity of supply of energy sources).	**3.51**	3.44	3.50	3.78	3.37

Source: own study based on the conducted research.

The third stage of the research consisted of the experts' assessment of the significance of the previously indicated 21 CSFs. The levels of the factors' significance were assessed by the respondents using a four-point scale, where 1 referred to irrelevant factors, 2 referred to non-significant factors, 3 referred to medially significant factors, and 4 referred to essential factors. The significance results are shown in Table 6, col. 3–7.

The individual analytical areas show that the key groups determining success in the building of a strategy aimed at achieving the energy security of Poland and the European Union and environmental protection, according to Polish experts, are the economic and political group, followed by energy security, production costs, energy prices, and laws in the field of environmental protection (Table 6, items 10, 21, 18, and 9). In the opinion of renewable energy source experts, energy security and environmental protection are, to the greatest extent, determined by factors in the political area (Table 7, col. 6), while experts from state-owned companies highlight the economic area (Table 7, col. 5). The remaining groups of experts attributed the greatest importance to the economic area (Table 7, col. 3, 4).

Table 7. Average weight attributed to a group of factors.

Group	Aggregate Average	Scientists	State Administration	State-Owned Company	RES
1	*2*	*3*	*4*	*5*	*6*
Social	2.69	2.44	2.81	2.75	2.68
Environmental	2.76	2.95	2.56	2.44	2.81
Technological	3.21	3.24	3.15	3.26	3.15
Political	3.35	3.31	3.19	3.39	3.37
Economical	3.36	3.37	3.21	3.50	3.29

Blue color —**social** sphere of the energy market. Green color —**environmental** sphere of the energy market. Gray color —**technological** sphere of the energy market. Orange color —**political** sphere of the energy market. Yellow color —**economical** sphere of the energy market. *Source*: own study based on the conducted research.

The next in line is the area of technological factors, where the most important are the directions of scientific and technical progress (Table 6, item 15). In all expert groups, the assessment of the significance of this area was consistent with the energy security strategies (Table 7, orange).

According to the experts, the least important areas are the environmental and social groups (Table 7). However, the order of significance differs from that assumed in Maslow's hierarchy. For the development of the strategy, the social area is the least important for scientists and RES experts (Table 7, col. 3, 6). A group of representatives of the governmental administration and state-owned companies recognized the environmental area as the least essential for building the strategy (Table 7, col. 4, 5).

3.2. The Pyramid of Needs and the Importance of the CSFs—Relationship Analysis

As part of the research (stage one), a group of factors for the development of the energy sector in Poland was generated, taking into account the energy security of Poland and the European Union and environment protection on the international scale. Then, analytical areas for energy security were analyzed and represented based on the modified ETPSE method (economical, technological, political, social, and environmental). At the same time, a pyramid of needs of the types of security was created based on the concept of the hierarchy of needs proposed by Maslow (Figure 2).

In the second stage, 21 key factors were selected based on the method of the strategic analysis of the CSFs (critical success factors), using the sequences of the QUEST analysis method (quick environmental scanning technique). In the third stage of the research, the significance of the selected factors was assessed using the knowledge of experts employed in government administration (functionaries), universities (professors with achievements in the field of energy and power industry), and energy market entities in the renewable energy (RES) and non-renewable energy sectors (post-holders and state-owned companies) (Table 6).

There remains an open question as to how the generated groups of factors for the development of the energy sector in Poland, represented by the obtained CSF significance levels (Table 6), fit into the pyramid of needs for security types based on the concept of the hierarchy of needs proposed by Maslow (Figure 2). The five individual levels (pyramid tiers) are marked with colors (economic level—yellow, technological—gray, political—orange, social—blue, and environmental—green). A similar procedure was followed in relation to the CSF groups. The CSFs were classified into individual groups: economic (six factors, yellow), technological (five factors, gray), political (five factors, orange), social (four factors, blue), and environmental (two factors, green).

In order to verify the levels of importance of the fulfillment of needs in the energy sector, defined according to the levels (pyramid tiers) (Figure 2), the levels of significance of individual CSF groups (Table 6) were compared with the respective levels in the pyramid of needs. It was assumed that the significance level 4 is equal to 100%. Then, the data from Table 7 were converted and presented in Figures 3–7. The red color shows the need fulfillment degrees in terms of the security types, based on the hierarchy of needs concept proposed by Maslow. In Figures 3–7, the remaining colors are in accordance with Table 7. Figure 3 shows the need fulfillment degrees based on the experts' opinions, presented as the aggregated averages (Table 7, col. 2) calculated for all expert groups. Figure 4 shows the need fulfillment degrees based on the expert scientists' opinions (Table 7, col. 3). Figure 5 shows the degrees of need fulfillment based on the expert opinions of government administrators (Table 7, col. 4). Figure 6 shows the need fulfillment degrees based on the expert opinions of state-owned companies (Table 7, col. 5). Figure 7 shows the need fulfillment degrees based on expert opinions from RES experts (Table 7, col. 6).

The authors' team hypothesized the sequence of fulfilled needs, which are presented in Figure 1. This hypothesis was not fully reflected in the conducted research (Table 8). The research showed that the importance afforded to the CSFs was centered on the economic and then political spheres. This may be due to the fact that, for the Polish energy sector, which is included in the state's critical infrastructure, the priority is strategic stabilization (from the point of view of realizing the state's national interest—the political area) [97], rather than cost optimization (the company's point of view—the economic area). However, the energy sector is evolving and transitioning towards a distributed model, in which meeting stakeholder expectations in the form of an economic calculus is a priority. However, this does not exclude benefits of social value [3,98].

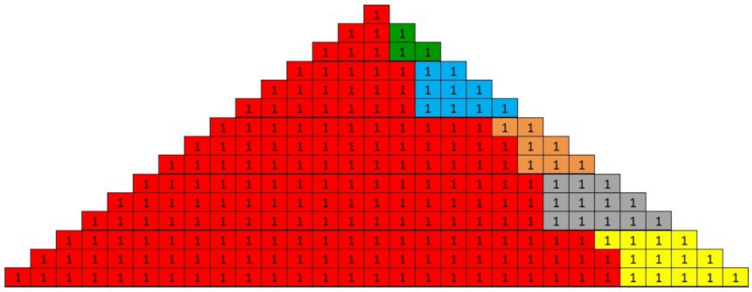

Figure 3. Need fulfillment degrees based on the experts' opinions, using the aggregated average. Source: own study. The red color shows the need fulfillment degrees in terms of the security types, based on the hierarchy of needs concept proposed by Maslow. Blue color —**social** sphere of the energy market. Green color —**environmental** sphere of the energy market. Gray color —**technological** sphere of the energy market. Orange color —**political** sphere of the energy market. Yellow color—**economical** sphere of the energy market.

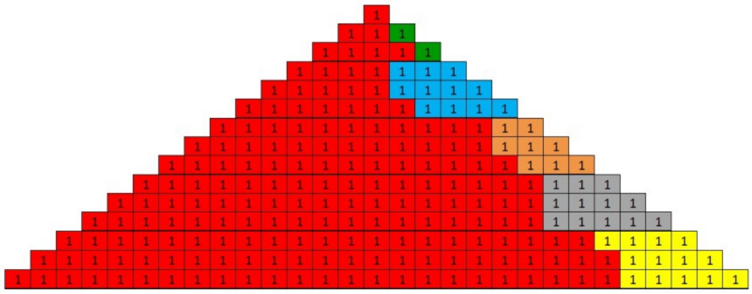

Figure 4. Need fulfillment degrees based on the expert opinions of scientists. Source: own study. Color markings as in Figure 3.

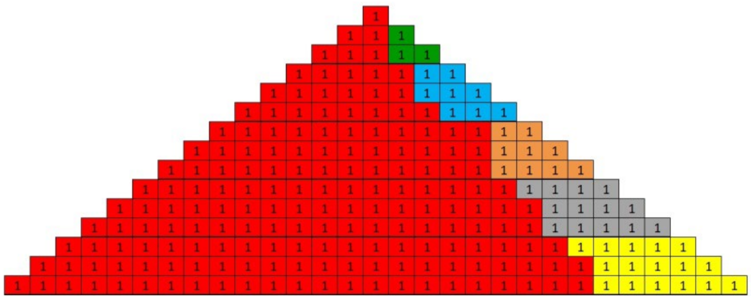

Figure 5. Need fulfillment degrees based on the expert opinions of government administrators. Source: own study. Color markings as in Figure 3.

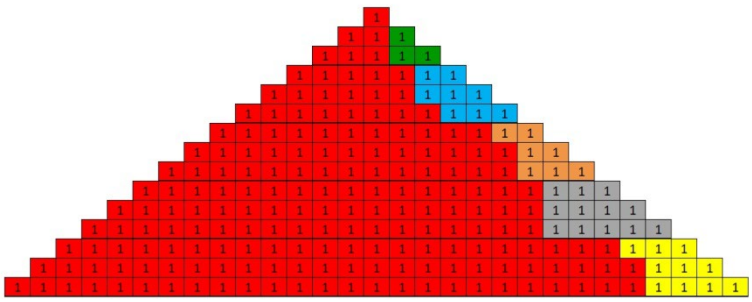

Figure 6. Need fulfillment degrees based on the expert opinions of state-own companies. Source: own study. Color markings as in Figure 3.

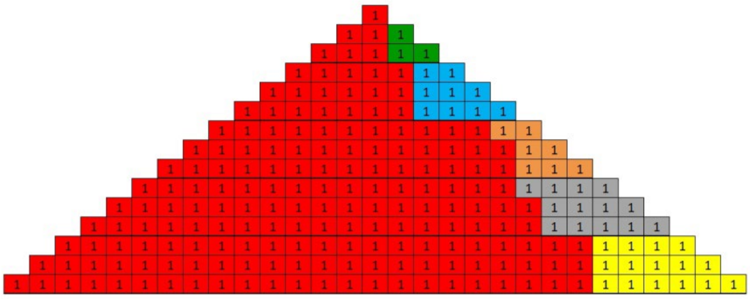

Figure 7. Need fulfillment degrees based on the expert opinions of RES experts. Source: own study. Color markings as in Figure 3.

Table 8. Ranking of the ETPSE areas.

Ranking Assumed	Aggregated Ranking
1. Economic sphere	1. Economic sphere
2. Technological sphere	2. Political sphere
3. Political sphere	3. Technological sphere
4. Social sphere	4. Ecological sphere
5. Ecological sphere	5. Social sphere

Source: own study.

The experts emphasized the importance of political over technological advantages. The technological sphere was, in our assumptions, located between the economic and political values (Figure 1). The conclusion was that technology is not regarded as the flywheel of energy security. The economic and political spheres were considered decisive for energy security. This was indicated by almost all the respondents, with the exception of RES representatives, to be the most important factor for building energy security.

The lowest aggregated weight was attributed to factors of the social and ecological sphere. However, the experts afforded more importance to the ecological area than the social one. This means that they are aware of the environmental impact on health—this is why personal development (social area) had a lower rank than environmental development.

4. Discussion

The main advantage of the research was not that we directly asked the respondents about their assessments and opinions on the energy security strategy, but that we asked them about the key features and factors building its foundations. This allowed the research team to determine the types of strategies preferred by the respondents on a scientific basis, without imposing criteria and typologies on the subjects. The research identified the influence of various factors, including stakeholders (their interests), on such a strategy. This corresponds to the general observation of the research team that energy security strategies are—probably unlike any other sector strategy—exposed to many, often opposing forces of influence. Thus, this fulfills the assumptions of the evolutionary school of strategy, according to which the shape of a strategy is influenced by various influential stakeholder groups. In this way, the "result" strategy is created as a result of the collision of forces originating from various groups of influence, where, at a given time, one of several such essential forces is dominant [99,100]. This causes a sequential correction or even a significant change in the basic strategic course. The evolutionary school can therefore serve as the most accurate scientific explanation of the rapid changes that took place in the energy sector as a result of the war in Ukraine. Among the four equally possible and desirable scenarios for the energy sector's development, the return of Europe to the "gray scenario", and possibly, in winter, to the "black scenario" area as a result of the crisis, is indicated by the complex directions of the development of energy technologies [3]. The dependence of the energy sector not only on technology development but also on political, social, and economic turmoil means that it is one of the most difficult types of technology to forecast. As the research conducted (Table 8) showed, it is not the designers of technical systems who decide the directions for the development of these systems, but the economic and accompanying political factors. Technology is only a transmission belt between the influences of the economic sphere and the political one on the social and ecological spheres. In the chain of impact constructed in this way, environmental protection was, together with the social area, on the last level of the goals. This completely reverses the pyramid structure shown in Figure 2 and Table 5. The respondents dealt unambiguously with the assumed and, therefore, desired structure of this pyramid. In the chain of influence constructed in this way, environmental protection was, along with the social area, on the last level of these goals.

With respect to the types of strategies being built, it should be noted that this calls into question the issue of formulating strategic goals, such as “zero-emission by 2050” or “fit for 55”, resulting from the failure to take into account the often very numerous, complex, and surprising processes in our environment. If we impose goals that are too ambitious, they will only become our wishes. The situation of the power industry as it is developing now cannot be compared to the 1960s, when very lofty technological goals were formulated by J.F. Kennedy, who asserted that man would land on the moon by the end of that decade. Great challenges can be formulated when functioning in a stable environment, which we are not experiencing at present (with COVID, the war in Ukraine, and the energy crisis, a crisis which is perhaps greater than that in the 1970s, with the greatest threat of the use of nuclear weapons since World War II). The evolutionary school addresses precisely these conditions by proposing less (evolutionary) progress but taking into account the complexity of the forces that shape Europe and the world, proposing to “reach the designated port” not by a simple course of action, such as “zero-emission by 2050”, etc., but by tedious adjustments. Respondents considered the key forces to be those of the economic and then political spheres, indicating the main sources of international turmoil in the year before the current energy crisis. The needs of the highest level of the energy security pyramid had to give way to the needs of the lower level as a result of the global interconnectedness of various states and economic actors. The failure to solve lower-level (almost existential) problems transfers the crisis to other regions of the world or continents where the higher-level approach prevails.

Over the last few months (February–July 2022), many studies have appeared, which compared the currently erupting energy crisis to the one in 1973. In both cases, military and subsequent political events gave rise to the energy crisis. Back then, in the early 1970s, it was emphasized that the days of the classical-planning school were over, and with it the stage of a stable “incremental” environment. Why, in the activities of the EU, as well as, in part, the USA, was there a continued tendency to think (in planning) and act (implementation of strategies) according to the canons of the planning school, which is so outdated now? According to the authors’ team, the use of a classic planning approach based on an incremental view is the main reason for the current crisis on the part of government administrations and the CEOs of companies in the energy sector. Despite such widespread training in creative thinking in Western universities, the incremental view is the dominant way of regarding the future among ruling politicians and managers. Some direct reasons for this state of affairs are provided by the very kind of technological developments, which, contrary to their declarations and advertisements, took place in an incremental manner (e.g., the generation of mobile communication networks, 2G, 3G, 4G, and 5G, and the generation of computers and TV sets). Table 9 presents the main features of these two views on energy security strategies.

Table 9. The main features of two views on energy security strategies: the planning and evolution schools.

Planning School **1973′ CRISIS—“WINTER 2022“ CRISIS**	**Evolution School**
Goal related to a specific achievement within a specific period of time.	Goal related to the achievement of a certain state resulting from the intertwining of certain impacts.
The assumption that trends in the macro-environment have a key impact on the implementation of security strategies.	Assumption that various forces from both the macro- and micro-environment have key influences on security strategies.
Long-term inductive look. Based on past trends, a forecast is built with a single outcome.	Long-term deductive view. A set of situations in the future are related to actions in the present.
A specific goal, often expressed very precisely, materially or numerically mobilizes extraordinary effort, concentration, and resources.	A specific condition is taken into account by all actors involved in building energy security.
Purpose-driven approach to strategy building.	A distributed approach to strategy building.
Types of core strategies: concentration, specialization, pricing strategy, related or concentric diversification.	Types of core strategies: uncorrelated diversification at the level of state actors, dispersion at the intrastate level (dynamic growth of social actors and individuals).
Examples of strategies in the military, political, and economic sectors.	Examples of strategies in the information sector, transportation, and cyberspace (large-scale participation of private companies, as well as citizens and social movements—hackers).
Diversification resulting from the entity’s internal calculations.	Diversification resulting from the requirements of the environment, understood as macro- and micro-environments (spheres composed of STEP factors and interest groups, including stakeholder groups).
Planning relatively easy—often procedural (e.g., by the EU or CEOs of powerful companies) and further centralized.	Planning is complex because different approaches must be used simultaneously to study different environments, with one for the macro-environment, another for the micro-environment, another for the sector, and another for the system. Such complexity of approaches, environments, and ways of study entails decentralized planning.
The strategy is built on the basis of the macro-environment and sector analysis carried out from the point of view of a single entity. There is a clash of its capabilities (strengths and limitations) with the factors of the environment (opportunities and threats).	The strategy is built on the basis of CSFs defined by different actors in different spheres. The resultant and often divergent outcomes constitute the security strategy. The state’s energy security strategy is built on the basis of sub-strategies representing the approaches of different groups and actors.
Popular research methods—forecasting, experience effect analysis, and strategic gap analysis.	Popular research methods—case study, Delphi method, and experiments.
Sets goals with the aim of simplifying complexity: Zero-emission by 2050; Fit for 55; Nord Stream II; Baltic Pipe.	Questions are raised and attempts are made to answer them in an effort to tame complexity: In what situation will coal cease to be a raw material tool? What should be done to ensure that oil is no longer such a key raw material or fuel? In what situation will it no longer be profitable for a citizen to fuel his home with coal or natural gas? In what situation will a citizen or company become independent from energy transmission networks?

Source: own study, based on [20,96,97,101–103].

Summarizing the content of Table 9, it can be concluded that the energy sector security strategies should bear the features of strategies characteristic of network technologies. This means that different groups of stakeholders representing different points of view should participate in their development. Therefore, the recommended method for the construction of these strategies is the CSFs analysis and the “bottom-up” filling of individual ETPSE spheres in the creation of a strategic concept. This is therefore a major challenge for the building of a new development planning system and thus also for the security of the energy sector.

5. Conclusions

There is no single methodological approach to strategy development. This article used an evolutionary approach based on the process of partial changes, during which a pattern of action is formulated and repeated over time. The goals in this system are not clear, and the decisions made reflect the system of power rather than deliberate actions. Strategies are generated reactively, not proactively. In this way, history plays a huge role in shaping invisible strategic limitations. The evolutionary approach to shaping the future is based on assumptions relating to adaptation and learning processes, limited rationality (H. Simon), and the domination of decision heuristics (D. Kahmann and A. Tversky [104]). Scenario-based thinking should not be included in a rigid planning process, as this is an emerging, spontaneous process [105]. The concept is focused on success. It is also descriptive, because it is based on the case study as the basic method of analysis. Thus, it follows that this approach can offer a very useful description of how to create a strategy, for example, in the form of a set of methods or even a proposal of the order of their application. However, it cannot provide a method for making decisions. The evolutionary school proposes a methodological framework that can be applied to different situations and actors. This is its greatest advantage: the greater relevance and scope of the problems and situations considered.

Until a few years ago, Poland was perceived as very conservative in its approach to abandoning "dirty" energy (derived from non-renewable sources) sources and focusing on modern and renewable ones. The analysis conducted in this research, as well as the research assumptions proposed and the conclusions obtained, indicate that this was a strategy of an evolutionary type rather than a conservative one. Just as, in the planning school, there is often a discrepancy between the planned and the actual states, so it is in the case of Europe. Evolutionary, although more conservative, behavior allows one to take into account reality and adapt one's strategy to it. Moreover, the Polish approach to the energy sector may be considered as an example of the equally serious treatment of the influences of political, economic, and social factors, as well as solutions to the technical and environmental problems related to the energy sector. The development of the technology sector, without the proper consideration of other areas of CSFs, reduces the energy sector security. We are witnessing this now.

The authors hope that the research related to energy security presented in this article will be repeated in other countries, allowing for the alignment of the approaches to building an energy security strategy. Probably, it would be very beneficial for individual groups of respondents, specifically experts, to pay attention to specific CSFs. The authors hope that the article will serve to popularize the use of CSFs in scientific research, which could then translate into improvements in government policies and the management by corporate CEOs in the energy sector.

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