

Article

# Social Media Engagement in Shaping Green Energy Business Models

Marzena Czarnecka <sup>1</sup>, Grzegorz Kinelski <sup>2,3,\*</sup>, Magdalena Stefańska <sup>4</sup>, Mateusz Grzesiak <sup>5</sup> and Borys Budka <sup>6</sup>

- <sup>1</sup> Department of Law and Insurance, College of Finance, University of Economics Katowice, ul. 1 Maja 47, 40-287 Katowice, Poland; marzena.czarnecka@ue.katowice.pl
- <sup>2</sup> Department of Management, WSB University, Ciepłaka 1c, 41-300 Dąbrowa Górnicza, Poland
- <sup>3</sup> Veolia Energy Contacting Poland Sp. z o.o., Puławska 2, 02-566 Warsaw, Poland
- <sup>4</sup> Department of Marketing Strategies, Institute of Marketing, Poznan University of Economics and Business, al. Niepodległości 10, 61-875 Poznan, Poland; magdalena.stefanska@ue.poznan.pl
- <sup>5</sup> Department of Applied Sciences, WSB University, Ciepłaka 1c, 41-300 Dąbrowa Górnicza, Poland; mgrzesiak@wsb.edu.pl
- <sup>6</sup> Department of Law and Insurance, University of Economics Katowice, ul. 1 Maja 47, 40-287 Katowice, Poland; borys.budka@ue.katowice.pl
- \* Correspondence: gkinelski@wsb.edu.pl; Tel.: +48-667-666-008

**Abstract:** Recent years have seen an increase in the role of social media in the communication of energy sector companies (ESCs) with consumers. Currently, consumers look for information, create it themselves, and share it with other Internet users. eWOM communication means that energy companies, firstly, must be present in social media so that consumers can get to know them better, and secondly, they must consciously shape their image according to the expectations of their customers. One-way communication, such as customer satisfaction measurements, is no longer enough to know their preferences. Market trends indicate that for current buyers—both consumer and non-consumer products—the image of a “green product” or a “green company” is expected. Only a few companies report that they are harmful for environment. All companies report that they are generally community friendly. The consumer would like to know, in particular, about the harmfulness to the environment. Thus, there is a knowledge gap that the companies are not filling. In addition to the advertised satisfaction indicators, you can also test customers’ perceptions of environmental responsibility. That is, the research and results in the area of social responsibility must also be accompanied by environmental responsibility. Therefore, the article aims to indicate whether the level of consumer engagement in social media affects the perception of the green energy business model and how the attitude and pro-environmental behavior of social media users affects this perception. The paper also identifies factors related to social media that influence the perception of ESCs.

**Keywords:** sustainable business models; energy sector; social media engagement; consumer behavior; management of energy market; green energy; green product; green company



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## 1. Introduction

The introduction should Until recently, energy sector companies (ESCs) mainly communicated through media relations, CSR or Sustainability reports, or corporate websites among other means. Currently, companies can use a wide range of electronic Web 2.0 based applications that include social networks, blogs, and photo and video sharing platforms [1,2]. Thanks to ICT, companies in the energy sector can communicate with consumers cheaper, faster, and more effectively. However, consumer interest in searching for them is limited and more often associated with recognizing the product and service offer and prices, than finding out where energy comes from and how, as the main part of the offer, was it generated. So far and for many years, ESCs have been studying customer satisfaction indexes (CSIs), thus determining measures of their perception by consumers

and business customers [3,4]. Currently, that is not enough when two specific issues are at stake, such as ecology on the one hand, and communication through social media and its effectiveness on the other hand. Ecology, decarbonization, and climate change are necessary aspects to consider in the development of energy companies [5,6].

So far, the greening of consumer behavior has narrowed down to food and non-food products for the household. They are purchased frequently and subjects of intensive advertising campaigns [7]. Thus, consumers focus on them and look for information about them, or even create them by themselves. However, trends in consumer behavior toward greener consumption and the selection of products that are organically produced or meet the 5R criteria (refuse, reduce, reuse, repurpose, and recycle) prompt companies providing other types of products and services to develop green strategies and communicate them to customers. Thus, it can be expected that as environmental awareness increases, consumers will try to recognize the possibilities of expanding their consumption toward a greener one in various aspects. Currently, environmental awareness and sustainable development are issues that should be studied as essential in customer relations [5].

With a favorable investment climate, supportive regulation, new partner ecosystems, better technologies and new business models, green energy investments are more capable of delivering robust returns now than ever before [8].

Managers are assumed to deliberately shape the business context for radical innovations. In particular, the strategic option of developing radical innovations in cooperation with direct competitors offers opportunities otherwise unattainable, and competition in the energy sector is low, these are the conditions of a monopoly or oligopoly [9].

The outlined premises lead us to undertake the topic of perception of ESCs in social media—among their users in general as well as those who are more sensitive to environmental issues. As a result, the following structure was adopted in the article. Firstly, a broad background of energy companies' behavior toward environmental protection is outlined considering the sustainable development goals adopted for the time horizon until 2030. That part explains how ESCs are currently perceived and their image is examined. In the next step, the considerations are narrowed down to explain the nature of energy companies' presence in social media. Then, the behaviors and expectations of social media users are indicated along with their diverse attitudes that range from content creators to followers. These considerations are prerequisites for the formulation of hypotheses. The next part discusses a quantitative study's methodology and the scope of conducted analyses. The paper concludes with a broad discussion of its results, and setting directions for the development of green business models in the energy sector in the light of established correlations.

## 2. Materials and Methods

### 2.1. Energy Sector Companies in Reaction on Global Trends

Across industries, but especially in the area of ESCs operation, consumers are interested in purchasing energy produced from renewable sources. Environmental and business sustainability actually means a better perception of companies, including entrepreneurs in the energy, local, and international markets [10].

Energy companies focus their business on decarbonization, energy flexibility, and business sustainability [11]. However, building energy models based on renewable sources may, but does not have to, be the only way for energy companies to develop. Still, there are nuclear and CCS storage technologies, the capacity market, or the more efficient use of current capacities [12,13].

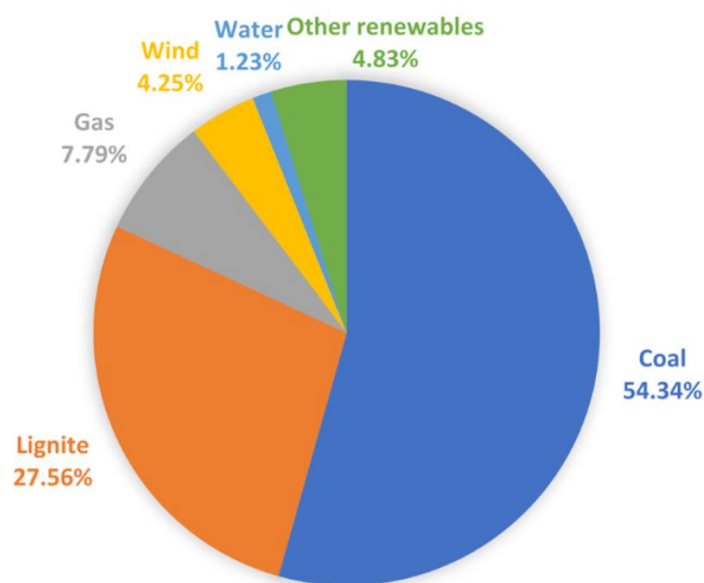
A question may be asked: what causes development to be unsustainable or sustainable? Sustainable development is a way of driving change and innovation. For example, it is the use of innovations such as smart technologies to control and save energy [14].

In the modern market economy, the focus is on the consumer, who, together with his preferences, needs, tastes, and other variables, can significantly affect a company's success. That is why the level of his satisfaction with the purchase of a given product or service is

so important. Satisfaction is an emotional state that arises in the process of undertaking something or as a result of achieving goals [15]. Another definition describes satisfaction as the positive feelings of a customer in relation to the value he receives as a result of using a specific product offer, in a specific situation. This feeling can be a direct reaction to the use of the product or a complete response to a series of experienced situations [16]. In terms of measuring marketing effects and evaluating sales results, a satisfied customer is a spokesperson for the brand, and his satisfaction with using it is gradually built—from partial and current, to cumulative and global [17].

Green energy as a direction requires a joint effort to build a sustainable future. The challenge is also the future's resilience to the effects of disasters occurring on the surface of our planet. Another new trend is the shift of business to social media. Communication technologies development has transferred communication processes to a virtual environment. The high-scale involvement of Internet users has developed a virtual environment, particularly in terms of perceiving the functioning of entrepreneurs on the market and their actions in sustainable operation, which are called green entrepreneurs.

Countries approach decarbonizing the economy differently. It is conditioned by many factors, mainly related to the country's economic policy and historical conditions [18]. Studies for this research were carried out in Poland because it is a specific market when it comes to the share of fossil fuels used to produce electricity. The energy mix in Poland is presented in Figure 1.



**Figure 1.** Structure of electricity generation sources in Poland (July 2021) [19].

## 2.2. Energy Sector Companies in Social Media

So far, perceiving companies by customers has been measured in ESCs through annual CSI surveys. The Customer Satisfaction Index (CSI) is one of the most frequently used assessments of perceiving a company by customers. It belongs to the quantitative methods of measuring customer satisfaction. CSI allows to analyze the level of customer satisfaction in terms of resources, products, services, and enterprises [20,21].

In consequence, the synthetic CSI is obtained, which is the average satisfaction rating for all buyers. Next, the collected material is analyzed, and the results can be depicted on the positioning map.

The collected values of the CSI integrated index for the consumers of energy companies in Poland are presented in Table 1.

**Table 1.** CSI integrated index for consumers—G1x tariff, for energy companies in Poland in 2013–2019 [22].

| Company | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 |
|---------|------|------|------|------|------|------|------|
| Enea    | 82.3 | 84.5 | 86.0 | 80.5 | 79.2 | 79.8 | 76.2 |
| ENERGA  | 79.8 | 80.0 | 80.5 | 78.9 | 77.8 | 77.5 | 81.1 |
| Innogy  | 83.4 | 81.4 | 83.2 | 85.0 | 82.1 | 80.7 | 85.0 |
| PGE     | 88.8 | 86.6 | 88.5 | 91.9 | 88.9 | 90.9 | 90.5 |
| Tauron  | 78.1 | 84.5 | 86.0 | 85.1 | 84.4 | 85.0 | 83.0 |

The results are impressive. Energy groups report very high customer satisfaction rates. Thus, it should be assumed that customers perceive the energy sector very positively. Unfortunately, these results viewed from different perspectives differ significantly, by a few and even a dozen or so points depending on which group prepares the report. Usually, in this report, this group has the highest scores. Therefore, these results cannot be relied upon [23].

In order to objectify the opinions of ESCs customers, the Energy Regulatory Office carried out benchmarking studies—only three times so far. However, even these results are not sufficient to fully assess perceiving enterprises by their customers, because the reports concerned the quality of energy supplied to consumers. The regulation of electricity supply quality should focus primarily on the measurable factors of service quality that are important for consumers and the existing possibilities for distribution companies to influence these factors [24,25].

To sum up, the assessment of customer satisfaction with the quality of services allows for collecting information on quality expectations by various categories of recipients.

For the first time, the Energy Regulatory Office had presented a report on the corporate social responsibility survey in the field of energy in 2009 (then in 2010 and 2011). The report also presents the activities of energy companies in the natural environment. It shows that good cooperation with and for the local environment is, as can be judged from the study results, important and probably easier to implement than in other areas. The benefits of this title have also been better estimated by energy companies. In some cases, specific financial resources were given, of a nominally large scale [26]. However, without indicating the financing sources or the relative inclusion of the given figures, it is difficult to assess what is the company expense [27].

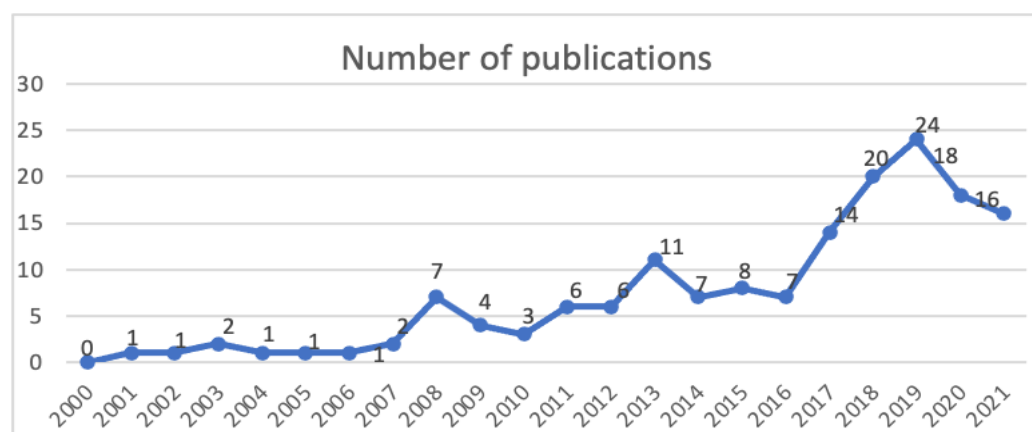
To sum up, the research carried out by ESCs in customer satisfaction, as well as those carried out by the Energy Regulatory Office in social responsibility and perceiving quality by energy companies' customers, cannot be considered complete and reliable. That is especially true of the modern means of communication, which are social media. Few companies report that they are harmful for environment. All companies report that they are generally community friendly [28,29]. The consumer would like to know, in particular, about the harmfulness to the environment. Thus, there is a knowledge gap that the companies have not filled. In addition to the advertised satisfaction indicators, you can also test customers' perceptions of environmental responsibility. That is, the research and results in the area of social responsibility must also be accompanied by environmental responsibility.

With the rise of social media, many individuals and businesses have been successful. Enterprises, including ESCs, devote a lot of effort, money, and time to social media marketing to achieve business goals [30]. For example, many companies set up their social media sites and share interesting and attractive information about their brands and products that increase awareness and improve brand building effectiveness and acquiring customers [31]. Currently, 85% of companies use social media to implement marketing campaigns, and the global penetration rate is 70% [32]. Social media are widely used as an important

component of the promotional mix to help companies communicate directly with their current and potential customers and deliver a positive word to the market [33].

In terms of developing and promoting new products, companies use social media to engage and collaborate directly with customers, and know their expectations to generate innovative product ideas [34,35]. Easy access and simple use of the social media platforms provide an innovative and relatively inexpensive way to connect and contact with customers, which has inspired companies, including energy enterprises, to create comprehensive social media strategies [31,36]. As a result of the use of technology, the co-creation of value and an increase in customer purchasing behavior justify a discussion on measuring the effectiveness of social media engagement in creating value and developing a better perception of the company on the market. Capturing and adding value to an organization, and, as such, measuring social media performance, becomes increasingly important for businesses [37].

Literature studies conducted based on the Scopus database led to the conclusion that research on ESCs presence in this part of the virtual environment are scarce. Based on the literature review limited to publications that have in their titles, keywords, or abstracts such key terms as social media and energy sector, 163 studies were distinguished in social sciences, business, and economics. A significant increase in publications took place after 2008. Before 2008, there had been only 19 of such publications (Figure 2).



**Figure 2.** Number of publications—own elaboration based on Scopus.

The most frequently cited article is a publication devoted to sustainable development goals integration into business sectors [38]. Another publication draws attention to the use of social media as a space for conducting image wars [1].

Among the analyzed publications, 31 keywords met the convergence criterion (co-occurrence = 3). A keyword “co-occurrence analysis” [31,33] is based on the assumption that two keywords appearing in more than one document is indicative of their relationship on a conceptual level. As a result, five main thematic segments were distinguished: renewable energy, social media, sustainable development and sustainability, and greenhouse gases (Figure 3).

The analysis leads to several important conclusions. First of all, there are few publications linking ESCs presence with social media users’ activity. Instead, the relationships concern the very issue of energy and energy demand or the origin of energy. Secondly, several leading areas of research can be distinguished, among which one can notice the threads—particularly sustainability, stakeholders, and energy policy—as an area of shaping institutional solutions [39–41]. Such policies bring with them systemic and market solutions, such as capacity market, energy market regulations, certificates of origin, etc., and that causes increased communication traffic in social media [12,42,43].



As a result, it can be seen that current researchers do not verify how the presence of energy companies in social media affects their perception—dependently on the media users' engagement level (passive recipients of content or active content creators).

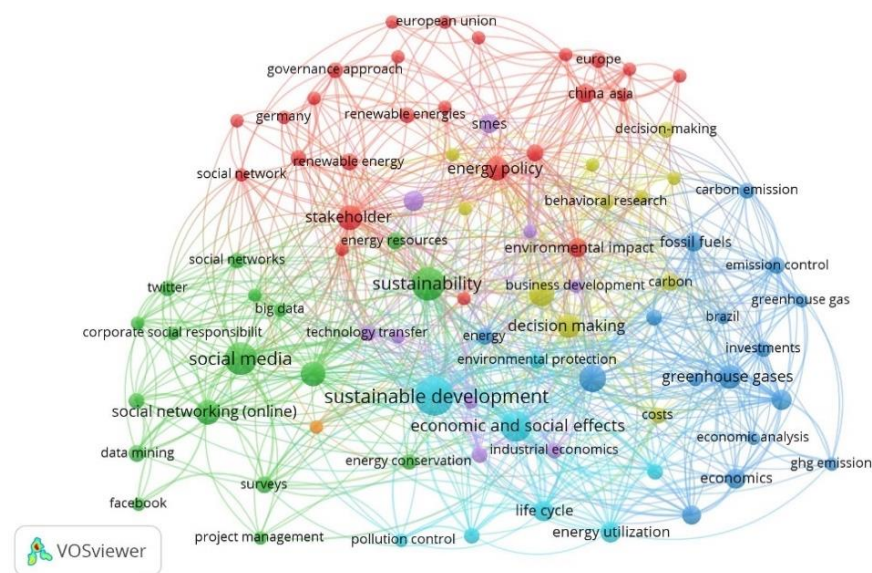


Figure 3. Thematic segments—own elaboration based on Scopus.

### 2.3. Consumer Behavior in Social Media

Social media play a great role in the purchase decision-making process and the companies selling green products and services. Increasing engagement in social media as well the emerging information technologies learn societies to make them more aware and be better informed. Regular uploads, updates and ongoing videography means that world becoming smaller, united and integrated. Access to ICT causes consumers to seek and share opinions in the virtual world in the form of likes, comments, ratings, reviews, video testimonials, tweets, images, and blog posts [44]. Moreover, the electronic word of mouth has higher credibility than traditional media among Internet users [45–47] and engaged customers who tend to use social media and electronic WOM to share positive information and experiences [37,48,49].

As far as ecological motivation of consumption is concerned, environmental knowledge has frequently been assumed to be the main motivator of green consumer behavior [50–52]. The behavioral literature finds a positive relationship between knowledge and behavior [53–55]. The indicated changes in consumer behavior and regulations related to the implementation of the Sustainable Development Goals, particularly goal 7, “ensure access to affordable, reliable, sustainable, and modern energy for all”, prompt energy companies to recognize the possibilities of creating business models based on an ecological image. In the context of long-term development, the issue of innovative activities undertaken by SMEs, which affect their ability to quickly respond to changes in the environment, seems to be of particular importance [56]. The dependence can be observed among SMEs that plan to increase R&D expenditure, indicating that the investment consists in financing opportunities available on the market that meet their needs, or planning to modernize their infrastructure or develop high-quality, reliable infrastructure [57].

As a consequence, many companies have already shifted promotional resources from traditional media and, in the last years, began using digital platforms to directly interact with customers. For example, [49] data showed that 71% of the Fortune Global 500 firms devoted a separate section of their website to environmental responsibility and 75% of these environmental sections gave users the opportunity to respond to the information provided.

Research indicates that engagement assurance can be considered an umbrella concept that serves determining which engagement indicators are more relevant and important for each type of social media, based on purpose. It has been demonstrated that consumer-generated referrals from social networking sites regarding offers significantly improve sales in social commerce [58,59]. Interactive media are likely to increase the effectiveness of corporate communication about CSR, because users can easily spread the communication messages to others [60].

Additionally, this finding concerned Facebook posts, not Twitter posts, suggesting that not all social media referrals are relevant to sales growth. Social media engagement indicators are also used to set goals and assess the extent to which companies implement social media strategies that deliver the desired marketing outcomes [61]. Previous research has provided guidelines for measuring social media engagement when determining the success of a social media campaign [62]. One of important factors influencing communication effectiveness is interactivity, understood as the ability to generate feedback. Changes in communication caused by the Internet development have influenced the dynamic development of social media, which enable a company to dialogue with its environment in real time [63].

#### 2.4. Social Media Users' Engagement

Social media members use different platforms to communicate. The connections between preferred attributes of social media platforms, the benefits obtained from these attributes and the personal values satisfied by those benefits were analyzed by scientists [64]. The authors identified four distinct groups that vary according to their motivations for using social media platforms. It leads to the conclusion that energy companies should also be present on various social media platforms for better reach and building interactive relationships.

People involved in creating social media content do it for a specific purpose—to share information, opinions, recommend products or services, but also to share their thoughts or win the audience's favor. High social media activity indicates the need of content creators to influence other users. Thus, they will be opinion leaders and, in the case of high engagement, influencers. This form of activity usually is associated with a significant commitment of time and the possession of specific skills in the use of communication technologies. From the perspective of enterprises, such people are in demand because they can be ambassadors of energy companies and brands, and sales efficiency may depend on their opinions and recommendations [65–68].

People with low levels of engagement are present in social media as well. However, their need to engage is less.

Another approach to differentiate social media users is based on the form of activity. Among social media users, one can distinguish people with very high activity and those who only read and browse content. In our study, we assume that people with high activity are those who create content—both textual and visual, including multimedia. Usually, these are people who create an image for themselves or their companies, whose activities are promoted. Such persons (companies) may have their own social media pages where such content is posted. On the other hand, there are people who limit their activity to liking or forwarding content, which is also a form of engagement, albeit less active.

The remarks lead to the formulation of hypotheses (Figure 4):

**Hypothesis 1 (H1).** *There is a relationship between perceiving ESCs and the level of social media users' engagement in creating content (content).*

**Hypothesis 2 (H2).** *There is a relationship between perceiving ESCs' activities in social media and the level of consumer involvement in various environmentally friendly behaviors in social media.*

**Hypothesis 3 (H3).** *There is a relationship between the level of social media users' activity and consumer involvement in various environmentally friendly behaviors in social media and perception of SM.*

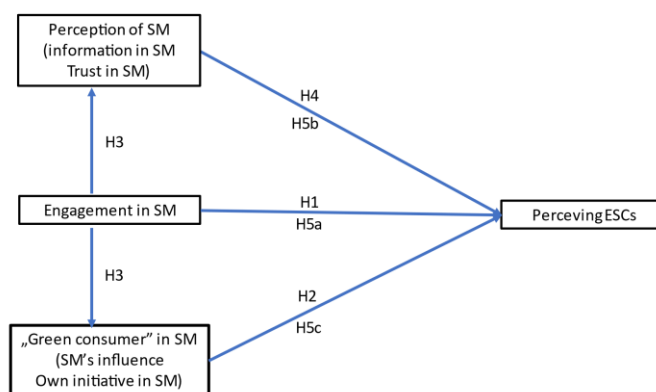
**Hypothesis 4 (H4).** *There is a relationship between perceiving ESCs and factors related to perception of social media.*

Since we assume that there is not only a relationship, but also influence, we formulate the additional hypothesis:

**Hypothesis 5a (H5a).** *Engagement in SM influences perceiving ESCs.*

**Hypothesis 5b (H5b).** *The perception of social media (SM) influences perceiving ESCs.*

**Hypothesis 5c (H5c).** *The attitude of green consumer in SM influences perceiving ESCs.*



**Figure 4.** Relationships between hypotheses and influence factors.

## 2.5. Method

### 2.5.1. Research Method Description

In 2021, an online survey was conducted among social media users, so, according to Dilmann's analysis, the sample selection and the research questions were composed correctly. The sampling list was aligned with the population and is representative of the target population; it effectively communicates with questions and evokes answers [69]. The research employs the correlation method [70].

The questionnaire was published on the Internet. In total, 2137 online surveys were collected. The structure of respondents is presented in Table 2. The analysis concerned respondents over 25 to deliberately limit it to people representing Generations X and Y.

**Table 2.** Structure of respondents.

| Areas                 | Number of Responses | Data in % |
|-----------------------|---------------------|-----------|
| <b>Sex</b>            |                     |           |
| No response           | 10                  | 0.5       |
| Woman                 | 1571                | 73.5      |
| Man                   | 545                 | 25.5      |
| I don't want to reply | 11                  | 0.5       |



Table 2. Cont.

| Areas                                   | Number of Responses | Data in % |
|---|---------------------|-----------|
| <b>Education</b>                        |                     |           |
| No response                             | 4                   | 0.2       |
| Basic                                   | 8                   | 0.4       |
| Medium/technical school                 | 403                 | 18.9      |
| Higher                                  | 1703                | 79.7      |
| Professional                            | 19                  | 0.9       |
| <b>Age of respondents</b>               |                     |           |
| 26–40                                   | 1062                | 49.7      |
| 41–55                                   | 867                 | 40.6      |
| 56–70                                   | 193                 | 9.0       |
| 70 and more                             | 15                  | 0.7       |
| <b>Place of residence</b>               |                     |           |
| No response                             | 4                   | 0.2       |
| city of 100–500 thousand inhabitants    | 445                 | 20.8      |
| a city of less than 100,000 inhabitants | 106                 | 5.0       |
| a city of over 500,000 inhabitants      | 559                 | 26.2      |
| village of 50–100 thousand inhabitants  | 280                 | 13.1      |
| a town of less than 50,000 inhabitants  | 743                 | 34.8      |

### 2.5.2. Research Tool

A survey questionnaire was employed in the study. The questions were grouped into thematic blocks:

- Form of consumer activity in social media;
- Consumer behavior and attitude toward ecological consumption;
- Perception of energy companies.

In the construction of the research tool, five-step Likert scales were used, which is typical for surveying respondents' attitudes. A value of 1 meant "I completely disagree", and 5 meant "I completely agree". Among the methods used are: correlation analysis, factor analysis, and linear step regression.

Our goal was to clarify whether there is a relationship between social media users' activity in a virtual environment and perceiving energy companies; and establish whether there is the impact of the pro-environmental factor on that perception.

### 2.5.3. Results Analysis stages

The analysis proceeded in several stages:

- a correlation analysis was carried out to verify the relationship between the perception of energy companies and social media activity (H1 verification);
- a correlation analysis was carried out to verify the relationship between the perception of energy companies and the attitude and behavior of respondents under the influence of information (on environmental protection) received in social media (H2 verification);
- a correlation analysis was carried out to verify the relationship between social media activity and the attitude and behavior of respondents under the influence of information (about environmental protection) received on social media (H3 verification);
- a correlation analysis was carried out to verify the relationship between the perception of ESCs and respondents' perception of SM (H4 verification);

- factor analysis to identify hidden dimensions and influence of variables such as: engagement in perception of social media (SM) and the attitude of green consumer in SM, then, linear regression analysis to verify influence of that dimensions on ESCs perception (H5 verification).

### 3. Results

#### 3.1. The Relationship between User Activity on Social Media and the Perception of Energy Companies (H1)

The perception of energy companies (ESCs) was examined by referring to the opinions contained in Table 3.

**Table 3.** Perception of ESCs and a consumer's role in the energy sector (ES).

| Statement   | Mean   | Median | Dominant | Standard Deviation | Variance |
|---|--------|--------|----------|--------------------|----------|
| 1. I believe that energy companies are doing a lot to protect the natural environment   | 2.40 * | 2      | 3        | 0.96               | 0.92     |
| 2. I believe that energy companies do not care enough about the natural environment   | 3.66   | 4      | 4        | 1.13               | 1.27     |
| 3. I believe that energy companies do not care enough about the protection of the natural environment   | 3.71   | 4      | 4        | 1.10               | 1.21     |
| 4. I believe that energy companies sufficiently inform about their environmental activities   | 2.43   | 2      | 3        | 1.00               | 1.00     |
| 5. I believe that energy companies could inform significantly more about their environmental activities   | 4.14   | 4      | 5        | 0.98               | 0.96     |
| 6. I believe that without international statutory regulations/requirements, energy companies will do little in the near future to protect the natural environment | 4.07   | 4      | 5        | 1.07               | 1.15     |
| 7. My vote as a consumer/buyer of energy is not important for the energy company  | 3.59   | 4      | 5        | 1.31               | 1.71     |
| 8. I would like to have a greater influence on the decision of what energy I buy depending on its production source   | 4.24   | 5      | 5        | 0.98               | 0.96     |
| 9. I believe that energy produced from renewable sources should not be more expensive than that produced from fossil raw materials                                | 4.42   | 5      | 5        | 1.10               | 1.20     |
| 10. I have little influence on the pro-ecological activities of energy companies  | 3.91   | 4      | 5        | 1.19               | 1.41     |
| 11. I would gladly buy energy from a "green" energy company   | 4.34   | 5      | 5        | 0.95               | 0.90     |
| 12. Having to choose between an entrepreneur offering energy from renewable sources and one offering energy from fossil sources, I will choose the first          | 4.22   | 5      | 5        | 1.07               | 1.14     |
| 13. I believe that the energy I buy comes at least in part from renewable energy sources  | 2.84   | 3      | 3        | 1.18               | 1.38     |
| 14. I am willing to pay a little more for energy if I know it comes from renewable sources  | 3.08   | 3      | 3        | 1.36               | 1.84     |

\* 1—I completely disagree, 5—I completely agree.

Based on descriptive statistics, it can be seen that ESCs are not perceived as entities doing much for the environment. Moreover, customers believe that they could do much more, but without pressure from the legislation authorities, the shift toward greening the

energy business will not happen. At the same time, there is an expectation on the part of consumers to have a greater influence on choosing energy and having more information about the energy sources. The declaration of willingness to pay more for green energy should be approached with caution at this stage of research, because giving a reliable answer to that question is possible only in practice, when a consumer faces the actual fees and makes an actual decision.

Based on the answers given to questions 1–14 from Table 3, the ESCs perception index was determined for each respondent. The value of index was calculated for each respondent as the average value of all 14 answers given by him or her. A similar procedure was employed to determine consumer activity in social media (Table 4).

**Table 4.** Internet users' activity in social media.

| Statement  | Mean   | Median | Dominant | Standard Deviation | Variance |
|--|--------|--------|----------|--------------------|----------|
| 1. I create and publish content  | 2.08 * | 2      | 1        | 1.23               | 1.50     |
| 2. I have my own website(s) on the Internet  | 1.74   | 1      | 1        | 1.41               | 1.98     |
| 3. I have my channel(s) on YouTube or other streaming services                                   | 1.27   | 1      | 1        | 0.86               | 0.75     |
| 4. I have a fanpage and manage it actively   | 1.58   | 1      | 1        | 1.18               | 1.40     |
| 5. I track messages from other users and reply them; I review and rate messages from other users | 2.77   | 3      | 3        | 1.30               | 1.69     |
| 6. I only browse the Internet, watch movies, listen to music, etc.                               | 3.41   | 4      | 4        | 1.23               | 1.51     |
| 7. I limit my activity, e.g., only to liking   | 3.00   | 3      | 4        | 1.29               | 1.68     |
| 8. I limit my activity to forwarding interesting content to friends with or without a comment    | 2.76   | 3      | 3        | 1.25               | 1.57     |

\* 1—I completely disagree. 5—I completely agree.

The values of descriptive statistics presented in Table 5 indicate an overall low active engagement of respondents in creating content in social media. Higher values of the average and the median in questions 5–8 indicate searching for information and tracking the opinions of other users rather than creating own content. At the same time, high values of standard deviations indicate a large variation in attitudes in this matter. That confirms a high level of differentiation among social media users as far as their activity there is concerned.

Considering the value of the Pearson correlation coefficient between the perception of energy companies and the level of respondents' activity in social media, it can be seen that it is very low, which indicates a statistically very weak relationship (0.157.  $p < 0.01$ ). It would mean that H2 should be adopted about the lack of a link between the perception of energy sector companies and the level of social media users' involvement in creating content and reject H1. Regardless of whether the respondents actively create content or follow it, the correlation coefficients obtained low values.

The lack of connection can be explained, e.g., with the lack of interest on the part of companies to use the help of active social media users in building their image in the virtual environment. On the other hand, social media users do not get involved in online issues related to energy companies.

At this stage, it was not verified how much important environmental issues are for respondents. However, as far as the results of literature study are concerned, It is noticeable that green energy becomes more and more important in ESCs policy due to external conditions such as international policy toward stopping or decreasing negative climate changes. As a result, it was decided to determine what their attitudes and behaviors

of social media users for the protection of the environment are under the social media influence and whether this factor affects the perception of companies from the energy sector.

**Table 5.** Environmental reactions and behaviors of social media users.

|  | Mean   | Median | Dominant | Standard Deviation | Variance |
|--|--------|--------|----------|--------------------|----------|
| Impact of SM—Reactions to environmental messages in social media   |        |        |          |                    |          |
| 1. I eagerly click on a like for environmentally important initiatives   | 3.39 * | 4      | 5        | 1.41               | 1.98     |
| 2. I encourage other users in social media to act if it is important for the natural environment                                 | 2.87   | 3      | 1        | 1.43               | 2.05     |
| 3. If the people I follow recommend me a pro-ecological solution. I take it into account   | 3.47   | 4      | 4        | 1.21               | 1.46     |
| 4. I am happy to follow the suggestions of others in social media what to do to take better care of the natural environment      | 3.20   | 3      | 3        | 1.25               | 1.57     |
| Self activity in SM—Consumer pro-environmental behavior in social media on their own initiative                                  |        |        |          |                    |          |
| 5. I learn for myself about the commitment of energy companies to environmental protection from social media                     | 2.30   | 2      | 1        | 1.26               | 1.58     |
| 6. Rather, I have to look for information about the commitment of energy companies to environmental protection from social media | 2.68   | 3      | 1        | 1.37               | 1.88     |
| 7. I actively look for information in social media about the sources of the energy I buy   | 1.95   | 2      | 1        | 1.15               | 1.33     |

\* 1—I completely disagree. 5—I completely agree.

### 3.2. Perception of Energy Companies' Activities in Social Media and the Level of Consumer Involvement in Various Pro-Ecological Behaviors in Social Media (H2)

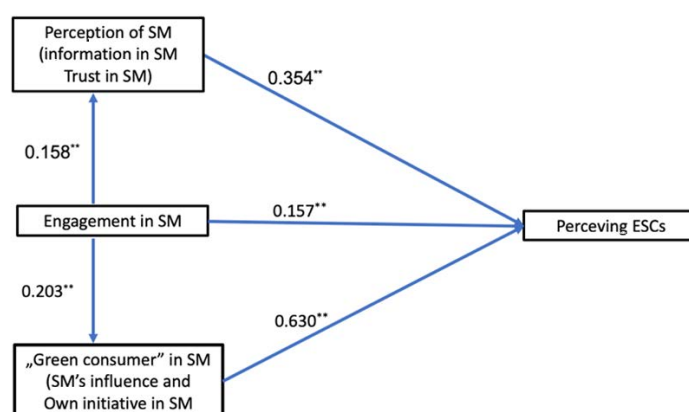
The pro-environmental attitude and behavior were verified using the following opinions. based on which the perception coefficient for each respondent was determined (Table 5).

The Cronbach Alpha coefficient for the adopted scale consisting of seven opinions is 0.842, which indicates that the adopted opinions meet the criterion of reliability (required value above 0.7). For the opinions 1–4, Cronbach's Alpha is 0.884, while for the opinions 5–7, a value of 0.7 was obtained, which is an acceptable result. These opinions are formed into two factors that have been called: reactions to pro-environmental messages in social media and the consumer's pro-environmental behavior in social media on his own initiative. The former draws attention to the consumer's reactions and willingness to engage in the form of providing information or implementing recommended pro-environmental solutions. The latter refers to the consumer's independent search for information about what energy companies are doing to protect the natural environment.

In the case of the analysis of the correlation between the attitudes and behaviors of respondents in social media of a pro-environmental nature and the perception of ESCs—it can be considered that this relationship is strong. Pearson correlation coefficient is 0.63 ( $p < 0.01$ ). The same value was obtained for the factor relating to the reception, Implementation, and transfer of pro-environmental activities in case of receiving a stimulus in social media. In a situation where the respondent has to search for information about the ESCs' pro-environmental behavior himself, the correlation coefficient has a lower value and amounts to 0.424 ( $p < 0.01$ ).

### 3.3. Relationship between Users' Social Media Activity and Their Environmental Behavior (H3)

An analysis of the correlation between user activity in social media and pro-environmental behavior indicates a weak relationship. The correlation coefficient takes the value of 0.203  $p < 0.01$ . In the further parts of the analysis, the opinions 1–4 from Table 5 were used to identify the factor of actual activity in social media, while the opinions 5–8 indicate a passive engagement of social media users. However, the low values of the correlation coefficient (Figure 5) were also obtained in their case. However, what is interesting, is that there is a strong relationship between “green consumers in social media” and his/her perception of ESCs. This leads to the assumption that not engagement in SM but the “green attitude of consumers” may be the factor that influences perception of the ESCs.



**Figure 5.** Correlation analysis results. \*\*, Significant correlation at the level of 0.01 (two-tailed).

### 3.4. SM Credibility and Perception of Energy Companies (H4)

Based on opinions on SM, information and trust in SM was extracted as the result of the factor analysis. The conditions determining the possibility of conducting such an analysis were met: Alpha Cronbach coefficient = 0.806, KMO value = 0.809 (Bartlett's Chi<sup>2</sup> test = 5687.987; df = 21; significance  $p < 0.000$ ). As a result of the factor analysis, two variables were identified that explain 64% of variance (Table 6).

**Table 6.** Results of factor analysis.

| Statement  | Credibility in SM (1) | Information in SM (3) |
|--|-----------------------|-----------------------|
| 1. I believe that social media is a very good source of information about the activities of companies to protect the natural environment | 0.850                 |                       |
| 2. In social media, I learn more about various environmental initiatives of companies than from these companies' websites                | 0.800                 |                       |
| 3. I believe that by engaging in social media I have a real impact on many phenomena related to environmental protection                 | 0.787                 |                       |
| 4. I have confidence in information from social media  | 0.684                 |                       |
| 5. I believe that the companies present in social media inform me about the issues that are important to me sufficiently                 |                       | 0.805                 |
| 6. I believe that companies present in social media inform me about issues that are important to me credibly                             |                       | 0.770                 |
| 7. I recognize and deal with fake news in social media   |                       | 0.579                 |

The calculations were made using the method of extracting factors—the main components and the rotation method—Varimax with Kaiser normalization. The factors were named conventionally in order:



Perceived credibility of enterprises in SM (credibility);  
Trust in SM and their agency (information).

In the next step, a correlation analysis was carried out between perceiving ESCs and the SM. The results are presented in Table 7.

**Table 7.** Perceiving ESCs and trust in SM.

|                 | Credibility | Information/<br>Perceiving ESCs | Perceiving ESCs |
|-----------------|-------------|---------------------------------|-----------------|
| Credibility     | 1           | 0.536 **                        | 0.831 **        |
| Information     |             | 1                               | 0.616 **        |
| Perceiving ESCs |             |                                 | 1               |

\*\**S*ignificant correlation at the level of 0.01 (bilaterally).

Both factors are correlated with perceiving ESCs—the values of coefficient are high, especially in case of credibility. This leads to the assumption, that there is an influence of those factors on perceiving ESCs. To test hypothesis 5, linear regression analysis was conducted. The results are presented below in Tables 8 and 9. The adjusted  $R^2$  is 0.195.

**Table 8.** The linear regression analysis results.

| Anova <sup>a</sup> |            |                |      |             |         |                    |
|--------------------|------------|----------------|------|-------------|---------|--------------------|
| Model              |            | Sum of Squares | df   | Mean Square | F       | Sig.               |
| 1                  | Regression | 99.204         | 3    | 33.068      | 155.623 | 0.000 <sup>b</sup> |
|                    | Residual   | 405.638        | 1909 | 0.212       |         |                    |
|                    | Total      | 504.842        | 1912 |             |         |                    |

<sup>a</sup>. Dependent Variable: perceiving ESCs, <sup>b</sup>. Predictors: (Constant), perception of SM, SM engagement, “green consumer” in SM.

**Table 9.** The Unstandardized and Standardized Coefficients.

| Coefficients <sup>a</sup> |                        |                             |            |                           |          |       |
|---------------------------|------------------------|-----------------------------|------------|---------------------------|----------|-------|
| Model                     |                        | Unstandardized Coefficients |            | Standardized Coefficients | <i>t</i> | Sig.  |
|                           |                        | <i>B</i>                    | Std. Error | Beta                      |          |       |
| 1                         | (Constant)             | 2.738                       | 0.057      |                           | 48.063   | 0.000 |
|                           | SM engagement          | −0.005                      | 0.020      | −0.005                    | −0.235   | 0.814 |
|                           | “green consumer” in SM | 0.188                       | 0.014      | 0.339                     | 13.431   | 0.000 |
|                           | perception of SM       | 0.102                       | 0.017      | 0.152                     | 6.016    | 0.000 |

<sup>a</sup>. Dependent Variable: perceiving ESCs.

The regression analysis confirms that two factors influence perceiving ESCs.

#### 4. Discussion of Results

Usually, the topics discussed in social media by their users as energy consumers are problems with the continuity of energy supply or the level of voltage in households. However, they depend not only on the supplier, but also the type of recipient, although not necessarily what he communicates in social media. Therefore, the main problem is communicating and sharing responsibility for supply quality deterioration. e.g., with production or service plants that introduce disruptions to the network [71,72]. Further energy market liberalization under the control of the regulator and an increase in consumers’ awareness and expectations as to energy supply quality will result in the spread of marginally used quality contracts for the supply of electricity, and implicitly also other utilities, such as gas or water [34]. Each group of electricity users has a different importance hierarchy of its quality parameters, the values of which should be strictly met. The high sensitivity

of electronic devices to the supply voltage parameters makes these figures particularly important for consumers using such devices. Therefore, this problem affects the banking sector, IT sector, companies operating in the areas of modern technology (high-tech), as well as households and small enterprises. Typical industrial devices, by nature designed for worse operating conditions, are generally more resistant to changes in supply voltage parameters. At the same time, these devices have a significant impact on the change of these network parameters (inverter drives shunt capacitors, other non-linear receivers) and are the cause of high communication traffic in social media and have a negative impact on the perception of the energy sector [73]. Therefore, it can be concluded that the problems do not lie solely with the ESCs.

The multidimensional literature analysis and the results of our own research led us to several conclusions. First of all, it should be noted that the literature combining the energy industry and social media is scarce. One can find many studies on consumer behavior and their preferences regarding social platforms, but they do not contain links to industries outside the FMCG market. Secondly, the division into users actively creating content and with limited activity that we propose does not indicate that these factors affect the perception of energy companies. However, there is a link between the pro-environmental attitude and behavior of users and their perception of energy companies. It means that for buyers these issues are not indifferent and energy companies could expose them more in their business models. Currently, the activity of energy companies seems to be too limited (which may have its conditions in the energy policy that is independent of them) which may entail the lack of consumers' conviction about the actual impact on the pro-environmental activities of energy companies in the direction of "energy greening". At the same time, it can be noted that there is a relationship between perceiving ESCs and trust in SM. That fact is an important prerequisite for active communication and dialogue with consumers in the social media environment. So far, companies from this sector have conducted one-way communication, consisting in providing information—mainly about their products and sometimes about image or related to CSR. The result indicating that actual activity in social media is an insignificant factor when it comes to the impact on the perception of energy companies suggests that there is a lack of relationship between the influencers and entities from the energy sector.

The research leads to one more conclusion. The respondents see social media as an important source of reliable information. They share the opinion that eWOM can be the basis for them to make purchasing decisions. They put a lot of faith and trust in the information coming from social media.

## 5. Future Research and Study Limitations

The conclusions of literature studies and research conducted among social media users led to the proposal of a business model for energy companies that want to build a competitive advantage based on green energy models and sustainability [62,74].

First of all, it is necessary to increase activity in social media, which cannot be limited to the presentation of the offer or the publication of social responsibility reports. Consumers want to be informed and expect greater access to information about the origin of the energy they purchase [75]. They now feel left out on this issue. Thus, the creation of two-way, symmetrical communication would make the consumer empowered in relation to the energy company.

Therefore, we point to the need to revise the presence of energy companies in social media and take the following actions:

- Increasing the presence in social media of a relational nature;
- Clearly indicating pro-environmental measures in the communications;
- Inclusion as an image element of the share of green energy in the offered energy, in a way that is understandable to consumers.
- Indicating the pro-environmental goals that the company intends to achieve, especially by inviting its clients to cooperate, with a significant impact in social media.

- Establishing relationships and including in communication opinion leaders who will accelerate diffusion of the business model based on green energy, particularly those for whom environmental issues are important in their own communication with the audience.
- Expanding and popularizing knowledge about problems in the network, especially devices that interfere with work in the network and advice on how to deal with it.

In our assumptions, we rely on a dynamic model of behavior change, in which the phase preceding the purchase decision is influenced by various social norms, emotions, and personal norms, as they affect the attitude and, ultimately, the consumer's purchase behavior [76]. Green consumer behavior model could be adopted by ESCs [77]. They can make use of the model while using similar strategies for green product. Behavioral change is an area influenced by variety of determinants and consumer desires and interests. It is proved that younger, middle-aged, educated, and good-income respondents have shown positive tendencies in pro-environmental behavior. Green consumer behavior is a function of demographic, sociological, and psychological determinants leaving a profound impact and influence on green behavior [78].

Green Energy models as a direction requires a joint effort to build a sustainable future. The development of communication technologies has led to the transfer of communication processes to the virtual environment while the high scale of involvement of Internet network users has led to the development of the virtual environment, particularly in terms of perceiving how entrepreneurs function on the market and take actions in what is referred to as entrepreneurs conducting sustainable activities or green entrepreneurs.

Change has been imminent and incipient for some time, but 2020 marks the year of the green watershed. It now seems more likely that we will see an accelerating number of companies investing in innovative and green solutions, rather than maintaining investment in legacy businesses that appear to offer decreasing profitability. In the post-COVID-19 environment, there is an even stronger rationale for companies to take action now on green energy to future-proof their business models and outsmart disruption, rather than simply waiting for costs to decline. Of course, these activities are closely linked to access to the Internet.

## 6. Conclusions

The main aim of the study was to examine the relationship between user activity in social media and perceiving energy companies. However, the research has shown that the perception of energy companies' activities is to a greater extent related to the level of consumer involvement in various pro-ecological behaviors in social media and trust in social media. Our study is new when it comes to the energy sector and should be continued. In the future, it would be interesting to examine the "greenness" of consumers and whether they think that they can have any impact on changing energy entrepreneurs' policies. It seems necessary to indicate the activity of consumers in the virtual world and to what extent consumers are interested in reducing pollution, buying ecological products, and, finally, caring for the environment, in the aspect of business activity of energy entrepreneurs. In addition, the question arises whether consumers want to have an impact on what is happening on the energy market. Legislators in the world and, particularly, in the European Union propose the introduction of citizen energy, so such consumer involvement is extremely important and concerns young people especially. The trends show that, globally, we want to have a greater impact on the energy sector, so we can talk not only about the green consumer, but about the conscious green consumer. Therefore, the subject of further research should be examining factors important not only from the perspective of consumer involvement in social media and the activities of energy companies, but also to compare Poland with other states. As we pointed out at the beginning, Poland is a country undergoing a deep green transformation due to the still large share of coal in the energy mix, which means that moving to green transformation and using green energy models for energy entrepreneurs is absolutely necessary.

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