

TECHNOLOGIES, MARKETS AND POLICIES

**BRINGING TOGETHER
ECONOMICS AND ENGINEERING**



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FEP

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UNIVERSITY OF PORTO

Editors

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WELCOME MESSAGE FROM THE CONFERENCE CHAIR



Welcome to the 5th edition of ICEE – Energy & Environment: Bringing together Economics and Engineering to be held at the University of Porto, next 2-3 June 2022. As in previous editions, the conference is organized by FEP (School of Economics and Management, University of Porto), CEF.UP (Research Center on Economics and Finance, University of Porto) and the ALGORITMI Research Center of the School of Engineering, University of Minho.

Like in previous editions, ICEE main goal is to bring together leading academic scientists, researchers and scholars from the energy and environment science community to interchange knowledge, to discuss and to disseminate new ideas towards a low-carbon, sustainable future. However, scientific knowledge, public policies, the economy and society are now quite different from those in 2013, the year of our 1st ICEE. Both the theme of the Conference – TECHNOLOGIES, MARKETS AND POLICIES – and most particularly special topics intend to reflect this new reality and new challenges that society must face.

On behalf of the organizing committee, I wish you a pleasant stay in Porto and I hope that ICEE'2022 will be a rewarding and useful experience for all the participants!

Isabel Soares
CONFERENCE CHAIR

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Venue

The Conference will take place at:

School of Economics of the University of Porto
(Faculdade de Economia da Universidade do Porto - FEP)
Rua Dr. Roberto Frias, s/n
4200-464 Porto
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DAY 2, FRIDAY, June 03, 2022

Energy Transition IV Chair: Isabel Soares (University of Porto) room 609	Sustainable Development and Mobility IV Chair: Susana Silva (University of Porto) room 613	Technologies For Economic Efficiency Chair: Thereza Aquino (Federal University of Rio de Janeiro) room 626	Energy Markets III Chair: Vitor Miguel Ribeiro (University of Porto) room 642
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11:30-13:00

89 - An overview of the literature on the evaluation methodologies of publicly funded socio-development projects

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93 - Waste-to-energy: Biogas efficiency of waste from the coffee production and consumption

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55 - Is climate finance flow for developing economies promoting climate change mitigation?

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Marta Guerra-Mota and Thereza Aquino

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68 - Is greenwashing a common practice in energy markets?

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5 - Implications of rising energy prices on the performance of the European Union's agricultural sector: Insights for policy rethinking

Vitor Martinho

39 - Demand Response on Electricity Markets: A literature review about benefits and barriers concerning the entire power system chain

Joana Sousa and Isabel Soares

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Micaela Antunes, Rita Martins and Carlota Quintal

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13:00-14:30

Lunch

IS GREENWASHING A COMMON PRACTICE IN ENERGY MARKET?

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KEYWORDS

Green Market, Greenwashing, Energy market, Portugal

ABSTRACT

The need for meeting energy needs but at the same time reduce greenhouse gas emissions (GHG) produced by primary energy sources has raised a wide range of concerns for different for industrial activities. Nonetheless, the development of the green marketing strategies over the year has drawn attention to a new phenomenon, namely the *Greenwashing*. This research attempts to contribute to analyze the use of greenwashing practices in companies' operating in the regulated energy market. Results from the content analysis showed that practices of greenwashing are not generalizable to the sample observed. However, for some companies these practices were evidenced.

1. INTRODUCTION

Over the last decades climate change has become an unprecedented challenge for government and society worldwide. The need for meeting energy needs but at the same time reduce greenhouse gas emissions (GHG) produced by primary energy sources has raised a wide range of concerns for different for industrial activities (Stephenson et al., 2012).

For the case of companies operating in the energy market, due to its effects on climate change, such as the carbon dioxide emissions associated with their activities, there is imperative the energy transitions. In order to support this transition, the development of technologies, policies and engagement of the society in a sustainable transition, can be considered as promising aspects to accelerate the process of decarbonization (Papadis & Tsatsaronis, 2020; Steg et al., 2018).

Nonetheless, the development of the green marketing strategies over the year has drawn attention to a new phenomenon, namely the *Greenwashing*. According to Berrone et al., (2017), *Greenwashing* is a widespread worldwide phenomenon related to the practice of releasing ambiguous or unevidenced claims regarding organizations' environmental impact.

In the current literature, there are several researchers focusing on the influence of Greenwashing practices for several industrial sector. However, analysis of green practices

of companies operating in the energy market is still scarce. Having in mind the role of the energy sector as well the consumers for the energy transition. This research attempts to contribute to analyze the use of greenwashing practices in companies' operating in the regulated energy market.

2. METHODOLOGY

In order to achieve the objective of this research, a review of the existing literature related to greenwashing practices was drew upon. Then, with the purpose of analyzing the actual scenario of energy companies, this paper will focus greenwashing for companies operating in the Iberian Energy Market addressing not only the (conscious or not) use of these practices but also the company's awareness towards them. A content analysis was used, since the literature related with these practices is still scarce.

Additionally, a case study method was chosen in order to explore in depth the greenwashing practices of these set of companies. As the objective of this research is to better understand the use and acknowledge of greenwashing practices of companies from energy sector, a set of companies were selected for this analysis, aiming to analyze their current practice in terms of sustainable achievements.

For such analysis the main source of data included institutional online channels of these set of companies, namely, their website, reports published at Global Reporting Initiative and social media profiles. In terms of methodological procedures, a preliminar bibliometrics analysis was developed resorting to the VOSviewer software. Afterwards, categories of analysis were created with respective frequency records.

3. RESULTS AND DISCUSSIONS

Drawing upon from the analysis proposed, this section has two broad aims, firstly to analyses outlined the preliminary analysis from the current literature related to greenwashing practices, and then to summarize the results from a content analysis focusing a set of Portuguese companies.

Network visualization: a greenwashing analysis

As sustainability has been the latest buzz word in the last years, several approaches focusing on green practices towards sustainability have also emerged along the years. In the case of Greenwashing practices, which aims to better understand the actual context that these green practices have appeared. As a preliminar analysis, this research aimed to make an attempt to bring to the light the actual networks of scientific publication related to this topic, namely greenwashing in the energy market. For this analysis this research considered the Web science platform (WOS) as the main source of data, this platform was chosen due to the availability to access the bibliographic database and also because the platform is widely used by academics from different areas. Figure 1 shows the main steps which were considered to achieve the preliminary results, what this research named as scientific network visualization in greenwashing.

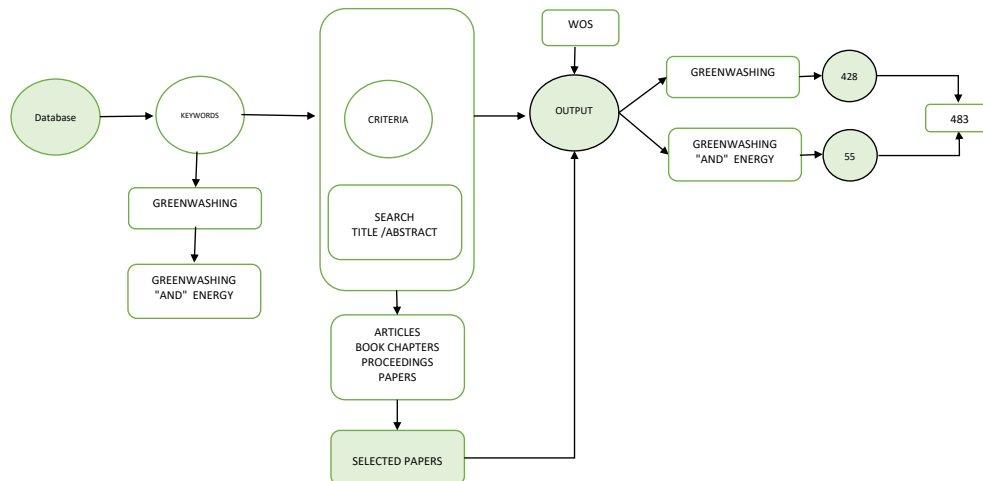


Figure 1: Proposed approach to develop scientific network visualization in greenwashing

The steps presented in Figure 1, shows that after applying the selected criteria, it was possible to reach a total of 483 and papers focusing on the keyword greenwashing. Here it is important to highlight that one of the main results achieved at this stage was the lack of researches linking the two terms, namely greenwashing and energy (proposed criteria suggested in Figure 1). In this research, the first attempt to search papers related to those terms was failed, since outcomes from WOS resulted in a total of 55 papers, and only seven out the 55 were related to the energy market (see (Guo et al., 2017; Høyer & Rüdiger, 2020; Muslemanni et al., 2021; Scanlan & Scanlan, 2017; Stephenson et al., 2012)). The results also showed that the current literature in Greenwashing practices have been increasing over the years, nonetheless, for the case of energy market there is a lack of researchers focusing on this topic.

Yet, in order to capture the importance of the proposed topic, a network analysis was developed aiming to analyze the actual scenario of published research related to greenwashing, for this analyses VOSviewer software was used. After searching the link between the key aspect related to greenwashing practices, Figure 2 shows the bibliographic coupling map on greenwashing, which was an output from the software application.

The results presented in Figure 2, sum up scientific research from the period of twenty years' time (2002 -2022), it includes articles, proceedings papers and reviewed articles from different journals. From the analyses conducted, results indicate the link and strength between the items summarized in Figure 2.

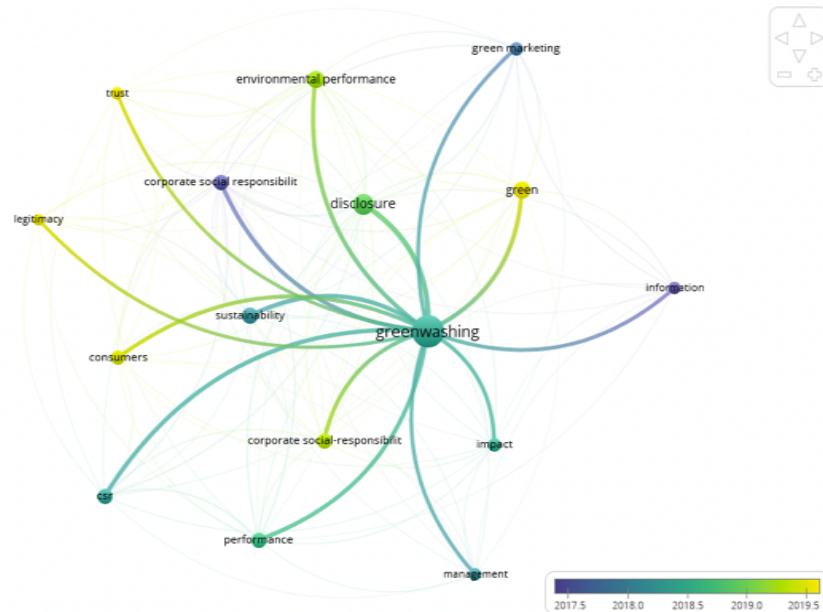


Figure 2: WOS bibliographic coupling map on greenwashing

The short distance between nodes confirms that when analyzing the research developed over the last years, greenwashing practices appeared strongly linked with aspects such as sustainability, corporate social responsibility, and green practices. Nonetheless, the results also showed that greenwashing practices are also connected to aspects related to consumers, legitimacy, and trusty, which confirms and reinforce the current literature, namely the need to better understand the trust and legitimacy of sustainable and green practices implemented by companies worldwide.

Content analysis

In a study on Green Advertising in China, Dai, Goh and Cheng (2014) created a content analysis typology for 1,338 press advertisements on this theme. In this study they used the assumptions of Carlson, Grove, and Kangun (1993), which proposed a matrix framework to analyze the degree to which advertising could be classified as greenwashing, as well as the typification of the "six sins of greenwashing" (Terra Choice Environmental Marketing cit. in Dai, Goh and Cheng, 2014). This premises was adapted to the study that is now presented in this research, adapting them to a new corpus of analysis, namely the websites of the 5 largest energy companies in Europe.

In the research developed by Dai, Goh, and Cheng (2014), and based on Carlson, Grove, and Kangun (1993), the authors classified the "Green Claim Orientation" dimension into 5 types: Product Orientation (advertising appeals emphasize the environmental characteristics of products); Process Orientation (advertising appeals emphasize the internal technology, treatment and other environmental protection); Image Orientation (Advertising appeals link business with environmental organizations / activities); Environmental Facts (Advertising appeals include the independent state of the environment) and Combination (a mixture of the above four types). Additionally, to highlight bad practices in communication these authors have identified the "six sins of

greenwashing" classification framework: Sin of the Hidden Trade-Off (claim to be "green" based on single or unreasonable / environmental characteristics, ignore the fact that the environment is more important); Sin of No Proof (green appeals are difficult to verify); Sin of Vagueness (green appeals are too broad and are likely to mislead consumers); Sin of Irrelevance (concern about problems that have no real value and distract consumers); Sin of Fibbing (general use of certification by independent experts or instructions) and Sin of the Lesser of Two Evils (keen to promote "organic", "green" and so on, ignore the real environmental value of the product).

Sample selection

In this research, a sample of selected companies based on the ranking of market shares and competition indicators prepared by the Energy Services Regulatory Authority¹. In this sense, five companies (C1 – C5) with the highest market share in the energy sector were selected as source of data to be analyzed in the light of its green claim orientation.

The structure of the content analysis was carried out exclusively through the analysis of the institutional website of the companies, and obeyed the following analysis grid presented in Table 1:

Table 1: Green Claim Orientation dimension by company

Company	Green Claim Orientation					Six sins of greenwashing					
	Product Orientation	Process Orientation	Image Orientation	Environmental Facts	Combination	Sin of the Hidden	Sin of No Proof	Sin of Vagueness	Sin of Irrelevance	Sin of Fibbing	Sin of Lesser of Two Evils
C1	X	X	X	X	X						
C2	X	X	X	X	X						
C3	X	X	X	X	X						
C4	X	X	X	X	X		X	X			
C5	X	X	X	X	X		X	X			

By analyzing the Green Claim Orientation dimension, it is possible to see that all 5 companies analyzed use their institutional websites advertising appeals to emphasize the environmental characteristics of products, internal technology, treatment and other environmental protection, link business with environmental organizations / activities and appeals and include the independent state of the environment. About the six sins of greenwashing dimension, only the energy companies C4 and C5 do not fully comply. Both do not demonstrate that an environmental claim not substantiated by easily accessible supporting information or by a reliable third-party certification and present claims that poorly defined or broad that its real meaning is likely to be misunderstood by the consumer.

4. CONCLUSIONS

¹ https://www.erse.pt/media/134h4sxu/202101_ele_rel_ml.pdf

This research will contribute to bring to the light the promotion and awareness of the application of more ethical and greener marketing practices in energy companies, whose responsibility is increased by the nature of their sector of activity. With the spread and sustainable practices, scientific research in this field have been increasing, nonetheless, there is lack of studies focusing on greenwashing practices in the energy sector, this sector is particular important due to urgency for decarbonizing the sector, also because it is important to provide to consumers clear information about sustainable and green initiatives developed by this sector.

Results from the content analysis showed that practices of greenwashing are not generalizable to the sample observed. However, for some companies these practices were evidenced.

This research is part of an ongoing work, and the preliminary results presented here summarize a preliminary examination of energy companies' commitment, which can provide guidance for future studies and for companies who wish to a more in-depth commit.

For future research, it is intended to develop a detailed analysis between WOS and Elsevier platform, and also a methodology to identify and measure the greenwashing in energy companies.

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