

Renewable Energy Discourse on Social Media: A Cross-Platform Sentiment Analysis

Sosyal Medyada Yenilenebilir Enerji Söylemi: Platformlar Arası Duygu Analizi

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ABSTRACT

The global shift towards renewable energy has garnered significant attention in digital spaces, with platforms teeming with discourse about its implications, challenges, and potential. This study undertook a comprehensive exploration of this digital discourse across prominent social media platforms, including Quora, Facebook, Instagram, Reddit, and the platform formerly known as Twitter, now "X." Leveraging the API-based tool from BrandMentions, a dataset focused on the keyword "Renewable Energy" was extracted and conducted in-depth sentiment and textual analyses. Findings revealed a predominant positive sentiment, accounting for 71.44% of the mentions. English emerged as the dominant language, comprising 97.48% of the dataset. Platform-specific insights showcased diverse aspects of the renewable energy conversation, from career-related inquiries on Quora to industry trends on Reddit. Co-occurrence analysis further underscored the multifaceted nature of discussions, highlighting areas of technological innovation, sustainability concerns, and commercial implications. This research sheds light on the complex web of online discourse on renewable energy, providing significant implications for stakeholders, policymakers, and researchers. Future studies might delve deeper into regional sentiments, and temporal shifts in discourse and employ more advanced analytical tools for granular insights.

KEYWORDS

Renewable energy, Social media, Sentiment analysis, Sustainable marketing, Marketing communication

ÖZ

Küresel olarak yenilenebilir enerjiye doğru olan geçiş, etkileri, zorlukları ve potansiyeli hakkındaki tartışmalar ile dijital mecralarda önemli bir ilgi çekmiştir. Bu çalışma, Quora, Facebook, Instagram, Reddit ve X. (eski adıyla Twitter) dahil olmak üzere önde gelen sosyal medya platformlarında bu dijital tartışmanın kapsamlı bir keşfini gerçekleştirmiştir. BrandMentions'dan API tabanlı bir araç kullanılarak "yenilenebilir enerji" anahtar kelimesine odaklanan bir veri kümesi çıkarılıp derinlemesine duygu ve metin analizleri gerçekleştirilmiştir. Bulgular, gönderilerin %71,44'ünün baskın bir pozitif duygu içerdiğini ortaya çıkarmıştır. İngilizce, veri kümesinin %97,48'ini oluşturarak baskın dil olarak ortaya çıkmıştır. Platforma özel bilgiler, Quora'da kariyerle ilgili sorularından Reddit'te endüstri trendlerine kadar yenilenebilir enerji tartışmalarının farklı yönlerini ortaya çıkarmıştır. Eş bulunuş analizi, tartışmaların çok yönlü doğasını vurgulayarak teknolojik yenilik, sürdürülebilirlik endişeleri ve ticari sonuçlar alanlarını öne çıkarmıştır. Bu araştırma, yenilenebilir enerji hakkındaki çevrimiçi tartışmanın karmaşık ağına ışık tutarak paydaşlar, politika yapımcılar ve araştırmacılar için önemli sonuçlar sunmaktadır. Gelecekteki çalışmalar, bölgesel görüşlere, söylemdeki zaman içindeki değişikliklere daha derinlemesine inebilir ve daha gelişmiş analitik araçlar kullanarak ayrıntılı içgörüler elde edebilir.

ANAHTAR KELİMELELER

Yenilenebilir enerji, Sosyal medya, Duygu analizi, Sürdürülebilir pazarlama, Pazarlama iletişimi

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INTRODUCTION

The increasing global energy demands and the urgent need for sustainability have significantly moved renewable energy sources to the center of international conversations and policy debates (Omri & Belaid, 2021). These resources are highly significant not just because of their power-generating capacity but also because they represent a paradigm change in how we approach development. This new approach is based on an integrated perspective that combines environmental stewardship with technical advancement (Destek & Sinha, 2020; Abdul et al., 2022). Many renewable energy sources, such as the sun's limitless light captured by solar panels, wind turbines' continuous winds, the Earth's natural heat captured by geothermal plants, and the everlasting water flow driving hydropower axles, show how inventive humanity has become in its search for sustainable energy sources (Vakulchuk et al., 2019; Shahbaz et al., 2020). Each resource provides a unique solution to different aspects of our energy problem. They all, however, share the same target: to decrease our carbon footprint while satisfying our energy needs (Li et al., 2022). As people worldwide face the severe consequences of climate change, the need for this transition becomes ever more crucial (Ragosa & Warren, 2019). With coastlines under threat from the inevitable rise of sea levels, the unexpected unpredictability of weather patterns resulting in unprecedented natural disasters, and the devastating loss of biodiversity, the urgency for reconsidering our energy sources reverberates more strongly (Church & White, 2011; Karn & Sharma, 2021; Mateo-Tomás & López-Bao, 2022). The harmful reliance on fossil fuels, with their carbon-intensive emissions, not only contributes significantly to these environmental difficulties but also poses direct health hazards, with pollutants negatively affecting air quality and human health (Rana & Ilina, 2021; Ching & Kajino, 2020; Ravindra et al., 2019). Furthermore, a developing global consciousness knows that, regardless of their current availability, fossil fuels have a limited lifespan (Clark, 2015). As the available reserves of energy diminish and the extraction process becomes increasingly difficult and environmentally harmful, there is a noticeable change occurring in the discourse concerning energy (Kreps, 2020). Renewable energy does not just appear as an option in this developing story. It appears as a beacon of hope, promising an environmentally friendly and, most importantly, an endless supply of energy, leading the way for a time when producing energy will coexist peacefully with protecting the environment (Ovchinnikova et al., 2021; Razi Dincer, 2022). With the increasing significance of renewable energy in global discussions, there has been a rapid and substantial growth of social media platforms, which have profoundly impacted our contemporary social structure (Saud et al., 2020). These platforms have experienced a significant transformation since they were first envisioned as digital locations for making personal relationships and having informal encounters with one another. They are now influential engines of information exchange, discussion, and base-level mobilization, having grown significantly from their early stages as digital meet-up points (Sasankan et al., 2019; Lee, 2019). Social media architecture enables the spontaneous formation of various communities, ranging from hyperlocal groups discussing neighborhood solar panel installations to expansive global movements gathering behind the more significant cause of combating climate change through sustainable energy practices (Boulianne et al., 2020). This digital revolution has reduced barriers to access to information and played a significant role in amplifying the voices of those who, in pre-digital periods, may have been marginalized in influential dialogues. Historically marginalized communities, activists without mainstream platforms, and even ordinary citizens with a passion for sustainability are now equipped with the means to share, educate, and inspire on a global scale. In addition, these platforms' interactive and real-time nature gives them unparalleled efficacy. They can mobilize the multitudes, shape public narratives, and sometimes directly or indirectly influence policy decisions (Boulianne et al., 2020). Decision-makers, legislators, and corporations are increasingly attuned to the pulse of online sentiment, frequently adjusting their strategies and positions based on the collective voice sounding from these digital echo chambers (Gilardi et al., 2022).

In the field of renewable energy, the significance of social media is crucial. As discussions about sustainability, renewable technologies, and environmental conservation gain popularity, platforms such as X., Instagram, and Facebook become invaluable for information dissemination and sentiment analysis. They serve as catalysts, propagating the numerous benefits of sustainable energy practices, clearing myths, and developing a community of knowledgeable supporters (Qazi et al., 2019). The tools and methods we can access become even more critical as we aim to fully comprehend the prevailing culture and collective awareness of the digital age. This is especially important now that digital material comes from many different places. Text analysis and sentiment analysis are at the heart of this project. These two closely related computer methods provide a sophisticated way to understand and decode the complicated web of digital conversation (Nandwani & Verma, 2021). Sentiment analysis, which harnesses the power of complex linguistic algorithms and machine learning models, is a beacon in this field of research. At its foundation, this approach delves into the subtle shades of

emotion that pervade written information. Rather than simply skimming the surface, sentiment analysis digs deeper, attempting to discover the subtle emotional nuances, whether they indicate delight, ambivalence, dissatisfaction, or outright opposition. In essence, it attempts to map out the emotional landscape of a discussion, recognizing not just the overt contents but also the underlying feelings that provide context and color to those messages (Wankhade et al., 2022). Text analysis is an equally powerful field that supports sentiment analysis. Although the former is sensitive to the emotional frequencies of the content, text analysis takes a different approach. It carefully searches through the enormous amounts of material, searching for trends, reoccurring themes, and semantic connections. By unraveling stories, associations, and contextual cues, this approach creates a detailed tapestry that provides a comprehensive grasp of the topic or issue at hand (Macanovic, 2022).

Analyzing the renewable energy discourse with sentiment analysis is of global importance. Diverse viewpoints, testimonies, discussions, and stories about renewable energy are abundant in the digital space, originating from a range of stakeholders, including both seasoned professionals and regular customers. Using emotion and text analysis in this extensive corpus of content may obtain priceless insights into the diverse viewpoints that shape the dialogue (Jain et al., 2021). This study enhances comprehension of the renewable energy sector in the era of digitalization by offering a comprehensive perspective on the beliefs, worries, aspirations, and reservations held by a diverse digital populace. Isoaho et al. (2021) argue that integrating robust sentiment and text analysis technologies with the dynamic and constantly growing digital conversation surrounding renewable energy offers valuable insights. The pressing nature of the environmental issues faced by our planet, coupled with the considerable potential of renewable energy solutions, amplifies the capacity of the digital age to foster connectivity, disseminate information, and facilitate proactive measures. Social media platforms have undergone a significant transformation from simple online gathering places to influential arenas for discourse that can create global trends and impact governmental decisions. The combination of renewable energy and digital discourse provides a particular viewpoint and presents a strategic implementation plan. This comprehensive research seeks to explore the intricate nature of digital conversations by utilizing sentiment and text analysis. Its objective is to offer a nuanced and multi-dimensional comprehension of the renewable energy landscape while capturing the hopes, concerns, and aspirations of the global digital population. The findings of this research will provide valuable insights into the formulation of marketing strategies and regulations aimed at promoting the social acceptance of renewable energy. This aspect holds significant importance in the broader context of global sustainability.

1. LITERATURE REVIEW

Sentiment analysis, also referred to as opinion mining, is a computational methodology within the field of natural language processing (N.L.P.) that is employed to ascertain the sentiment or emotional disposition conveyed in a given textual composition. The main objective of sentiment analysis is to comprehend and classify the subjective content expressed in a given text into positive, negative, or neutral categories. The field of sentiment analysis involves extracting information about positive and negative sentiments from textual data. This information is derived not only from the specific words used but also from the contextual cues surrounding these words and the underlying linguistic structure of the text (Taboada, 2016). Sentiment analysis plays a crucial role in comprehending the emotional disposition and viewpoints expressed within extensive textual datasets, rendering it an invaluable instrument for enterprises, scholars, and individuals responsible for generating informed judgments (Kauffmann et al., 2019). A comprehensive review of sentiment analysis techniques in natural language processing highlighted the diverse application areas of sentiment analysis, including renewable energy, healthcare, and politics (Gunasekaran, 2023). Studies provided comprehensive guidance on performing sentiment analysis with “R”, emphasizing its applicability in various fields, including finance and energy (Klinkhammer, 2022).

The vast expanse of social media has become a treasure trove for sentiment analysis, especially in sectors like finance and energy. A study delving into the usability of various natural language processing models to analyze sentiments from social media, specifically targeting the cryptocurrency domain, found correlations between sentiment metrics and Bitcoin price movements, emphasizing the potential of sentiment analysis in predicting market trends (Raheman et al., 2022). Another intriguing study explored methods of curating social media corpora to filter irrelevant tweets using pre-trained transformer-based models. The study achieved impressive F1 scores, suggesting the potential of their approach as a pre-processing step for social media datasets (Arnold et al., 2023). The field of electric vehicles also witnessed sentiment analysis applications employing both token-wise and document-wise sentiment analysis to understand public sentiment toward electric vehicles (Sarjou, 2021).

The importance of public sentiment towards renewable energy resources has been increasingly recognized in recent academic studies. A study analyzing over 71 thousand tweets from January to July 2020 found that public sentiment towards solar energy varied significantly across states in the U.S., with the Northeastern U.S. region showing more positive sentiment than the Southern U.S. region. The study also highlighted that public sentiment correlated with renewable energy policies and market conditions, such as Renewable Portfolio Standards (R.P.S.) targets and net metering policies (Kim et al., 2020). Another research on sentiment analysis of electricity-related tweets in the U.K. and India revealed that despite government subsidy schemes, public sentiment was unfavorable towards rising electricity prices (Kaur & Edalati, 2022). In Norway, a machine learning-based sentiment classification model was applied to analyze public sentiments towards wind energy, revealing an intensification of negative tweets towards wind power in 2018/2019 (Vågerö et al., 2023). These studies underscore the significance of sentiment and text analysis in understanding public perceptions and shaping renewable energy policies and strategies.

2. METHODOLOGY

2.1. Purpose of the Research

This study aims to provide a brief overview of the level of awareness and concern over renewable energy in the digital realm, to establish a foundation for future in-depth and extensive research in this area. The objective is to gain valuable insights into the public's perception of sustainable green energy. These insights can be used to make informed business decisions in sectors such as healthcare, energy, and environment. Additionally, the findings can be utilized to develop strategies aimed at enhancing customer satisfaction and engagement.

2.2. Analysis Method

This article uses sentiment analysis, where features extracted using machine learning algorithms, statistical models, or predefined dictionaries are used to classify sentiment as positive, negative, or neutral. Determining the sentiment or emotion expressed in a text using the natural language processing (NLP) approach, sentiment analysis seeks to comprehend and interpret a person's or group of people's attitudes, ideas, and feelings toward a specific subject, good, service, or event. The text was cleaned and processed in advance for analysis. The retrieved features are then utilized to categorize the sentiment of the text using machine learning techniques. To interpret the overall sentiment indicated in the text, the sentiment labels derived from classification are used.

2.3. Data Extraction

The *BrandMentions* platform, equipped with API-based functions, was used to harvest data from various social media sites. To initiate the data collection process, a targeted extraction was undertaken from five prominent social media platforms: Quora, Facebook, Instagram, Reddit, and X. These platforms, collectively boasting billions of users, serve as a microcosm of the broader public sentiment, offering diverse perspectives from individuals spanning different geographies, demographics, and backgrounds. The keyword "renewable energy" was employed to maintain a focused data retrieval, ensuring that the conversations captured were squarely centered around the topic of interest. The keyword "renewable energy" was employed to concentrate the recorded discussions on the subject of interest to achieve a targeted data gathering.

2.4. Limitations

It is crucial to acknowledge that the dataset under consideration represents merely a subset of the potential reservoir of data. The 1400 references accessed fall inside the confines of the website's complimentary data allocation. While the findings offer a glimpse into public opinion on renewable energy, it is essential to acknowledge that they may not encompass the entirety of digital perspectives.

3. FINDINGS

In the study conducted to measure digital sensitivity surrounding "renewable energy" using an API-based tool, the depth and breadth of the digital discourse surrounding this critical topic were revealed through the data measurements collected. Due to the data collection tool's limitations, approximately 1,400 mentions of the specified keyword were identified. When the mentioned items were examined in more depth, it was determined that the data consisted of 6 thousand interactions, including 2200 thousand shares and 4900 likes. This volume of interaction underscores the increasing levels of interest and engagement that the topic of renewable energy is arousing in the digital community. Additionally, sentiment analysis provides a nuanced

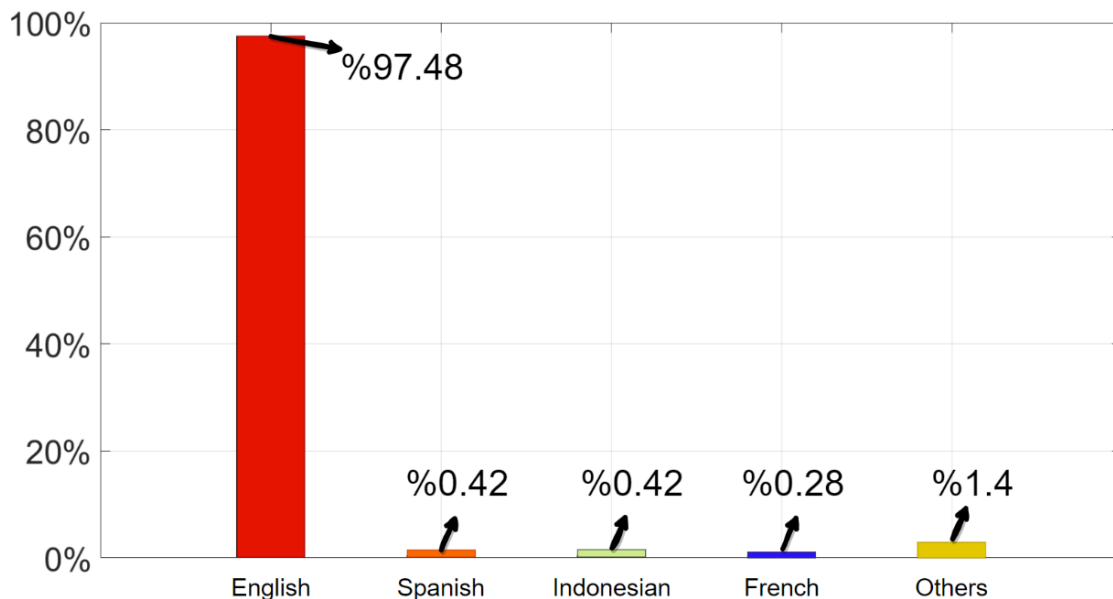
perspective on the overall tone of the discourse. The fact that 1,000 of the 1400 mentions are positive indicates a predominantly positive view towards renewable energy. However, 201 bets with a negative sentiment were also identified, indicating areas of concern or potential misinformation requiring further investigation. A visual representation of the stated measurements is presented in Figure 1.

Figure 1. Mention Volume, Interactions, and Sentiment Polarity



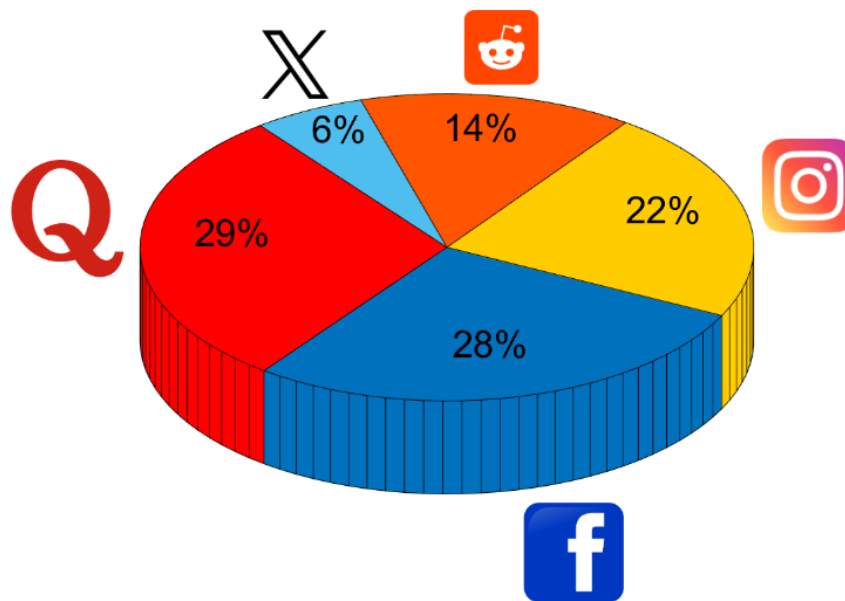
One of the remarkable aspects examined in analyzing the data set obtained in the research on the keyword “renewable energy” was the linguistic distribution of the mentions. Language as a dimension offers invaluable insight into the geographic and cultural spread of a topic’s discourse, reflecting both the global reach of the topic and potential regional emphases or concerns. This analysis revealed a dominant prevalence of English in digital conversations; this accounts for 97.48% of the total mentions. Analysis can be done in different languages, but the adequacy of the results was not accepted because sufficient data was not obtained. This dominance of English underscores the vital role of this language in the global discourse on renewable energy and potentially points to a significant amount of content, research, and debate from English-speaking regions. Nevertheless, the discourse was by no means monolingual. Spanish was used at a rate of 0.42%, Indonesian at 0.42%, French at 0.28%, and other languages at 1.4%. This diversity shows global interest in renewable energy (Figure 2).

Figure 2. Languages of Analyzed Mentions



During this research into the digital footprint of the term “renewable energy”, data was obtained from a selection of leading social media platforms such as Quora, Facebook, Instagram, Reddit, and the platform formerly known as Twitter, now branded as X. Each of these platforms, with different user demographics and interaction modes, offers a unique perspective on the global discourse surrounding renewable energy. Delving deeper into the analysis of mentions on these platforms, discernible patterns were identified that shed light on differences in participation and discussion intensity. Notably, Quora has been at the forefront of this discourse, mentioning “renewable energy” accounting for 29% of the data pool. Given Quora’s question-and-answer forum format, this appears to occur at a higher level of questioning and information-seeking behavior on the topic. Close behind, Facebook, with its extensive global user base and diverse community pages, contributed 28% of mentions, reflecting its role as a hub for shared news, discussions, and community discussions regarding renewable energy sources. Instagram, a primarily visual platform, accounted for 22%. This may indicate a growing trend in which visual narratives showcasing renewable projects, innovations, or educational content resonate with audiences. Reddit, a platform known for its in-depth discussions and niche communities, accounted for 14% of mentions, highlighting dedicated groups and threads exploring the intricacies of renewable energy. Finally, platform X, formerly known as Twitter, accounted for 6% of the dataset with its rapid-fire conversation style; this data set is shown in Figure 3. While this proportion is relatively smaller, it underscores the platform’s role in disseminating timely news policy debates and expert commentary on renewables. Essentially, the distribution of mentions on these platforms reveals where conversations about renewable energy are most concentrated and offers insights into the nature and depth of these discussions, depending on the platform’s unique characteristics.

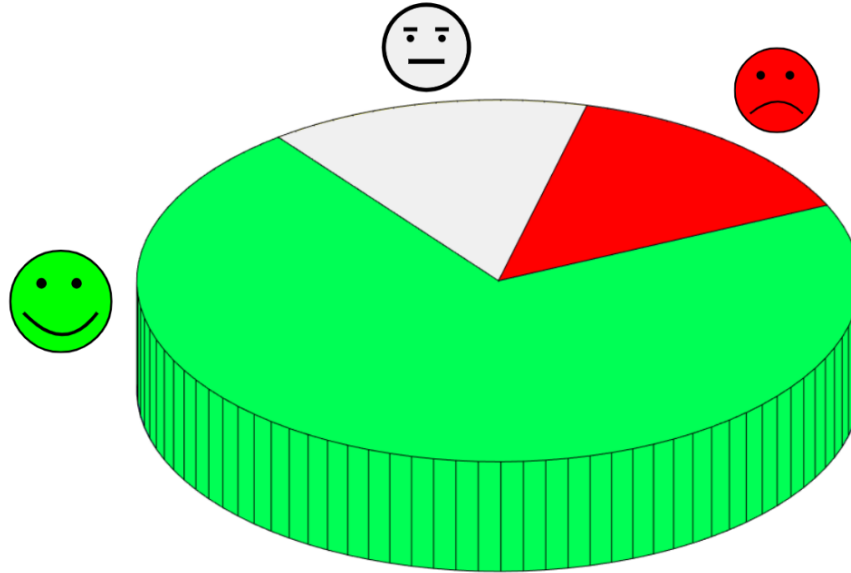
Figure 3. Participation and Discussion Intensity on Social Media Platforms



In academic research, especially when delving into digital discourse analysis, understanding the sentiment behind vast swathes of textual data is paramount. It provides a lens through which general attitudes, perceptions, and feelings about a particular issue can be discerned. From this perspective, a meticulous sensitivity analysis was conducted on the data obtained regarding “renewable energy,” and a different sentiment model was detected. Most of the mentions, 71.44%, were categorized as positive. In the context of this study, positive mentions encompass those that express approval, enthusiasm, optimism, or support for renewable energy. Such mentions might include advocacy for its adoption, sharing success stories of renewable energy projects, expressing hope for a sustainable future, or highlighting its environmental benefits. The preponderance of positive sentiment suggests a prevailing optimism and favorability towards renewable energy in the digital discourse. On the other end of the sentiment spectrum, 14.35% of the mentions were classified as negative. Negative mentions typically convey disapproval, skepticism, concerns, or critiques. These could range from doubts about the efficiency of certain renewable technologies to concerns about initial installation costs, challenges transitioning away from fossil fuels, or potential drawbacks in specific contexts. While this proportion is notably smaller than the positive mentions, it underscores the existence of reservations or challenges that stakeholders might need to address. Lastly, a nearly equivalent portion, precisely 14.21%, of

the mentions remained neutral in sentiment. Neutral mentions do not express a clear positive or negative stance but tend to be more informational, factual, or objective. They could be simple statements of renewable energy statistics, factual reports without editorialized content, or general inquiries seeking more information. These ratios are shown in Figure 4.

Figure 4. Sentiment Analysis of Mentions



Textual analysis, particularly in academic research, is a powerful instrument to discern patterns, emphases, and recurring themes within large datasets. By examining the frequency and prevalence of specific terms, one can glean insights into the primary foci and areas of concern related to the topic under investigation. With this intent, a comprehensive text analysis of the data amassed in connection with “renewable energy” was carried out. The analysis unveiled a set of terms that recurrently punctuated the discourse. Foremost among these were words like “energy” and “solar.” Their prominence is unsurprising given that discussions about renewable energy invariably revolve around diverse energy sources, with solar energy being one of the most popular and widely adopted forms. The term “carbon” also stood out, underscoring concerns about carbon emissions and the global imperative to transition towards carbon-neutral or carbon-negative solutions. Similarly, words such as “gas,” “fossil,” and “emissions” highlight the ongoing dialogue contrasting renewable sources with traditional fossil fuels and the environmental repercussions associated with their combustion. Terms like “sustainable,” “greener,” and “future” encapsulate the broader ethos of the renewable energy movement - a drive towards more environmentally friendly, sustainable solutions that promise a greener future. “Storage” and “battery” underscore technological discussions around the challenges and innovations in storing renewable energy, a critical component to ensure its consistent and reliable delivery. Other terms like “bills,” “consumption,” and “footprint” provide insights into more pragmatic concerns - the cost implications of renewable adoption, energy consumption patterns, and the environmental footprint of various energy sources. “Development,” “climate,” “sources,” and “solutions” further elucidate the multi-dimensional nature of the discourse, encompassing technological advancements, climate change concerns, diverse energy sources, and potential solutions to existing challenges. The data was synthesized into a word cloud to offer a more visually intuitive representation of these findings. This graphic representation, depicted in Figure 5, illustrates the relative frequencies of these pivotal terms, providing an overview of the key themes and topics dominating the digital conversation on renewable energy.

Green energy	15	Solar powered	4
Solar panels	14	South Africa	4
Renewables	11	Partnerships	4
Go green	9	Green	4
Renewable	9	Sustainable future	4
Sustainable energy	9	Sustainable living	4
Solar installation	8	Technology	3
Energy transition	8	Energy Solutions	3
Climate action	8	Green-tech	3
Go Solar	8	Leadership	3
Ecofriendly	8	Solar energy system	3
Energy efficiency	7	Green jobs	3
World tourism day	7	Bioenergy	3
Sustainable	7	Gas	3
Climate change	7	Commercial Solar	3
Solar system	6	Residential solar	3
Cc tv	5	Sun	3

Delving deeper into the dataset, a notable observation was the variance in the content that garnered significant traction across different social media platforms. Such high-engagement content often serves as a bellwether for prevailing public sentiment, interest areas, and emergent trends by analyzing these top-performing posts, which represent the most shared and liked posts, not in general, but on current topics. As detailed in Table 2, nuanced insights can be gleaned into the facets of the renewable energy discourse that resonate most profoundly with the digital populace.

First post on Quora: The highlighted query revolves around job opportunities in the U.K., particularly after obtaining a master's in sustainable renewable energy and specialized recycling for E.V. iron-lithium batteries. This query underscores a clear intersection between education, industry demand, and specialized technological advancements. The emphasis on recycling electric vehicle batteries suggests a forward-thinking approach to sustainable practices, highlighting the burgeoning demand for expertise in this niche area. It also reflects a broader global trend of professionals seeking roles in the green economy and sustainable sectors.

First post on Facebook: The shared article draws a link between two Sustainable Development Goals - Zero Hunger and Affordable and Clean Energy. The post captures the interwoven nature of sustainable practices by emphasizing the criticality of renewable energy in addressing global food challenges, especially in the context of climate change and population growth. Such content underscores the holistic approach needed to address global challenges and showcases the interconnectedness of energy solutions with broader sustainability goals.

First post on Instagram: The highlighted post announces a LinkedIn Live session featuring an expert discussing renewable energy solutions. The use of specific hashtags, an emphasis on innovative solutions, and the interactive nature of the content showcase Instagram's strength as a platform for brand engagement, awareness campaigns, and knowledge dissemination. This post exemplifies the growing trend of companies leveraging social media for thought leadership, community engagement, and promoting sustainable initiatives.

First post on Reddit: The content shines a spotlight on Trigon Metals and the broader context of copper demand, especially with the shift towards renewable energy and the proliferation of electric vehicles. The detailed post provides an investment perspective and encapsulates the macroeconomic shifts, challenges in global copper production, and opportunities for emerging market players. It underscores Reddit's role as a platform for in-depth analysis, discussions, and a space where industry trends are dissected with granularity.

First post on X: The tweet emphasizes a contractual agreement between Citicore Renewable Energy Corp. and Clark Electric Distribution Corp. for power supply. Its succinct format and the inclusion of a stock ticker symbol epitomize X utility as a real-time news dissemination platform, especially for corporate announcements and market-relevant news. It underscores the platform's prominence for quick, timely updates in the business and renewable energy sectors.

In summary, the high-engagement content across these platforms, as showcased in Table 2, offers a multifaceted view of the renewable energy discourse. From career aspirations and global sustainability goals to corporate announcements and in-depth industry analyses, these posts illuminate the diverse ways renewable energy permeates digital dialogues, each platform catering to distinct facets of the conversation.

Table 2. Five Most Posted Contents by Platform

Platform	Mention	Sentiment
Quora	What are the job opportunities in the U.K. after completing a master's in the U.K. in sustainable renewable energy and recycling of the E.V. iron-lithium battery? What are the top companies in the U.K. for such a job?	Neutral
Quora	How can the United States strategically leverage emerging technologies, such as artificial intelligence and renewable energy, to drive economic growth, create jobs, and strengthen its global competitiveness in the 21st century?	Positive
Quora	How do you think countries like the U.K. should balance investments in renewable energy and fossil fuels in order to achieve net zero carbon emissions?	Positive
Quora	What do you think of China's top climate envoy Xie Zhenhua's criticism of export controls on renewable energy products as "politicizing" and "imperiling" to decarbonization goals?	Negative
Quora	What implications does the U.K. government's decision to relax planning rules for onshore wind farms have for future renewable energy generation in England?	Positive
Facebook	Achieving zero hunger, one of the Sustainable Development Goals requires meeting another S.D.G.: ensuring access to modern energy. This article highlights the importance of embracing renewable energy solutions as the fabric of our global food system faces strain from climate change and a growing population. Read more here: https://rb.gy/i2op0	Negative
Facebook	Hydropower is Switzerland's primary source of renewable energy. It makes up 65% of the country's electricity consumption, followed by nuclear energy 20%, new renewable energies (photovoltaics, wind, small hydropower, and biomass) 14%, and fossil fuels 2%.	Positive
Facebook	Cross River Commissioner for Power, Prince Eka Williams Meets Foreign Investors #IgbereTV The Honorable Commissioner of Power & Renewable Energy, Prince Eka Williams, has met with Foreign investors interested in The Revamping Of Tinapa Business Resort, Igbere TV reports. The Commissioner promised the investors uninterrupted Power Supply as the Adiabo powerplant is almost completed and soon to be commissioned. The investors were taken around Tinapa, accompanied by the Honorable Commissioner for Finance, General Manager Tinapa. They were later taken to the Government House to meet with The Executive Governor Of Cross River State, H. E Sen. Prince Bassey Otu, who appreciated and welcomed them to the state and also promised them full cooperation and all necessary support they need.	Positive
Facebook	"Kenya is in many areas quite advanced in climate action, for example, Kenya has over 90% renewable energy and is top of the list of countries leading the world to achieve 100% in the next couple of years" – Amb. H.E Henriette Geiger	Positive
Facebook	Globe's efforts to green its network, aligned with its ISO 50001-certified energy management system, contributed to increased network efficiency and cost savings from reduced energy consumption. This includes the shifting of more sites to renewable energy, integrating green network solutions in its operations, and the adoption of energy-efficient technologies that have allowed the company to maximize operational network capabilities.	Positive
Instagram	#PreEventTalk #Windergergy #REIexpo Join us on LinkedIn Live with Mr. Mohanram, our Head of New Product Development, on Oct. 26 at 2.30 p.m. He will share however-renew is helping companies achieve	Positive

Platform	Mention	Sentiment
	their renewable energy goals with our innovative solutions. You will also have the chance to interact with him and ask your questions during the live session. Don't miss this opportunity to learn from one of our experts and discover how ever-renew can power your future with renewable energy.	
Instagram	Our incredible operation team is conducting a quick rotor blade inspection of a Gaetz Brook Community wind turbine. It's amazing to be a part of the renewable energy industry, where every day brings us closer to a greener future. Let's continue working together for sustainability and harness the power of wind! 🌿☀️🌍🌱 #NaturalForces #GaetzBrookCommunityWindFarm #RenewableEnergy #windturbine #WindPower #Sustainability #greenenergy #windpower	Positive
Instagram	Our Future to provide an overview of the updated draft National Energy Policy (NEP) and discuss how the goals of this policy and the draft Climate Change Policy (CCP) align with the global movement to reduce reliance on fossil fuel and promote sustainable, renewable energy. Reducing our greenhouse gas emissions is important for the well-being of our people, the success of our economy, and the health of our natural environment. That's why the updated draft NEP has a goal of 100% renewable energy by 2050, and the draft CCP has a goal of achieving a sustainable, low or zero-carbon economy.	Positive
Instagram	Did you know? The Inflation Reduction Act of 2022 (IRA) offers significant savings to those who would like to transition to clean, renewable energy sources. The IRA provides a 30% tax credit for families investing in clean energy systems like solar electricity, solar water heating, and battery storage for their homes. This can result in considerable savings.	Positive
Instagram	World Environmental Health Day is a day that aims to raise awareness about the critical relationship between environmental factors and human health. From air and water pollution to climate change, it's time we address the various environmental health challenges we're currently facing. Trina Solar, as an integrated renewable energy solutions provider, is committed to contributing to a healthier environment by working on innovative solutions for more sustainable and renewable energy sources. #SolarPower #Energy #PV #TrinaSolarEurope #RenewableEnergy #Sustainability #Environment #solarpower	Positive
Reddit	"The overall outlook for Trigon Metals is positive due to the increasing demand for copper driven by the shift towards renewable energy and the rise of electric vehicles. Chile and Peru are the world's largest copper producers, but their output is declining, creating an opportunity for new countries to enter the market. Trigon Metals has a bright future. Currently producing copper and has plans to increase production in the future. TM has no debt, \$10 million in cash (which is growing), and significant investment from Eric Sprott, a well-known mining investor. TM.v is in a good position to continue exploring new copper deposits and expanding its existing operations."	Positive
Reddit	As India continues its journey towards a sustainable energy future, the role of solar power has taken center stage. With abundant sunlight throughout the year, solar energy has emerged as a promising solution to meet the nation's growing energy demands while reducing its carbon footprint. At the heart of this solar revolution are solar module distributors who play a pivotal role in making solar power accessible to all. OneKlick Techno Renewable is a top solar panel distributor company committed to powering India's growth with clean energy.	Positive

Platform	Mention	Sentiment
Reddit	The World Digital Mining Summit sees Bitcoin miners double down on efficiency and renewable energy.	Positive
Reddit	A revolution is taking place behind the scenes, the tiny house movement, in a society where luxury is the norm. People interested in downsizing to a simpler, cheaper, and greener way of life are increasingly drawn to the concept of tiny houses. This article delves into the meaning of small houses as a symbol of conscientious living and ecologically sound housing, as well as its advantages, disadvantages, and rising popularity.	Positive
Reddit	The geographical concentration of mining operations also poses environmental concerns. Regions with abundant energy sources are often ecologically sensitive areas, where increased energy demands can lead to habitat destruction and air and water pollution. In response to these concerns, some efforts are underway to make Bitcoin mining more environmentally friendly. Some miners are exploring the use of renewable energy sources, such as solar and wind power, to power their operations. Additionally, there has been interest in transitioning to alternative consensus mechanisms that are less energy-intensive, such as proof-of-stake.	Positive
X	\$CREIT: Citicore Renewable Energy Corp. has secured a contract with Clark Electric Distribution Corp. to supply 7.5 megawatts (MW) of power.	Neutral
X	Renewable energy creates economic value. Economic value is sustained by consuming energy. Consuming energy destroys the environment by transforming raw materials. Renewables destroy the environment	Negative
X	Hi Pat, 'Ireland South' is the name of the constituency I was elected to. As for what we've done, you can find info on my website. Nature Restoration, soil health legislation, marine protected areas, accelerating renewable energy and now working to reduce plastics! More to come 😊☐	Positive
X	Low-temperature processes to reduce silver use in tandem perovskite-silicon solar cells: Researchers from Germany's Fraunhofer ISE developed new techniques to reduce silver consumption in tandem perovskite...	Positive
X	Let's focus on helping rural economies to DIVERSIFY & INNOVATE across industries and services (bio-economy and circular economy, renewable energy productions, ecosystem preservation, etc.).	Positive

CONCLUSION

The steady and inevitable growth of renewable energy as a subject of significant global concern and a central focus of online discussions is evidence of the changing attitudes worldwide towards sustainability and environmental stewardship. This extensive investigation, including several digital platforms and employing sophisticated text and sentiment analysis technologies, has provided insights into the complex characteristics of the growing renewable energy discourse in the digital realm. This review has brought attention to several significant points. The prevalence of the English language in discussions highlights its significance as the common language in worldwide discussions about renewable energy. The results of nuanced sentiment analysis indicate a prevailing favorable mood towards renewable energies, suggesting a widespread sense of hope worldwide regarding sustainable energy alternatives.

Nevertheless, adverse emotions can also serve as a means to draw attention to areas of worry, incorrect information, or possible obstacles, underscoring the significance of transparent dialogue and knowledge dissemination. The analysis conducted on this platform has contributed to a deeper comprehension of the subject matter. The emergence of media such as Quora has facilitated the exposure of career-related problems and inquiries. This phenomenon may indicate a burgeoning labor force that exhibits a willingness to embrace and adjust to the principles and practices of the green economy. The discourse observed on the Facebook platform highlights the inherent interconnectedness between global crises and the pursuit of sustainable

solutions. Online platforms such as Reddit facilitate the exposure of intricate industry trends and transformations. Instagram and X platforms have emerged as diverse channels for organizations and individuals to promote, engage in discourse, and disseminate information about renewable energy topics, employing their distinctive content formats.

This study offers a comprehensive overview of the subject matter. However, due to the constantly changing digital landscape and the ongoing dialogue surrounding renewable energy, numerous potential areas for future research should be explored. The analysis of digital discourse on renewable energy, specifically focusing on reactions to worldwide occurrences, policy modifications, and technology advancements, holds significant scholarly significance. This approach facilitates the provision of valuable insights that can inform the formulation and implementation of social engagement programs to promote global sustainability. Future research endeavors may employ enhanced iterations of analytical tools to conduct more comprehensive analyses of extensive data sets and obtain a broader spectrum of digital insights. In addition to the dichotomy of positive and negative, an in-depth understanding of particular issues, misconceptions, or areas of enthusiasm can serve as a valuable compass for enhancing communication and formulating effective policy measures. Today, where digital platforms serve as indicators of societal awareness, it is possible to develop approaches to engage various parties in alignment with the preferences and needs of the worldwide digital community. By comprehending the origins of discourse, the emergence of issues, and the dynamics of perception shifts, it becomes feasible to customize interventions, training programs, and innovative approaches that will effectively engage the global community. In the context of the ongoing renewable energy revolution, engaging in conscious and democratic dialogue assumes a pivotal role in shaping a sustainable and collaborative future.

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