DIGITALES ARCHIV

Chygryn, Olena; Kuzior, Aleksandra; Olefirenko, Oleg et al.

Article

Green Brand as a New Pattern of Energy-Efficient Consumption

Marketing i menedžment innovacij

Provided in Cooperation with:
ZBW OAS

This Version is available at:
http://hdl.handle.net/11159/12838

Leibniz-Informationszentrum Wirtschaft
Leibniz Information Centre for Economics

Mitglied der
Leibniz-Gemeinschaft

GREEN BRAND AS A NEW PATTERN OF ENERGY-EFFICIENT CONSUMPTION

Olena Chygryn, https://orcid.org/0000-0002-4007-3728
Dr.Sc., Sumy State University, Ukraine
Aleksandra Kuzior, https://orcid.org/0000-0001-9764-5320
Ph.D., Silesian University of Technology, Poland
Oleg Olefirenko, https://orcid.org/0000-0002-6214-4590
Dr.Sc., Sumy State University, Ukraine
Jan Uzik, https://orcid.org/0000-0001-6678-2285
The University of Economics in Bratislava, Slovakia
Corresponding author: Olena Chygryn, o.chygryn@econ.sumdu.edu.ua
Type of manuscript: research paper

Abstract: *In the conditions of the spread of globalization processes, growing interdependence, and interconnectedness of countries, a significant intensification of the academic society efforts to ensure national energy security and independence is necessary. The purpose of the paper is to provide a systematic review of the scientific environment aimed at analysing the contents and features of scientific publications dealing with new trends and patterns in sustainable energy consumption. In order to create a semantic and definition basis and research the main trends of scientific publications on the subject of developing energy efficiency and sustainable consumption, the paper carried out a bibliometric analysis concerning the categories «energy efficient» and «energy consumption» using the Scopus and VOSviewer tools. The main question is, what are the main scientific and research trends and patterns in the field of energy efficiency and sustainable consumption? For this purpose, the quantity and quality tendencies of the scientific articles which are studying issues connected with energy efficiency and sustainable consumer behaviour were determined. A sample of more than 24000 scientific publications on this issue was generated from publications indexed by the Scopus database. The study period covers 2001-2021. On the global level, the analysed investigated area is represented by the countries: China, the USA, and India. VOS viewer tools were used to systemize 5 clusters of scientific articles that analysed sustainable energy consumption from different points of view. Identification of regularities in the developing of scientific approaches to energy-efficient consumption and developing sustainable energy sector was carried out using bibliometric analysis, which has made it possible to describe the dominant retrospective evolutionary and temporal tendencies in the development of this theory concerning the concepts of sustainable development, environmental management, and development of renewables. As a result, one of the most significant trends is a green brand and tendencies connected with developing green marketing and green consumer awareness.*
Keywords: energy efficient, sustainable consumption, green marketing, green brand.
JEL Classification: O30, Q41, Q42

Cite as: Chygryn, O., Kuzior, A., Olefirenko, O., & Uzik, J. (2022). Green Brand as a New Pattern of Energy-Efficient Consumption. *Marketing and Management of Innovations*, 3, 78-87. https://doi.org/10.21272/mmi.2022.3-07

Introduction. In the modern world, most social and economic activities (population, business, public sector) require energy. According to the forecast of the International Energy Agency (IEA, 2021), by 2040, the consumption of energy recourses will increase by another 30% due to a significant increase in energy demand, especially in developing countries. At the same time, the European Union has remained the leading centre of energy efficiency implementation. Energy supply primarily comes from non-renewable energy sources, most of which are concentrated in several geographic areas. It makes the global energy system vulnerable to short-term shocks (such as conflicts and war aggression in energy supplier countries), but even more so in the long term due to possible supply and demand imbalances. Therefore, energy efficiency is a critically important tool to reduce the pressure on the energy supply system, supporting national security and developing the countries' green brands (Us et al., 2021). At the same time, the green brand creates the opportunity to attract additional investment for countries and support a positive green image, which determines the preconditions for countries' sustainable development in the future. Simultaneously, the negative environmental consequences of increased energy consumption are obvious. According to different approaches, energy efficiency is one of the effective ways to decrease the consumption of various energy resources and emissions of greenhouse gas and other substances, therefore preserving the environment, improving health and people's quality of life (Burghard et al., 2022; Yelnikova et al., 2020). Large-scale implementation of energy efficiency requires not only the availability of technological, organizational, and financial components for the implementation of projects but also a balanced and transparent system of relations between key subjects of the energy market and the development of the basic principles of energy-efficient behaviour of all stakeholders of the energy market (Ziabina et al., 2021). Investigations of the modern tendencies and patterns require determining the less studied ways and approaches, looking at energy-efficient consumption in various contextual conditions. The purpose of the paper is to provide a complex exploration of the scientific environment targeted to analyse the contents and features of scientific publications connected with new trends and patterns in sustainable consumption of energy resources.

Literature Review. Sustainable energy consumption is one of the key drivers of developing efficient processes in the energy sphere of the national economy and strengthening the countries' energy security (George, 2020; Lyeonov et al., 2018; Samusevych et al., 2021; Bhowmik, 2019). The modern world requires the gradual abandonment of fossil fuels and the transition to renewable energy sources. Therefore, it is necessary to form a system of strategic actions detailing resource opportunities, substantiating the importance of greening the energy sector to ensure the economic growth of the country and the formation of a favourable business environment both at the state and regional levels and the level of individual energy consumers. The implementation of the selected measures should form a sustainable economic system oriented toward the provision «green» vector for the development of the national economy (Sahoo, 2017; Us et al., 2020). The authors of one of the most cited articles about the development of smart technologies in the energy sector (Enokido et al., 2010) emphasize that smart computing systems and non-hierarchical systems of exchange, transfer, or transmission of energy are now becoming popular. They provide more effective total energy consumption and throughput than traditional systems. Indian scientists (Piparsania et al., 2023) noted that in their country, there is the fastest growth in domestic energy use due to spreading access to energy resources and the widening of non-effective energy-using equipment. In deciding on such a problem, they proposed to develop green building technologies and increase environmental awareness.

The academic community has made huge progress in determining and describing the mechanisms and principles of developing a wide range of sustainable practices on the national economy and company levels (Khalatur et al., 2022; Sedmíkova et al., 2021). Thus, El Amri et al. (2020) investigated the influence of managerial decisions, pricing in the energy sphere, and environmental changes on the dynamic of carbon prices as liquid carbon assets. Lyulyov et al. (2021) systemized the pros and cons of the global cooperation role in mitigating and adapting to climate change and its influences. The authors emphasize that renewables development is a result of spreading the processes of democracy and globalization. Considering the conclusions by Pimonenko et al. (2021), which noticed that today the global environmental situation and the problems of climate change and exhaustion of natural resources are now discussed on all international levels. Simultaneously, many scientific publications are now paid to the role of sustainable banking and green financing in promoting a green climate-neutral future. (Rahim et al., 2016) evaluated the performance of the environmental energy management system, which was implemented on the principles of optimization and natural heuristic algorithms. Also, for evaluating energy pricing, the combined model was used. Ziabina et al. (2020) formalized the interconnection between the indicators of domestic energy efficiency from the wide set of social, environmental, financial, and economic indicators of the development of national economics. Using

multiple correlation-regression analyses, the main ways to decide the problems of the low rates of energy efficiency projects and programs and the promotion of carbon emission on a global level were identified. Kolosok et al. (2022) systemized the EU experience and noticed that smart transformation energy infrastructure oriented to the principles of implementation of renewables is quite important for decreasing GHG pollution and boosting the production of energy with environment-neutral technologies. Starchenko et al. (2021) checked the hypothesis of the relationship between the system of green organizational systems and development companies' sustainable branding, which was represented by indicators of loyalty to sustainable green brands and companies' net profit. The author concluded that enterprises with developed ecomanagement had a higher indicators value.

A significant cluster of scientific publications is devoted to the tendencies of developing renewables. Kolosok et al. (2021) determined the modern trends in the investigation development of renewables, sustainable development, and environmental economics. The authors noticed that the main research in this field focuses on the managerial decisions, energy security, economic efficiency, and reliability of implementing innovative project elements in supporting sustainable energy systems and programs. Vasylieva et al. (2020, 2021) suggested modern ways to improve the economic and environmental efficiency indicators of the energy management domestic system of the national economy. The set of scientists emphasized that implementing innovative energy management has to consider countries' commitments and requirements to transition to a carbon-neutral way of providing economic activity and mitigating climate change. On the base of Shepard's analysis was concluded that, at first, this is a result of the processes of the global economic and financial crisis and the straightening of war actions and conflicts. Second, the increasing dynamics of the energy used, and as a result, growing efficiency gaps, bring to an unbalanced situation in export processes of primary energy resources. Many scientific papers are devoted to investigating the behavioural trends in energy consumption. Vasudevan and Aslan (2022) proved that a constructive and effective organizational climate is a visible value that improves companies' working environment, internal communications, leaders-followers relationships, and employees' social behaviour. Vakulenko et al. (2021) studied the cooperation of stakeholders in the initiation, development, design, and construction of renewable energy projects. In the investigation process for studying the essence and features of stakeholders' communications, the system matrix was created, which explains the nature and outcomes of the processes of interconnections in the sustainable energy sector. Kyrychenko et al. (2021) emphasized that academic institutions in the world are promoting creating sustainable awareness in society and represent the progressive ways of solving complicated problems in the sphere of environmental economics and green society development. In turn, Letunovska et al. (2021) determined the domestic population's relevant consumer and behavioural patterns in supporting health care policy and developing green tendencies in nutrition. Nevertheless, the issues connected with the basic trends of sustainable energy consumption remain insufficiently researched and determined the key categories in the system of energy-efficient management. The present study aims to address what core scientific trends and social patterns are now relevant in energy efficiency and sustainable consumption.

Methodology and research methods. The investigated issues connected with energy efficiency and sustainable consumption were published in the leading journals chosen based on Scopus CiteScore System (Table 1).

Table 1. The TOP-10 Journals based on Scopus CiteScore 2021

Journal Title	CiteScore	SNIP	SJR
Science	57,8	9,116	14,859
Renewable and Sustainable Energy Reviews	28,5	4,535	3,678
IEEE Communications Magazine	24,6	3,542	5,146
IEEE Transactions on Wireless Communications	15,7	2,321	4,436
Energy and Buildings	11,5	2,069	1,682
Internet of Things (Netherlands)	10,2	2,105	1,607
IEEE Systems Journal	9,7	1,81	1,543
Ad Hoc Networks	9,5	1,557	1,397
Computer Communications	7,8	1,536	1,103
Computer	4,8	1,673	0,940

Sources: developed by the authors.

Selected scientific journals characterized by high-level CiteScore, that evaluate an average number of citations received per document. For the selected subject area, the highest CiteScore has the Science journal (CiteScore Rank – 57,8), established in 1883 by the American Association for the Advancement of Science. At the same time, SCImago Journal Rank determines the average level of citations obtained by the journal. They depend on the scientific sphere of interest, subject field, and prestige of the determined magazine. The science journal also has the highest level (SJR – 9,116). Besides this, Source Normalized Impact per Paper (SNIP) evaluates a relevant number of citations received relative to citations expected for the journal's scientific subject field. Besides this, Source Normalized Impact per Paper (SNIP) evaluates a relevant quantity of citations that correspond to the scientific journal's subject field. The Science magazine also has the highest SNIP Rank – 14,859. Such tendencies characterize the relevance of the selected scientific publications for investigation.

The represented bibliometric approach investigates the quantity and quality tendencies of the scientific articles that study issues connected with energy efficiency and sustainable consumer behaviour. These techniques are devoted to estimating and determining the target subject areas in developing sustainable energy practices and creating green consumer awareness. They provide an opportunity to systemize and structure scientific papers on the main areas of investigation. Besides, EViews software was employed to create bibliometric maps, based on network data from Scopus base, that describe the tendencies in co-citation and co-occurrence analysis.

Results. The tendencies of scientific studies conducted on recent patterns of energy-efficient consumption and practices were analysed considering the terminological basis. Figure 1 provides information on the number of scientific papers published from 2000 till 2021 about energy efficient consumption in Scopus base. The Scopus analytics tools could review more than 24900 papers from the scientific base and analyse the trend and patterns of publication from a different point of view: by authors, affiliation, subject area, type of documents, countries, funding organization, etc.

Figure 1 shows a significant increase compared to 2000 to a peak of 2138 articles in 2021. The five times increasing academic curiosity confirms the change in the global energy consumption trend, especially in developed countries.

Figure 1. Dynamic of scientific publications per year
Sources: developed by the authors.

That is also justified by cross countries representation (Figure 2a, b). Analysing the macro geographical level where the appropriate investigations were represented (Figure 2a), the results describe a significant number of scientific research on sustainable energy consumption in Europe (7860). Zooming in, China shows the predominant number of studies (23% of investigations), the second place by United States (16% of investigations) and India (15% of investigations).

As shown in the analysis results, many studies discussed green energy management practices, renewables, green technologies, recycling, waste reduction, environment-neutral transportation, and an environmental economy. Also, many studies dealt with energy consumption patterns, investigating the habits and roots, energy service quality, and attractiveness of renewable and eco-friendly energy products. The next most investigated issue of papers investigating modern consumers' behaviour and attitude toward green energy is

the realization of environmentally friendly approaches in different levels of economic activity (smart energy, digitalization of the energy sector of the national economy).
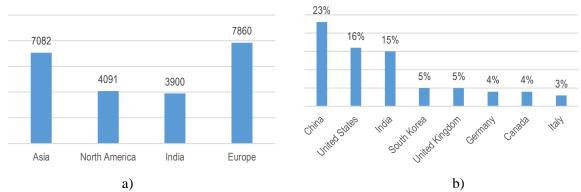

a)   b)

Figure 2. The structure of scientific publications by (a) macro level and (b) distribution among the countries

Sources: developed by the authors.

The significant unit of analysis was the subject areas in energy-efficient consumption (Table 2).

Table 2. Segmentation of papers by subject area of scientific investigation

Subject Area	% of Papers
Computer Science	31,6%
Engineering	29,8%
Mathematics	7,5%
Energy	5,9%
Environmental Science	4,1%
Materials Science	3,6%
Physics and Astronomy	3,5%
Social Sciences	2,6%

Sources: developed by the authors.

The Computer Science and Engineering sector was the centre of more than 61% of analysed scientific investigations. At the same time, the other part of the papers was widely represented among the other subject areas.

Table 3 shows that publications on the topic of energy-efficient using mainly funded by the National Natural Science Foundation of China (9% of papers), Fundamental Research Funds for the Central Universities, China (3% of papers), and the European Commission (2% of papers each).

Table 3. Summary of funding sponsors

Institution	Number of Papers
National Natural Science Foundation of China	2131
National Science Foundation, USA	660
Fundamental Research Funds for the Central Universities, China	385
European Commission	366
National Research Foundation of Korea	328
National Key Research and Development Program of China	314
Ministry of Education of the People's Republic of China	237
Horizon 2020 Framework Programme	203

Sources: developed by the authors.

The other academic institutions and organizations represented inferior numbers of analysed papers. Considering results explain that a significant number of scientific publications investigate a wide range of methods and approaches for developing intelligent energy systems and models, which will allow investigating the tendencies of digital technologies for reducing energy consumption in smart transmission systems and distributing energy. Such tendencies are appropriate with the most high-cited papers (Table 4). Many studies

investigated specific intelligent practices – such as wireless sensor networks (Boyinbode et al., 2010) and system-on-chip designs with integrated solutions for increasing energy consumption performance and efficiency (Benini and De Micheli, 2002). Also, the papers of Japanese scientists are popularizing devoted to the intelligent cloud computing model and model of smart generation, transmission, and distribution, which will evaluate the total energy consumption compared with results achieved in the realization of cyclic algorithms (Enokido et al., 2010).

In addition, a significant number of the high-cited scientific publications accounted for the ecological dimension of green energy consumption, overlooking managerial, economic, and social factors.

Table 4. The most-cited papers

Title	Author (s)	Journal Title	Year of publication	Number of Citation
Networks on chips: A new SoC paradigm	Benini L., De Micheli G.	Computer	2002	2929
Exploiting heuristic algorithms to utilize energy management controllers with renewable energy sources efficiently	Rahim S., Javaid N., Ahmad A., Alrajeh N., Qasim, U.	Energy and Buildings	2016	209
A model for reducing power consumption in peer-to-peer systems	Enokido T., Aikebaier A., Takizawa M.	IEEE Systems Journal	2010	197
A survey on clustering algorithms for wireless sensor networks	Boyinbode O., Le H., Mbogho A., Takizawa M., Poliah R.	Proceedings - 13th International Conference on Network-Based Information Systems	2010	180
An energy-efficient model for fog computing in the Internet of Things (IoT)	Oma R., Nakamura S., Duolikun D., Enokido T., Takizawa M.	Internet of Things (Netherlands)	2018	75

Sources: developed by the authors.

Although scientific investigations in this field are mostly related to the technological and environmental aspects, cues from the descriptive analysis of the papers suggest that the administrative and social perspectives of sustainable energy consumption are also recently taking hold.

Table 5 represents the highly cited authors whose academic publications are devoted to sustainable energy consumption.
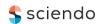
Table 5. The most-cited authors

Author (s)	Country	Number of Citation	H-index
Leung Victor C.M.	Canada	34183	87
Benini Luca	Switzerland	33788	82
Javaid Nadeem	Pakistan	12398	52
Takizawa Makoto	Japan	6296	35
Enokido Tomoya	Japan	3785	29

Sources: developed by the authors.

The findings showed that Leung Victor (87 citations), Benini Luca, (82 citations), and Javaid Nadeem (52 citations) have the biggest number of citations of articles published since 2010.

The Scopus tools analytics allowed analysing the most significant institutions that had funded the scientific research in sustainable energy consumption. Among them are such powerful academic institutions as the National Natural Science Foundation of China, Fundamental Research Funds for the Central Universities (China), European Commission, National Research Foundation of Korea, National Key Research and Development Program of China, Ministry of Education of the People's Republic of China, Seventh Framework Programme (EU), Horizon 2020 Framework Programme.

The citation analysis provided with the VOSviewer 1.6.13 tools detected the biggest clusters of research teams that significantly influence the development of the theory of sustainable energy consumption (Figure 3).
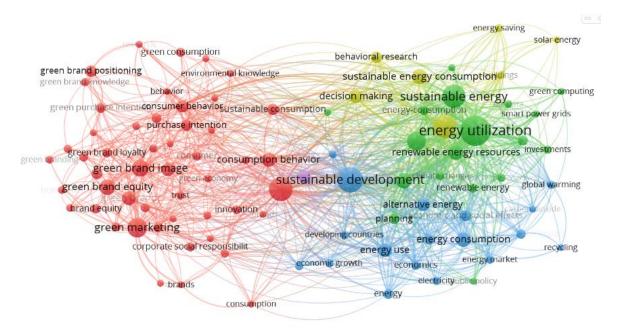
Figure 3. The results of the co-citation analysis of the environment of an energy efficiency consumption

Sources: developed by the authors.

Figure 3 shows that most studies focused on sustainable energy practices and green brand positioning, including sustainable energy consumption, renewable energy, recycling technologies, waste reduction, sustainable energy transportation, and a circular economy. Besides, several studies dealt with energy consumption patterns and green marketing, investigating the habits and roots, environmental knowledge, and attractiveness of renewable and eco-friendly energy products.

The analysis of a co-citation revealed the most authoritative scientific researchers as well as the 5 big clusters of research teams that had the greatest influence on the development of the theories of energy efficient consumption (Figure 3). The biggest red cluster includes the categories (more than 50 items) connected with sustainable development and green branding: green brand, green brand trust, green advertising, green brand knowledge, green image, brand loyalty, green consumption, green economy, green products, green trust, green satisfaction, greenwashing, environmental concerns, corporate social responsibility, etc. The significant green cluster is chained with energy utilization. It contains the next categories: sustainable energy, circular economy, energy consumption, smart power grids, effects, energy saving, energy performance, greenhouse gases, green computing, solar energy, renewable energy resources, etc. The next cluster describes the tendencies in the energy sector and includes such categories: energy use, energy market, alternative energy, recycling, economic growth, etc. The trends in Figure 3 describe the new pattern in sustainable energy consumption, including the new pattern – a green branding.

Figure 4 illustrates the results of the co-occurrence analysis of the main keywords devoted to energy-efficient consumption.

The co-occurrence analysis of the main keywords devoted to energy-efficient consumption also represented the huge new tendency that characterizes the green brand development for 2018-2020 years. Noteworthy here that before the appearance of such a tendency, a significant number of scientific publications were devoted to green marketing and developing the green consumer behaviour.

At the same time, the analysed tendency is the opposite of co-citation trends. In this case, two publications will be bibliographically couple if both previous publications cite the third publication. The higher coupling degree indicates a more significant number of citations common among the two target documents. The leaders, in this case, are India, China, USA. Such a tendency indicates the high number of countries' scientific publications used in other countries for investigations and writing articles devoted to sustainable energy consumption. Thus, in the first biggest cluster are the Chinese publications cited by scientists from Algeria, Belgium, Brazil, Canada, Chile, Denmark, Finland, France, Italy, Morocco, Netherlands, Nigeria, Portugal, Spain, Switzerland, and Thailand. The next significant cluster was created by Indian publications cited by Bangladesh, Egypt, Germany, Ghana, Hungary, India, Iraq, Oman, Serbia, Slovakia, South Africa, Tunisia, and Ukraine.
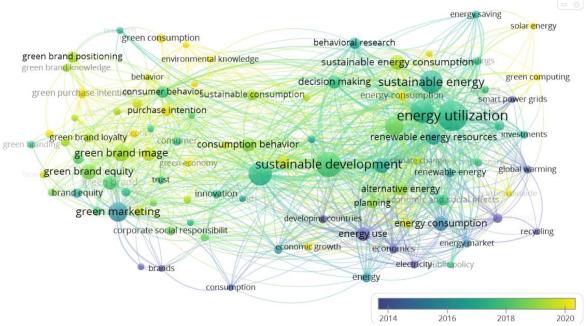
Figure 4. The results of the co-occurrence analysis of the main keywords devoted to energy-efficient consumption

Sources: developed by the authors.

Conclusions. Ensuring the competitiveness of the national economy is one of the most urgent tasks in ensuring the sustainable economic development of the state. At the same time, in the conditions of the spread of globalization processes, growing interdependence and interconnectedness, and Russia's military aggression, a significant intensification of the state's efforts to ensure national security and independence is necessary. In this context, considerable attention from countries and regions of the world is focused on energy resources as one of the most important components of ensuring sustainable development and economic and energy and, in a certain way, competitiveness of the national economy. In turn, increasing the efficiency of the functioning of the energy sector of the national economy is impossible without the formation of environmentally aware behaviour of all subjects of economic activity.

Identification of regularities in the developing of scientific approaches to energy-efficient consumption and developing sustainable energy sector was carried out using bibliometric (VOSviewer and Scopus tools analytics) analysis, which has made it possible to describe the dominant retrospective evolutionary and temporal tendencies in the development of this theory concerning the concepts of sustainable development, environmental management, and development of renewables.

Author Contributions: conceptualization, O. C., A. K., O. O., and J. U.; methodology, O. C., A. K., O. O., and J. U.; software, O. C., A. K., O. O., and J. U.; validation, O. C., A. K., O. O., and J. U.; formal analysis, O. C., A. K., O. O., and J. U.; investigation, O. C., A. K., O. O., and J. U.; resources, O. C., A. K., O. O., and J. U.; data curation, O. C., A. K., O. O., and J. U.; writing-original draft preparation, O. C., A. K., O. O., and J. U.; writing-review and editing, O. C., A. K., O. O., and J. U.; visualization, O. C., A. K., O. O., and J. U.; supervision, O. C., A. K., O. O., and J. U.; project administration, O. C., A. K., O. O., and J. U.; funding acquisition, O. C., A. K., O. O., and J. U.

Conflicts of Interest: Authors declare no conflict of interest.
Data Availability Statement: Not applicable.
Informed Consent Statement: Not applicable.

References

Benini, L., & De Micheli, G. (2002). Networks on chips: A new SoC paradigm. *Computer, 35*(1), 70-78. [Google Scholar] [CrossRef]

Bhowmik, D. (2019). Decoupling CO2 Emissions in Nordic countries: Panel Data Analysis. *SocioEconomic Challenges*, 3(2), 15-30. [Google Scholar] [CrossRef]

Boyinbode, O., Le, H., Mbogho, A., Takizawa, M., & Poliah, R. (2010). A survey on clustering algorithms for wireless sensor networks. Paper presented at the *Proceedings - 13th International Conference on Network-Based Information Systems, NBiS 2010,* 358-364. [CrossRef]

Burghard, U., Dütschke, E., Caldes, N., & Oltra, C. (2022). Cross-border concentrated solar power projects - opportunity or dead end? A study into actor views in Europe. *Energy Policy,* 163, 112833. [Google Scholar] [CrossRef]

El Amri, A., Boutti, R., Oulfarsi, S., Rodhain, F., & Bouzahir, B. (2020). Carbon financial markets underlying climate risk management, pricing and forecasting: Fundamental analysis. *Financial Markets, Institutions and Risks*, 4(4), 31-44. [Google Scholar] [CrossRef]

Enokido, T., Aikebaier, A., & Takizawa, M. (2010). A model for reducing power consumption in peer-to-peer systems. *IEEE Systems Journal, 4*(2), 221-229. [Google Scholar] [CrossRef]

George, B. (2020). Inclusive Sustainable Development in the Caribbean Region: Social Capital and the Creation of Competitive Advantage in Tourism Networks. *Business Ethics and Leadership*, 4(3), 119-126. [Google Scholar] [CrossRef]

IEA (2022). Ensuring the uninterrupted availability of energy sources at an affordable price. Retrieved from [Link]

Khalatur, S., & Dubovych, O. (2022). Financial Engineering of Green Finance as an Element of Environmental Innovation Management. *Marketing and Management of Innovations*, 1, 232-246. [Google Scholar] [CrossRef]

Kolosok, S., Bilan, Y., Vasylieva, T., Wojciechowski, A., & Morawski, M. (2021). A scoping review of renewable energy, sustainability and the environment. *Energies*, 14(15). [Google Scholar] [CrossRef]

Kolosok, S., Saher, L., Kovalenko, Y., & Delibasic, M. (2022). Renewable Energy and Energy Innovations: Examining Relationships Using Markov Switching Regression Model. Marketing and Management of Innovations, 2, 151-160. [Google Scholar] [CrossRef]

Kyrychenko, K., Laznenko, D., & Reshetniak, Ya. (2021). Green University as an Element of Forming a Sustainable Public Health System. *Health Economics and Management Review*, 2(4), 21-26. [Google Scholar] [CrossRef]

Letunovska, N., Yashkina, O., Saher, L., Alkhashrami, F. A., & Nikitin, Yu. (2021). Analysis of the model of consumer behavior in the healthy products segment as a perspective for the inclusive marketing development. *Marketing and Management of Innovations*, 4, 20-35. [Google Scholar] [CrossRef]

Lyeonov, S. V., Vasylieva, T. A., & Lyulyov, O. V. (2018). Macroeconomic stability evaluation in countries of lower-middle income economies. *Naukovyi Visnyk Natsionalnoho Hirnychoho Universytetu*, (1), 138-146. [Google Scholar]

Lyulyov, O., Pimonenko, T., Kwilinski, A., & Us, Y. (2021). The heterogeneous effect of democracy, economic and political globalisation on renewable energy. Paper presented at the *E3S Web of Conferences, 250*. [Google Scholar]

Pimonenko, T., Us, Ya., Myroshnychenko, Yu., Dubyna, O., & Vasylyna, T. (2021). Green Financing for Carbon-Free Growth: Role of Banks Marketing Strategy. *Financial Markets, Institutions and Risks*, 5(3), 71-78. [Google Scholar] [CrossRef]

Piparsania, K., & Kalita, P. (2023). Overview of Multi-Stakeholder Approaches and Initiatives for Achieving Sustainable Development in the Residential Sector. In *Industry 4.0 and Advanced Manufacturing* (pp. 327-343). Springer, Singapore. [Google Scholar] [CrossRef]

Rahim, S., Javaid, N., Ahmad, A., Khan, S. A., Khan, Z. A., Alrajeh, N., & Qasim, U. (2016). Exploiting heuristic algorithms to efficiently utilize energy management controllers with renewable energy sources. *Energy and Buildings*, *129*, 452-470. [Google Scholar] [CrossRef]

Sahoo, K. K. (2017). Transform of Ethical Practices in Globalized Economy, a Special Focus on Ghana. *Business Ethics and Leadershi*p, 1(4), 58-65. [Google Scholar]

Samusevych, Y., Maroušek, J., Kuzmenko, O., Streimikis, J., & Vysochyna, A. (2021). Environmental taxes in ensuring national security: A structural optimization model. *Journal of International Studies*, 14(2), 292-312. [Google Scholar]

Sedmíková, E., Vasylieva, T., Tiutiunyk, I., & Navickas, M. (2021). Energy consumption in assessment of shadow economy. *European Journal of Interdisciplinary Studies*, 13(2), 47-64. [Google Scholar]

Starchenko, L., Lyeonov, S., Vasylieva, T., Pimonenko, T., & Lyulyov, O. (2021). Environmental management and green brand for sustainable entrepreneurship. In *E3S Web of Conferences* (Vol. 234, p. 00015). EDP Sciences. [Google Scholar] [CrossRef]

Us, Y., Pimonenko, T., & Lyulyov, O. (2021). Energy efficiency profiles in developing the free-carbon economy: On the example of Ukraine and the V4 countries. *Polityka Energetyczna, 23*(4), 49-66. [Google Scholar] [CrossRef]

Us, Ya., Pimonenko, T., Tambovceva, T., & Segers, J-P. (2020). Green transformations in the healthcare system: the covid-19 impact. *Health Economics and Management Review*, 1(1), 48-59. [Google Scholar] [CrossRef]

Vakulenko, I., Saher, L., Syhyda, L., Kolosok, S., & Yevdokymova, A. (2021). The first step in removing communication and organizational barriers to stakeholders' interaction in smart grids: A theoretical approach. In *E3S Web of Conferences* (Vol. 234, p. 00020). EDP Sciences. [Google Scholar] [CrossRef]

Vasudevan, H., & Aslan, I. (2022). Developing Organizational Citizenship Behaviour: Organizational Climate and Leader-Member Exchange Effects. *Marketing and Management of Innovations*, 1, 94-107. [Google Scholar] [CrossRef]

Vasylieva, T., Jurgilewicz, O., Poliakh, S., Tvaronavičienė, M., & Hydzik P. (2020). Problems of measuring country's financial security. *Journal of International Studies*, 13(2), 329-346. [Google Scholar]

Vasylieva, T., Pavlyk, V., Bilan, Y., Mentel, G., & Rabe, M. (2021). Assessment of energy efficiency gaps: The case for Ukraine. *Energies*, *14*(5), 1323. [Google Scholar] [CrossRef]

Yelnikova, J., & Barhaq, A. R. (2020). Transparency of responsible investment environment. *Business Ethics and Leadership*, *4*(4), 68-75. [Google Scholar] [CrossRef]

Ziabina, Ye., & Kovalenko, Ye. (2021). Regularities In The Development Of The Theory Of Energy Efficiency Management. *SocioEconomic Challenges*, 5(1), 117-132. [Google Scholar] [CrossRef]

Ziabina, Ye., Pimonenko, T., & Starchenko, L. (2020). Energy Efficiency of National Economy: Social, Economic And Ecological Indicators. *SocioEconomic Challenges*, 4(4), 160-174. [Google Scholar] [CrossRef]

Олена Чигрин, д.е.н., Сумський державний університет, Україна
Александра Кужур, Ph.D., Сілезійський технологічний університет, Польща
Олег Олефіренко, д.е.н.*,* Сумський державний університет, Україна
Ян Юзік, Економічний університет в Братиславі, Словакія

Зелений бренд як новий патерн енергоефективного споживання

В умовах поширення процесів глобалізації, зростання взаємозалежності та взаємопов'язаності країн необхідна значна активізація зусиль наукового суспільства щодо забезпечення національної енергетичної безпеки та незалежності. Метою статті є систематичний огляд наукового середовища з метою аналізу змісту та особливостей наукових публікацій, присвячених новим тенденціям і закономірностям сталого енергоспоживання. З метою створення змістової та дефініційної основи та дослідження основних тенденцій наукових публікацій на тему розвитку енергоефективності та сталого споживання в роботі проведено бібліометричний аналіз категорій «енергоефективність» та «енергоспоживання» з використанням інструментів Scopus та VOSViewer. Головне питання полягає у визначенні основних науково-дослідницьких тенденцій та закономірностей у сфері енергоефективності та сталого споживання. Для цього було проаналізовано кількісні та якісні тенденції наукових статей, які досліджують проблеми, пов'язані з енергоефективністю та сталою поведінкою споживачів. Сформовано вибірку з понад 24000 наукових статей з даної проблеми за період з 2001 по 2021 рр. з публікацій, що індексуються наукометричною базою даних Scopus. На глобальному рівні значна кількість наукових публікацій належить Китаю, США та Індії. У роботі систематизовано 5 кластерів наукових статей, які досліджували стале споживання енергії з різних точок зору. Виявлення закономірностей у розвитку наукових підходів до енергоефективного споживання та розвитку сталого енергетичного сектору здійснено за допомогою бібліометричного аналізу, що дозволило описати домінуючі ретроспективні еволюційні та часові тенденції у розвитку теорії щодо концепції сталого розвитку, екологічного менеджменту та розвитку відновлюваних джерел енергії. Як наслідок, одним із найбільш значущих трендів є зелений бренд і тенденції, пов'язані з розвитком зеленого маркетингу та екологічної обізнаності споживачів.

Ключові слова: енергоефективний, стале споживання, зелений маркетинг, зелений бренд.