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## 1. Introduction

This editorial paper presents a brief review of the 11 selected papers recently published: nine from *Energies* and two from other journals, and their citations are compared. It is observed that *Energies* citations in the total 9 papers were 272, with an average of above 30 citations per paper, apart from one paper ([1], cited 49 times). The citation review of these papers is tabulated at the end of the paper in Table 1, with descriptive statistics in Table 2, whereas a bar chart is also presented to demonstrate citation distribution. In the next section, we present a brief review on our selected papers, in which we note that two papers from other journals are also being reviewed due to topic alignment in the area. The final section contains some concluding remarks.

Table 1. Number of Citations.

S.N	Reference Number	Citations
1	[2]	33
2	[3]	30
3	[4]	15
4	[5]	18
5	[6]	10
6	[1]	49
7	[7]	21
8	[8]	48
9	[9]	48
	Total citations	272
	Average per paper	30





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Mean	30.2
Median	30
Mode	48
Standard Deviation	15.3
Coefficient of Variation	0.51
Kurtosis	-1.75
Skewness	0.16
Range	39
Minimum	10
Maximum	49
Sum	272
Count	9

Table 2. Descriptive Stats of Citations of Energies.

## 2. Brief Review

The global move towards controlling environmental degradation by accomplishing higher economic development has prompted economies all over the world to research, scheme, and implement environmentally-friendly policies for meeting the sustainable development challenges. The budding challenges focus on the environmental costs of higher real-output growth from energy use, rapidly evolving energy production/consumption patterns, globalization, the COVID-19 pandemic, lack of sustainable economic support, environmentally-friendly technologies, and human capital requirements, etc. Not only emerging, but also developed, economies need to fathom more sustainable economic development policies for advocating investment in technologies and environmentally-friendly preferences towards economic development. Here, we bring together the articles that scrutinized shreds of evidence from empirical studies, based on the strong theoretical grounds which aimed at policy-oriented issues of energy economics in the times of mushrooming economic growth post-COVID-19 and post-Ukraine–Russian war. The journal Energies has received exceedingly influential and highly cited research articles from various stakeholders globally in the past two years. Beginning in 2020, eight articles that were published within the broad themes of "Environmental degradation from energy use" and "Environmentfriendly Breakthrough Technologies" can be found at: http://www.mdpi.com, accessed on 2 August 2022. For all other articles related to *Energies*, the journal can be accessed free of charge as it is an open access journal: https://www.mdpi.com/journal/energies, accessed on 2 August 2022.

We will begin first with the highly effective and cited paper on this topic authored by [9]. The paper discusses the role of structural changes, such as improving industrial structures and infrastructure, in BRICs (Brazil, Russia, India, China, and South Africa) that have resulted in vicious economic growth at the cost of upholding their energy production and demand. The urge to make per-capita GDP (gross domestic product) reach the turning point of the Kuznets curve has added additional gravity to the course of amassed production costs and encouraged renewable energy consumption. In this emergent framework, investments in structural industry reforms for cleaner energy production, cultivating citizen consciousness, and increasing human capital levels need the implementation of significant environment-sustainable strategies. From a policy-making perspective, it suggests establishing alliances to acquire support from developed countries to meet the challenge of budding energy demand and finding alternative clean energy for production. In the same regional context of BRICs, another very interesting contribution was made by [7]. They attempt to fill the research gap by understanding the dynamic (rather than only static) effects of foreign capital inflows on renewable energy and non-renewable consumption. This study carries significant importance as it suggests policymakers take precautionary measures in their energy consumption patterns and restructure effective green economic strategies. Another contributed paper in the same vein is by [6]. Their model predicts the implications of energy consumption in BRICs and compares aggregate and disaggregate

levels from ARIMA (Autoregressive integrated moving average), the Diebold-Mariano test, and FGM(1, 1) (Frictional grey modeling) techniques. Overall, the empirical assessment reveals that if the number of observations is sufficiently large, models such as ARIMA and FGM have more predictive power in energy consumption forecasting. The study is significant in terms of its methodological contribution to energy economics while drawing sample data from the same emerging economies of BRICs. They also offer new insights to the policymakers to follow SDGs concerning energy policy by also keeping their output growth level rising. This implies a steady structural change toward renewable energy technologies.

Ref. [1] observe the associations between renewable and nuclear energy consumption, carbon dioxide emissions, and economic growth in the specific case of Spain. Knowing that intensifying the use of nuclear energy consumption can lead to a significant decrease in carbon dioxide emissions is of crucial interest to policymakers. From a policy-formulation outlook, it demands key changes in legislation on reducing environmental degradation and further highlights that green energy (alone) is deficient to mitigate the environmental challenges. The fifth paper on this issue, by [2], assesses the impact of globalization, renewable energy consumption, and technological innovation on carbon dioxide emissions in the context of the eighth biggest emitter (2019) in South Korea. Unlike the traditional observation of the Environmental Kuznets Curve (EKC) hypothesis, they stress the essential role of globalization and technological innovations in affecting carbon emissions. Implications from their analysis are significant to policymakers in the context of designing an effective strategy to cut back emissions and minimize their reliance on nonrenewable sources of energy.

On the same grounds, ref. [8] provide effective practices in cutting down non-renewable energy consumption by using advanced technology such as information and communication technology (ICT) solutions, which are precisely centered on the COVID-19 pandemic that has enormously led to a drop-down effect in energy consumption. This subject is imperative because, over the past two years, economists have been greatly fretful about declining global economic output and unexpected environmental degradation amid the COVID-19 crisis. The solution requires the development of renewable energy to achieve sustainable development. The seventh paper on this theme by [5] is about the effects of oil prices on renewable energy consumption in Russia. This study relatively succeeds at finding the negative impacts of oil prices and carbon dioxide emissions, and the positive impact of incomes on renewable energy consumption. Insights from their empirical analysis provide strong evidence for implementing the projects that extend the use of renewable energy sources and enactment of incentive policies such as land allocation, tax relief, low interest, and long-term credit facilities in the case of oil-exporting countries.

In "Does Foreign Direct Investment Influence Renewable Energy Consumption? Empirical Evidence from South Asian Countries", ref. [4] find a significantly negative nexus between FDI (foreign direct investment) and renewable energy, and a strong and favorable relationship between GDP and renewable energy use in South Asian nations comprising Pakistan, Bangladesh, India, and Sri Lanka. The paper then puts forward their policy suggestions for reducing the reliance on perilous energy sources and encouraging the financial sectors to play a part in the efficient use of renewable energy. The last article, "Empirical Research on the Relationship amongst Renewable Energy Consumption, Economic Growth and Foreign Direct Investment in Kazakhstan and Uzbekistan", is authored by [3]. They examine the associations between foreign direct investment, economic growth, and renewable energy consumption in the case of Kazakhstan and Uzbekistan. Overall, the empirical assessment reveals the existence of two-way linkages between foreign direct investment and renewable energy consumption, as well as the existence of co-integration between these two series. It offers new insights to policymakers by suggesting re-strategizing the energy-environment policy, which can play the eminent role of a growth-generating engine to stimulate the production process.

There are two further interesting papers, though not published in *Energies*, but which are worth considering in this review. We begin with [10], who explore the implications of

financial development with environment-related technologies, research, and development, and how energy intensity, renewable energy production and natural resource depletion can achieve a target of sustainability in Canada. The paper employs a dynamic ARDL model on Canadian data between 1989 to 2020. The results show that environment-related technologies in Canada help to reduce environmental degradation both in the short run and in the long run. The paper suggests that to achieve a sustainable environment, Canada needs to improve innovations in environment-related technologies for achieving sustainable growth and a friendly environment. A recent review on the subject is given by [11], which noted some of the important papers with average annual higher citation rates that are published in *Energies*. A rough estimate is that other competitive journals have lower annual citation averages, even considering these two papers with extreme citations, putting their average below 28.

In a nutshell, the above reasoning for policy implications in the cited scholarly work favors a strategic approach to re-design sustainable economic growth policies—one that includes the collective use of renewable energy sources, through structural changes in key sectors of production and a breakthrough shift towards environmentally-friendly technologies exhibiting increasing output growth returns. Such a goal may not be as easy a target as perceived. If focused, it would indeed be cost-effective from socio-economic perspectives, but in the usual sense of the term, would require gradual shifts. The price that emerging economies would have to pay can be mitigated by acquiring support from greater co-operation among developed and developing economies. In a developing world, characterized by technological lock-in with growth at the expense of environmental degradation, policymakers would require extra insights from research studies, as mentioned above, in deciding the best newly available technologies, simply because of the costs signal for environmental damages are right. The need to shift energy use to renewable sources without compromising economic growth is more desirable than ever before. The above literature has demonstrated that it greatly depends on the extent to which the environmentallyfriendly technology will be diffused and continuously used, and much more than its intrinsic determinants alone. Certainly, the reason for gathering high citations on the above articles is because they collectively address the currently relevant issue while suggesting the development of breakthrough clean energy technologies and provide policy solutions targeted at environment protection regulations toward global sustainable development.

## 3. Concluding Remarks

This editorial paper presents a brief review of the selected recently published papers on the topic of environmentally-friendly degradations of technologies development, which are new breakthroughs around energy saving and cost economizing. It demonstrates that, due to open-access citation, the average citations in the *Energies* journal is higher than other competitive journals.

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