

A Research on the Importance of Renewable Energy: The Case of the Next-11

Başak Gül Akar¹

Abstract

Reducing carbon dioxide emissions to protect the climate is essential for environmental sustainability. In this context, it is clear that protecting the environment is a matter of global concern under the motto of ‘a better future for everyone’. The Next-11 countries form an exemplary group expected to share this sensitivity. This is because it is intriguing to see what contributions they will make as newly industrialised and emerging economies. Being evaluated within this category may also imply their involvement in the issue of environmental pollution. Additionally, it is important to consider the environmental footprint these eleven countries leave through renewable energy sources, which are highlighted as one of the most vital solutions to this problem and serve as good examples of globalization. Therefore, the study aims to examine the current situation of the Next-11 group of countries and their outlook towards the future within the triangle of globalization, environmental impacts, and renewable energy.

Introduction

The annual increase in global energy demand and its associated environmental impacts play a vital role in large-scale sustainable and green global energy transformation. To achieve this, renewable energy technologies provide an excellent opportunity to cut greenhouse gas emissions and prevent global warming by replacing traditional energy sources. A key advantage of renewable energy sources is that they have considerably less environmental impact than fossil fuels, especially during their operational phase. Moreover, it is necessary to consider renewable energy sources, support technological advances, and promote sustainable practices. These actions are crucial to

1 Assoc.Prof.Dr., Çukurova University, the Faculty of Kozan Business Administration, bgakar@cu.edu.tr. ORCID ID: <https://orcid.org/0000-0001-7258-4402>

managing the effects of globalisation and fostering sustainable development (Sayed et al., 2021; Hundie et al., 2025).

The shift to renewable energy has been prompted by numerous global crises, including worsening climate change, rapidly increasing fossil fuel prices, macroeconomic instability, health issues, and an urgent energy crisis. Simultaneously, the contribution of rising energy demand to environmental pollution has underscored the importance and necessity of clean energy sources. In this context, considering that the Next-11 countries, created by Goldman Sachs using indicators such as macroeconomic stability, political maturity, market openness, investment policies, and education quality as criteria, are also similar in terms of population (Lawson et al., 2007), the energy agenda for this group must be closely monitored. These countries, which are poised to become the main drivers of the global economy and are among the world's fastest-growing economies, have experienced ongoing deterioration in environmental conditions despite their economic progress (Murshed et al., 2022). Kongbuamai et al. (2023) highlight that most of the Next-11 countries are developing economies in the early stages of technological advancement, and they find that these groups of 11 countries are environmentally burdensome relative to their economic orientation. Furthermore, land use in these countries is largely dominated by the primary agricultural sector, which conflicts with biological capacity reserves. They also conclude that urbanisation has a negative impact on the ecological footprint, while the use of energy and information-processing technologies has a positive impact on the ecological footprint of these nations.

On the other hand, continuing sustainable development in the face of climate change and environmental degradation has resulted in a significant shift towards renewable energy sources. A reliable, affordable, and stable renewable energy source is expected to meet a large portion of future energy demands. The increased utilisation of various renewable energy sources is essential to fulfil the Paris Agreement² or achieve sustainable development goals. The environmental impacts of different renewable energy sources have garnered the attention of environmental experts since their inception. Renewable technologies are regarded as clean energy sources, and their optimal utilisation reduces environmental impacts, produces minimal

2 Under the Paris Agreement, the Parties, recognizing that climate change is a common concern of humankind, shall take measures to combat climate change while respecting respect, promote, and take into account their obligations regarding human rights, the right to health, the rights of indigenous peoples, local communities, migrants, children, persons with disabilities, and vulnerable persons, as well as the right to development, gender equality, the empowerment of women, and intergenerational equity (UN, 2015).

secondary waste, and remains sustainable according to current and future economic and social needs (Gayen et al., 2024; Sebestyén, 2021; Panwar et al., 2011). Idroes et al. (2024) also stated in their study that implementing sustainable development policies aimed at decoupling economic growth from carbon dioxide (CO₂) emissions is crucial. They recommend policies encouraging the manufacturing sector to transition to cleaner production methods and technologies through tax incentives, subsidies, or grants for businesses adopting sustainable practices and investing in environmentally friendly technologies, emphasising that promoting green industries is of vital importance.

The study by Girlovan et al. (2025) is noteworthy in that it introduces the adoption of renewable energy as a key driver of sustainability that effectively reduces the environmental impacts of globalisation, examining the issue within the context of the relationship between globalisation and the environment. Similarly, Nadiri et al. (2024) emphasise that carbon taxes, eco-innovation, renewable energy, and globalisation contribute to slowing environmental degradation and that economic progress plays a role in reducing environmental sustainability issues. A common point between these two studies is that European Union (EU) countries serve as examples when assessed in terms of their level of development. Furthermore, Nadiri et al. (2024) reveal that despite being highly developed, EU member countries face unprecedented environmental problems, demonstrating that despite their economic success, many nations struggle to protect their environmental assets.

In this context, it is important to examine the issue of renewable energy in relation to globalisation and environmental impacts, and to consider the situation in Next-11 countries, which are less developed economies, while recognising that this is the case in developed countries.

Renewable Energy: Reviewing Its Global Importance and Environmental Impacts

Gayen et al. (2024) clearly demonstrated the importance of renewable energy sources in their study, which included a graphical summary.

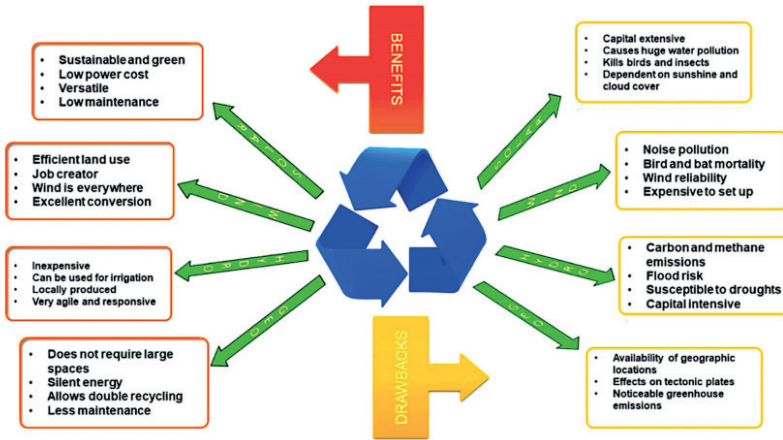
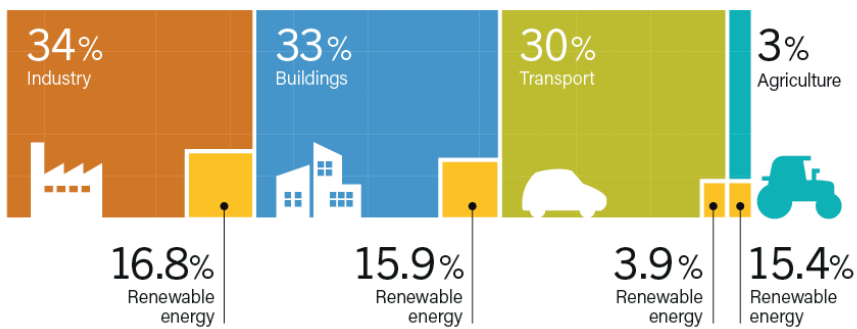


Figure 1. An overview of the environmental impacts of renewable energy for sustainable development

Source: Gayen and Roy (2023)

Gayen and Roy (2023) assert that renewable energy technologies provide numerous environmental advantages, such as lowering greenhouse gas emissions, enhancing air quality, and reducing reliance on finite fossil fuel resources, as shown in Figure 1. These advantages support long-term sustainability. However, the shift to renewable energy faces several challenges. Intermittent production, energy storage issues, and resource availability are obstacles that need technological advancements and effective policy interventions. The equilibrium between environmental conservation and renewable energy development must be carefully managed. Well-designed policies and regulations are essential to optimise the environmental benefits of renewable energy. Sebestyén (2021) indicates that the effects of wind turbines on flying animals are significant, that hydroelectric plants mainly alter flow conditions, that geothermal plants are notably disruptive in terms of noise and hydrothermal disturbances, that solar plants have considerable visual and land impacts, and that biomass plants' effects are largely linked to harvesting activities. The analysis reveals that the most critical environmental impacts are, respectively, ice fall in wind power, changes in river flow regimes in hydroelectric, noise in geothermal, erosion caused by panels in solar, and harvesting scale in biomass power plants. Since the impacts of biomass plants largely depend on their performance expectations, this renewable energy source has the lowest potential for reducing harmful effects.

As shown in Figure 2, statistics from the Renewables 2024 Global Status Report by Ren(21) show that renewable energy and heat are utilized in all sectors including buildings, industry, agriculture, and transport. On a final consumption demand sector basis, renewable energy sources as a proportion of total final consumption for 2021 range from a high of 16.8% for industry to a low of 3.9% for transport. Such differences not only describe the individual character of each sector but also signal the lack of harmonized policies for raising the proportion of renewable energy both across sectors and within them.



Note: Total final energy consumption in the Figure-2 does not account to military activity and energy use elsewhere specified.

Figure 2. Renewable Share of Total Final Energy Consumption, by Sector (2021)

Source: REN(21) Renewables 2024 Global Status Report-Energy Demand

Considering these indicators alongside the findings of the study by Saqib and Radulescu (2025), it should be emphasised that while green growth initiatives and renewable energy use reduce the ecological footprint, industrialisation and globalisation increase it. The finding that combining renewable energy use with industrialisation or globalisation reduces their environmental impacts, especially over time, should be highlighted. In this context, the idea that Research and Development (R&D) projects promoting green growth and aiming to improve the use of renewable energy should be heavily allocated, particularly within the framework of 'Newly Industrialising Countries', should be considered an important policy step. Again, for Bangladesh, one of the Next-11 countries within this group, a study conducted by Ruan et al. (2025) shows a statistically significant long-term link between green growth strategies and carbon emissions.

Nevertheless, economic growth is a major factor contributing to the increase in emissions, highlighting the trade-offs between environmental protection and development. It is clear that lawmakers in Bangladesh and other developing countries seeking to incorporate renewable energy into their development plans should take these findings into account. Simultaneously, Zhang et al. (2025) specify the environmental benefits of renewable energy utilization in their study of developing countries and show that it reduces carbon emission considerably within global value chains. The study, which finds that digitalisation counteracts the negative impact of renewable energy on carbon emissions as a key result, also confirms that the environmental advantages of renewable energy cannot be fully realised in environments where digital infrastructure draws significantly on fossil fuels. In the present day and age of digitization, this finding highlights the imperative of harmonizing digital strategy with green energy policy for optimizing the aggregate environmental effectiveness of world value chains.

Chen et al. (2025) reveal that renewable energy significantly reduces carbon emissions across all segments, while globalization, energy intensity, and Gross Domestic Product (GDP) increase emissions in different areas, balancing economic growth and showing that this situation presents a complex challenge for environmental sustainability. Although the study conducted for the seven developed countries provides evidence of this complex structure, it has become essential to investigate the issue for the Next-11 group of countries as well, because these countries also form a newly industrialised group, which prompts questions about whether they are at an advantage or disadvantage concerning renewable energy, globalisation, and environmental impacts. Indeed, the income-based classification analysis in the study by Maftoon et al. (2025) highlights diverse effects, indicating that high-income countries benefit more from green technologies and renewable energy sources, while low-income countries face structural constraints that limit their environmental improvements. These findings offer critical insights for policymakers and emphasise the need for sustainability strategies tailored to specific stages of economic development. Nguyen et al. (2025) conclude that in developed countries, economic growth functions as an intermediary in the link between energy consumption and ecological footprint, with both renewable and non-renewable energy having notable impacts, whereas in developing countries, promoting energy consumption may help reduce ecological degradation resulting from access to green energy and modern technologies.

A Discussion on Opportunities and Risks for the Next-11 Countries

The expansion of economic activities in developed and developing countries has raised two major concerns. These are the rapid depletion of non-renewable energy sources caused by continuous consumption and the impacts of global warming driven by greenhouse gas emissions such as carbon dioxide and methane. In this context, the 1997 Kyoto Protocol³ served as a platform for initiatives aimed at reducing emission rates caused by fossil fuels, requiring industrialised countries to cut their greenhouse gas emissions, particularly CO₂ emissions. Looking at the economies of the Next-11 countries, it is notable that various energy improvement programmes — essential for sustainable development — have been launched. These countries are leading emerging markets worldwide and enjoy higher economic growth rates than others, but this rapid expansion is increasingly harming environmental conditions through excessive energy consumption. From this perspective, it is vital to assess the Next-11 countries' current performance on climate change and energy use, considering their policies on environmental sustainability. The Next-11 countries are responsible for nearly half (45%) of all carbon emissions. This is significant because they rely heavily on capital-intensive energies and are a key focus group regarding renewable energy and economic growth. Since enhancing energy efficiency in these countries helps reduce CO₂ emissions both directly and indirectly through regulatory and intermediary effects, it is essential first to identify the sources of energy inefficiency in both production and consumption channels. Regarding inefficiencies in production processes, diversifying the primary energy inputs used for electricity generation is important. In this context, replacing less efficient energy sources with relatively more efficient alternatives could represent an important energy policy reform for these countries (Muhammed and Ubandawaki, 2024; Yang et al., 2022; Khan et al., 2022).

Murshed (2024)'s study, covering the period 1996-2021, states that research conducted outside Nigeria shows that the remaining Next-11 countries are heavily dependent on fossil fuels to achieve their economic

3 The Kyoto Protocol, adopted on 11 December 1997 and entering into force on 16 February 2005 after complex ratification, now has 192 parties. It strengthens the UN Framework Convention on Climate Change by requiring industrialised and transition economies to reduce greenhouse gas emissions to agreed targets. While the Convention urges countries to develop policies and report, the Protocol binds only developed nations, emphasising their greater responsibility for high GHG levels through the principle of 'common but differentiated responsibilities and respective capabilities,' recognising their primary role in current emissions (UNFCCC, 2025).

production targets. They observe that greening economic growth in these rapidly developing nations, especially by ensuring that the rate of economic output exceeds the increase in CO₂ emissions, has become a vital concern for their governments. Primarily, Next-11 countries, particularly upper-middle-income nations trailing behind lower-middle-income ones, should implement policies that expedite the shift to renewable energy, enabling clean energy to replace polluting sources in these countries.

More importantly, as determined by Sun et al. (2023), evidence from studies conducted between 1990 and 2018 indicates that financial investments aimed at improving human development and institutional quality are necessary to reduce the ecological footprint. Furthermore, emphasis on sustainable use of resources is put forth to ensure long-term natural resource availability and minimize ecological footprint. At the same time, fighting income inequality is needed to ensure sustainable use of the environment and for long-term ecological sustainability. In addition, Sun et al. (2023) also put forward an interesting recommendation that policymakers give high priority to policies of enhancing human capital in the form of quality education and training programs fostering environmental awareness and competency in sustainability. Such policies, which could include practices like the incorporation of environmental education into the curriculums of schools, promoting vocational training for green industries, and providing lifelong learning opportunities related to environmental management, offer the potential for a more sustainable future with increased involvement.

One possible way to encourage energy consumers to switch to renewable energy is to develop positive policies in collaboration with private financial institutions. These policies could include reducing subsidies for non-renewable energy while offering easy credit for adopting renewable energy sources, such as solar power, by commercial and residential users. Furthermore, it is advised that Next-11 countries adopt carbon pricing mechanisms (Qin et al., 2021). As demonstrated in the study conducted by Sultana and colleagues (2023) from 1990 to 2019 for the Next-11 countries, governments should also support green investments that significantly reduce carbon emissions from production processes. Reducing dependence on non-renewable energy sources is essential to meet energy demands. To maintain a clean and safe environment, policymakers should establish regulations to limit the use of fossil fuels in their countries' manufacturing sectors. Existing policies should be updated and replaced with new ones to fulfil the objectives of the Kyoto Protocol. Additionally, a broader effort is needed to raise public awareness about the importance of planting trees. Since plants absorb a large portion

of atmospheric carbon dioxide, the indiscriminate cutting of trees must be halted.

On the other hand, as understood from the research by Huang et al. (2024), covering the period 1990-2020, a moderate policy is necessary for the Next-11 economies, which are overly dependent on oil revenues to ensure long-term fiscal expansion. Economic diversification from its oil dependence must be the top agenda. The governments can invest revenues raised from oil taxation in infrastructure, education, and other non-oil sectors that will render the overall economy stronger. Further, investment in green technology and alternative energies can improve the Next-11 economies' long-term financial growth potential by creating new avenues for economic growth while reducing environmental risks. Essentially, Next-11 economies can achieve environmental sustainability and economic growth through striking a balance between sustainable energy and foreign investment attraction, thereby supporting their long-run financial development ambitions.

Addai et al. (2024), in their study examining the ecological footprint of Next-11 countries from 1990 to 2022, found that economic growth generally harms the environment, but increased use of renewable energy can mitigate this if institutional quality supports environmentally friendly outcomes. Renewable energy consumption helps reduce the ecological footprint, and institutional quality enhances sustainability by lowering it. However, the economic growth of these countries continues to depend on non-renewable resources such as coal and natural gas, which worsen environmental problems. To address this, governments should invest more in renewable energy and increase its share in the energy mix. This shift can promote growth without damaging the environment, particularly through public-private partnerships and policies aimed at improving corporate responsibility. As indicated in the study conducted by Fachrurrozi et al. (2022) using data from 1984 to 2013, which supports these recommendations, cooperation among the Next-11 countries should be strengthened for economic growth, energy consumption, and the continuation of globalization.. In particular, because globalisation plays a role in boosting economic growth and encouraging energy consumption, these countries should continue to foster cooperation. This is essential not only to sustain economic growth but also to develop and share environmentally friendly technologies and to transition from fossil fuels to renewable energy for future economic stability and sustainability.

The findings of Wang et al. (2022), based on data from 1990 to 2018, also show that environmental regulations significantly reduce the ecological footprint, while economic growth increases the ecological footprint in

Next-11 countries. Additionally, democratic quality, renewable energy consumption, and globalisation are factors that contribute to environmental quality. Therefore, this research highlights the importance of enhancing democratic accountability in Next-11 countries and its political significance. Moving in this direction will also support the development of effective environmental policies. Such policies will increase renewable energy use, ultimately leading to improved environmental quality.

In this context, Tezcan (2024) aims to assess the performance of the Next-11 countries in terms of energy use and climate change from 2010 to 2022. According to the results obtained, Bangladesh, the Philippines, and Egypt received the top three scores, while Mexico, Indonesia, and Iran received the lowest three scores. In 2022, Nigeria replaces Mexico in this group. It is observed that the performance scores of the countries either remained the same or increased slightly over the years. This situation suggests that reaching the 2030 targets will be challenging.

Additionally, Li and colleagues (2023), based on their analysis over the 2001-2018 years emphasized the importance of Next-11 countries establishing a regional network that systematically monitors green certificates, sustainability scores, and financed projects, given the high level of economic policy uncertainty they experienced. This will minimize every country's government's political power and support long-term projects without the intervention of the government. Conversely, the conservation of natural resources is also important for the mitigation of climate change. In this respect, governments can impose green taxes on energy-consuming sectors with a view to promoting the use of renewable energy sources as alternatives. Similarly, the imposition of appropriate pricing mechanisms on fossil fuels will also lead consumers to renewables. Governments are also advised to allocate more funds towards the purchase of advanced machines and training staff for efficient exploration. This will reduce waste formation and lower carbon emission during extraction.

In recent years, as biomass energy has become one of the world's important renewable energy sources, the research conducted by Nosheen and Khan (2022) covering the period 1990-2019 has also stood out among policy recommendations with this different perspective. Accordingly, it has been found that an increase in biomass energy use in Next-11 countries tends to have a positive impact on economic growth. To address the issue of global warming, these countries need to enhance their technological developments and innovations and improve their utilisation of biomass energy. Since the use of biomass energy tends to raise income levels, economic strategies

focused on enhancing the supply and structure of biomass energy are suitable options for these economies.

Ibrahiem et al. (2024), based on their analysis of the period 1990-2021 for the Next-11 countries, state that renewable energy managers must comply with the Paris Agreement in order to combat global warming and increase their efforts. They suggest revisiting the “Energy Trinity” (energy equity, security, and sustainability) and addressing other challenges based on the “Energy Trinity” index during the post-carbon transition period. Since energy security impacts health, education, and the environment, policymakers should diversify energy sources by supporting cost-effective renewable options and promoting green investments, flexible credits, tax breaks, or technical training. Interregional cooperation is crucial for trade between energy-poor and energy-rich nations. Technologies such as renewable sources and green hydrogen are essential for sustainability. Countries should encourage high-tech companies by streamlining their economies, reducing reliance on fossil fuels, and decreasing environmental pressures. The negative relationship between complexity and renewable energy sources should guide policies toward more efficient and environmentally friendly energy solutions.

Research conducted by Murshed et al. (2022) using data from 2004 to 2020 for the Next-11 group of countries shows that improvements in energy efficiency and increased renewable energy consumption reduce carbon dioxide emissions, but making the financial system more inclusive tends to raise emission levels... More importantly, it has been observed that energy efficiency gains and financial inclusivity together lower countries’ carbon dioxide emission figures. Therefore, it can be argued that more efficient energy use can offset the negative environmental effects of financial inclusivity to some extent. Furthermore, although higher economic growth, greater participation in international trade, and urbanisation have been associated with increased carbon dioxide emissions in these countries, higher renewable energy use has been found to reduce emission levels. Heterogeneous country-specific results have also been observed.

Conclusion

Charles Dickens writes in *A Tale of Two Cities*:

“It was the best of times, it was the worst of times, it was the age of wisdom, it was the age of foolishness, it was the epoch of belief, it was the epoch of incredulity, it was the season of Light, it was the season of Darkness, it was the spring of hope, it was the winter of despair, we had

everything before us, we had nothing before us, we were all going direct to Heaven, we were all going direct the other way.”

These words, penned in the 19th century, sometimes make me feel pessimistically that we are still in the same place on the energy issue, despite the high rates of non-renewable energy consumption in the first quarter of the 21st century. The Next-11 countries, with their struggles in this area, serve as morale boosters for both the group they represent and the underdeveloped nations that follow them. Perhaps the most fundamental and profound political proposal is to set an example. To achieve this, we need to start with the smallest unit. For instance, by raising children at home, by showing students at school, employees at work, and citizens in parks and nature how not to harm the environment. While the role of major energy policies cannot be underestimated, people must first breathe life into their communities and breathe new vitality into them.

Therefore, to help these eleven promising nations navigate the difficult, environmentally damaging growth process smoothly, the prioritisation of clean energy sources in public and private projects should be integrated into each country's institutions to establish a sustainable energy framework. When formulating policies, it is crucial to correctly prioritise whether to focus on people, living beings, or nature. More importantly, should the focus be on clean people, living beings, or nature? To accomplish this, renewable resources should be provided first, but prior to that, essential training should be given on how we should utilise our resources and how we can contribute to their sustainability, alongside measures to ensure their ongoing existence.

References

- Addai, G., Amegavi, G. B., & Robinson, G. (2024). Advancing environmental sustainability: The dynamic relationship between renewable energy, institutional quality, and ecological footprint in the N-11 countries. *Sustainable Development*, 32(6), 7397–7408. <https://doi.org/10.1002/sd.3096>
- Chen, H., Zhang, L., Pinzon, S., Chen, H., & Chen, B. (2025). Decarbonizing the G7: Renewable energy, economic growth, globalization, and policy Pathways to sustainability. *Renewable Energy*, 244, 122671. <https://doi.org/10.1016/j.renene.2025.122671>.
- Fachrurrozi K, Masbar R, Aliasuddin, Seftarita C. Energy-growth-globalization (EGG) nexus in N-11 countries. *Heliyon*, Sep 6;8(9):e10522. doi: 10.1016/j.heliyon.2022.e10522.
- Gayen, D., Chatterjee, R., & Roy, S. (2023). A review on environmental impacts of renewable energy for sustainable development. *International Journal of Environmental Science and Technology*, <https://doi.org/10.1007/s13762-023-05380-z>
- Girlovan, A., Tudor, C., Saiu, G.R., & Guse, D.D. (2025). Exploring the impact of globalization and economic-energy dynamics on environmental sustainability in the EU. *Global Transitions*, 7, 41-55. <https://doi.org/10.1016/j.glt.2024.12.002>.
- Goldman Sachs (2007). *BEYOND THE BRICS: A LOOK AT THE NEXT 11*(PDF) (İngilizce). Goldman Sachs. 1 Nisan 2007. s. 161. 1
- Huang, H., Cheng, X., Wei, L., Liu, D., & Deng, M. (2024). Are natural resources a driving force for financial development or a curse for the economy? Policy insight from Next-11 countries. *Resources Policy*, 88, 104466. <https://doi.org/10.1016/j.resourpol.2023.104466>.
- Hundie, S.K., Abdisa, L.T., Legas, H.A., Shumetic, A., & Alemayehu, F.K. (2025). Globalization and environmental sustainability in Ethiopia: Assessing the impact of economic factors and resource management. *Journal of Cleaner Production*, 519, 145886. <https://doi.org/10.1016/j.jclepro.2025.145886>.
- Ibrahiem, D.M., Houssam, N., Esily, R.R., Sethi, N., & Fouad, H. (2024). Modelling energy trilemma and economic growth on renewables in N11 economies: Do economic complexity matter? *Heliyon*, 10(17), e36937. <https://doi.org/10.1016/j.heliyon.2024.e36937>.
- Idroes, G.M., Rahman, H., Uddin, I., Hardi, I., & Falcone, P.M. (2024). Towards sustainable environment in North African countries: The role of military expenditure, renewable energy, tourism, manufacture, and globalization on environmental degradation. *Journal of Environmental Management*, 368, 122077. <https://doi.org/10.1016/j.jenvman.2024.122077>.

- Khan, S., Murshed, M., Ozturk, I., & Khudoykulov, K. (2022). The roles of energy efficiency improvement, renewable electricity production, and financial inclusion in stimulating environmental sustainability in the Next Eleven countries. *Renewable Energy*, 193, 1164-1176. <https://doi.org/10.1016/j.renene.2022.05.065>.
- Kongbuamai, N., Bui, Q., & Adedoyin, F.F. *et al.* (2023). Developing environmental policy framework for sustainable development in Next-11 countries: the impacts of information and communication technology and urbanization on the ecological footprint. *Environ Dev Sustain*, 25, 11307–11335. <https://doi.org/10.1007/s10668-022-02528-8>
- Li, T., Umar, M., Mirza, N., & Yue, X-G. (2023). Green financing and resources utilization: A story of N-11 economies in the climate change era. *Economic Analysis and Policy*, 78, 1174-1184. <https://doi.org/10.1016/j.eap.2023.05.007>.
- Lawson, S., Heacock, D., & Stupnytska, A. (2007). Beyond the BRICS: A look at the 'Next 11' in BRICs and beyond, Chapter Thirteen, 159-164, Goldman Sachs Global Economics Group.
- Maftoon, A.S., Shaheen, W.A., Razzaq, A., & Afzal, K. (2025). Navigating the Nexus: A dynamic analysis of green innovation, renewable energy, and productivity on global ecological footprints. *Sustainable Futures*, 10, 100991. <https://doi.org/10.1016/j.sfr.2025.100991>.
- Muhammed, I.A., & Ubandawaki, A.T. (2024). Renewable Energy and Economic Growth in “Next Eleven” Emerging Markets. In: Chen, L. (eds) *Advances in Clean Energy Systems and Technologies*. Green Energy and Technology. Springer, Cham. https://doi.org/10.1007/978-3-031-49787-2_22
- Murshed, M., Khan, U., Khan, A.M., & Ozturk, I. (2022). Can energy productivity gains harness the carbon dioxide-inhibiting agenda of the Next 11 countries? Implications for achieving sustainable development. *Sustainable Development*, 31:307–320. DOI: 10.1002/sd.2393
- Murshed, M. (2024). Can renewable energy transition drive green growth? The role of good governance in promoting carbon emission-adjusted economic growth in Next Eleven countries. *Innovation and Green Development*, 3(2), 100123. <https://doi.org/10.1016/j.igd.2023.100123>.
- Nadiri, A., Gündüz, V., & Adebayo, T.S. (2024). The role of financial and trade globalization in enhancing environmental sustainability: Evaluating the effectiveness of carbon taxation and renewable energy in EU member countries. *Borsa Istanbul Review*, 24(2), 235-247. <https://doi.org/10.1016/j.bir.2024.01.004>.
- Nguyen, T.T.H., Phan, G.Q, Pham, V.K., & Bui, M.H. (2025). The nexus of renewable, non-renewable energy and ecological footprint with mediating effects of economic development: Evidence from a global sample. Editor(s): Nicholas Apergis, *Encyclopedia of Monetary Policy, Financial Mar-*

- kets and Banking* (First Edition), Academic Press, 515-525. <https://doi.org/10.1016/B978-0-44-313776-1.00263-4>.
- Nosheen, M., & Khan, Z. (2022). Nexus between biomass energy and economic growth: evidence from the next eleven countries. *Environ Sci Pollut Res*, 29, 60823–60831. <https://doi.org/10.1007/s11356-022-19489-0>
- Qin, L., Malik, M.Y., Latif, K., Khan, Z., Siddiqui, A.W., Ali, S. (2021). The salience of carbon leakage for climate action planning: Evidence from the next eleven countries. *Sustainable Production and Consumption*, 27, 1064–1076. <https://doi.org/10.1016/j.spc.2021.02.019>.
- Panwar, N.L., Kaushik, S.C., & Kothari, S. (2011). Role of renewable energy sources in environmental protection: A review. *Renewable and Sustainable Energy Reviews*, 15, 1513–1524. doi:10.1016/j.rser.2010.11.037
- REN(21) Renewables 2024 Global Status Report-Energy Demand. <https://www.ren21.net/why-is-renewable-energy-important/> (20.07.2025)
- Ruan, Y., Wang, W., Abubakar, M., & Ahmad, N. (2025). Global economic resilience: Developing green growth strategies, renewable energy integration, and environmental economics for sustainability. *Renewable Energy*, 251, 123341. <https://doi.org/10.1016/j.renene.2025.123341>.
- Saqib, N., & Radulescu, M. (2025). Expectations of reversing the path of the climate change: How industrialization, green growth and renewable energy protect environmental sustainability in the era of globalization? Editor(s): Nicholas Apergis, *Encyclopedia of Monetary Policy, Financial Markets and Banking* (First Edition), Academic Press, 233-243. <https://doi.org/10.1016/B978-0-44-313776-1.00206-3>.
- Sayed, E.T., Wilberforce, T., Elsaid, K., Rabaia, M.K.H., Abdelkareem, M.A., Chae, K-J., & Olabi, A.G. (2021). A critical review on environmental impacts of renewable energy systems and mitigation strategies: Wind, hydro, biomass and geothermal. *Science of The Total Environment*, 766, 144505. <https://doi.org/10.1016/j.scitotenv.2020.144505>.
- Sebestyén, V. (2021). Renewable and Sustainable Energy Reviews: Environmental impact networks of renewable energy power plants. *Renewable and Sustainable Energy Reviews*, 151, 111626. <https://doi.org/10.1016/j.rser.2021.111626>.
- Sultana, T., Hossain, S., Voumik, L.C., & Raihan, A. (2023). Does globalization escalate the carbon emissions? Empirical evidence from selected next-11 countries. *Energy Reports*, 10, 86-98. <https://doi.org/10.1016/j.egy.2023.06.020>.
- Sun, Y., Tian, W., Mehmood, U., Zhang, X., & Tariq, S. (2023). How do natural resources, urbanization, and institutional quality meet with ecological footprints in the presence of income inequality and human capital in the

- next eleven countries? *Resources Policy*, 85 (Part A), 104007. <https://doi.org/10.1016/j.resourpol.2023.104007>.
- Tezcan, N. (2024). Performance analysis of the Next Eleven countries regarding climate change for the selected years. *Journal of Capital Markets Studies (JCMS)*, 8(2), 275-290. <https://doi.org/10.1108/JCMS-08-2024-0043>
- United Nations Climate Change-UNFCCC. (2025). The Kyoto Protocol, Process and meetings. <https://unfccc.int/process-and-meetings/the-kyoto-protocol> (05.07.2025).
- United Nations-UN. (2015). Paris Agreement. https://unfccc.int/sites/default/files/english_paris_agreement.pdf (02.07.2025).
- Wang, J.; You, S.; Agyekum, E.B.; Matasane, C.; Uhunamure, S.E. (2022). Exploring the Impacts of Renewable Energy, Environmental Regulations, and Democracy on Ecological Footprints in the Next Eleven Nations. *Sustainability*, 14, 11909. <https://doi.org/10.3390/su141911909>
- Yang, L., Zhou, X., & Feng, X. (2022). Renewable energy led Economic Growth Hypothesis: Evidence from novel panel methods for N-11 economies. *Renewable Energy*, 197, 790-797. <https://doi.org/10.1016/j.renene.2022.07.025>.
- Zhang, Y., Khan, N.U., Cai, H.H., Tang, S., & Bousrih, J. (2025). Sowing the seeds of sustainability: Digitalization, renewable energy, and carbon emissions in emerging economies' global value chains. *Journal of Environmental Management*, 393, 127119. <https://doi.org/10.1016/j.jenvman.2025.127119>.