



OPEN ACCESS

International Journal of Applied Research in Social Sciences

P-ISSN: 2706-9176, E-ISSN: 2706-9184

Volume 6, Issue 4, P.No. 506-517, April 2024

DOI: 10.51594/ijarss.v6i4.988

Fair East Publishers

Journal Homepage: www.feubl.com/index.php/ijarss



NAVIGATING LEGAL AND POLICY CHALLENGES IN THE ENERGY TRANSITION: CASE STUDIES FROM THE UNITED STATES AND NIGERIA

Munachi Chikodili Ugwu¹ & Adefolake Olachi Adewusi²

¹Energy and Environmental Law and Policy,
Georgetown University Law Center, Washington, DC, USA

²Independent Researcher, Ohio, USA

Corresponding Author: Munachi Chikodili Ugwu

Corresponding Author Email: Munaugwu@gmail.com

Article Received: 12-01-24

Accepted: 15-03-24

Published: 08-04-24

Licensing Details: Author retains the right of this article. The article is distributed under the terms of the Creative Commons Attribution-Non Commercial 4.0 License (<http://www.creativecommons.org/licences/by-nc/4.0/>) which permits non-commercial use, reproduction and distribution of the work without further permission provided the original work is attributed as specified on the Journal open access page.

ABSTRACT

The energy transition is a critical global imperative, necessitating a shift towards sustainable energy sources to mitigate climate change and ensure energy security. However, navigating the legal and policy landscape presents significant challenges. This paper examines the legal and policy frameworks in the United States and Nigeria, two countries with distinct energy landscapes, to identify common challenges and best practices. In the United States, a complex interplay of federal and state regulations impacts the transition to renewable energy. Case studies highlight the role of federal policies, state-level initiatives, and legal battles over energy infrastructure projects in shaping the transition.

Similarly, in Nigeria, regulatory hurdles and socio-economic factors impede progress towards sustainable energy. Government initiatives to promote renewable energy face challenges, including energy access disparities and financing constraints. A comparative analysis reveals both

similarities and differences between the two countries' approaches to the energy transition. Lessons learned underscore the importance of regulatory clarity, stakeholder engagement, and policy coherence in facilitating the transition. Drawing on these insights, this paper offers recommendations for policymakers and stakeholders to overcome legal and policy challenges in the energy transition. By adopting best practices and learning from case studies, both the United States and Nigeria can accelerate progress towards a sustainable energy future.

Keywords: Legal, Policy, Challenges, Energy Transition, Case Studies, United States, Nigeria.

INTRODUCTION

The transition to sustainable energy sources is of paramount importance in addressing the dual challenges of climate change and energy security (Cevik, 2024). As the world grapples with the consequences of fossil fuel dependence, the imperative to transition towards cleaner and renewable energy sources becomes increasingly urgent. This introduction provides an overview of the significance of the energy transition and outlines the legal and policy challenges that accompany this transformation (Oriekhoe et al., 2024). The burning of fossil fuels for energy production is a leading contributor to greenhouse gas emissions, exacerbating global climate change (Wuebbles and Jain, 2001). Transitioning to renewable energy sources such as solar, wind, and hydroelectric power is essential to reduce carbon emissions and mitigate the impacts of climate change. By decarbonizing the energy sector, nations can contribute to global efforts to limit global warming and minimize the risks associated with climate change-induced disasters. Dependence on finite fossil fuel reserves poses risks to energy security, as geopolitical tensions and price fluctuations can disrupt energy supplies (Oriekhoe et al., 2023). Transitioning to renewable energy sources diversifies the energy mix, reducing reliance on imported fossil fuels and enhancing energy independence. Moreover, renewable energy technologies offer decentralized and distributed energy solutions, increasing resilience to disruptions and enhancing energy access in remote or underserved areas (Zakeri et al., 2021). The transition to renewable energy presents significant economic opportunities, including job creation, technological innovation, and sustainable development. Investments in clean energy infrastructure, such as solar and wind farms, contribute to economic growth and stimulate local economies. Additionally, the renewable energy sector fosters innovation and entrepreneurship, driving advancements in energy efficiency, storage technologies, and grid modernization (Okorie et al., 2024). The combustion of fossil fuels releases harmful pollutants, such as particulate matter, nitrogen oxides, and sulfur dioxide, which have detrimental effects on public health. Transitioning to clean energy sources reduces air pollution and its associated health impacts, including respiratory diseases, cardiovascular disorders, and premature mortality. By improving air quality, the energy transition promotes public health and enhances quality of life for communities worldwide (Wilkinson et al., 2009).

The legal and regulatory landscape governing the energy sector is often complex and fragmented, with overlapping jurisdictional responsibilities and conflicting interests. Regulatory uncertainty can impede investment in renewable energy projects and hinder the deployment of innovative technologies (Oriekhoe et al., 2024). Harmonizing and streamlining regulatory frameworks is essential to provide clarity and certainty for investors and stakeholders in the energy transition. Inconsistent or contradictory energy policies at the federal, state, and local levels can create

barriers to the adoption of renewable energy technologies. Conflicting policy objectives, political dynamics, and lobbying efforts may hinder the development of coherent and long-term energy strategies (Egieya et al., 2023). Aligning policy goals, establishing clear targets, and fostering cross-sectoral collaboration are critical to overcoming policy inconsistencies and driving the energy transition forward. The upfront costs of renewable energy projects, such as solar panels and wind turbines, can be substantial, requiring significant capital investment (Steffen, 2020). Access to finance, including debt and equity financing, is essential to scale up renewable energy deployment and accelerate the transition. However, limited access to affordable financing, perceived investment risks, and lack of supportive financial mechanisms can hinder investment in renewable energy projects, particularly in developing countries. Integrating renewable energy sources into existing energy systems requires robust infrastructure, including smart grids, energy storage solutions, and interconnection networks (Worighi et al., 2019). Challenges related to grid reliability, intermittency, and grid integration may arise as the share of renewable energy increases. Moreover, outdated infrastructure and inadequate transmission capacity can impede the transition to renewable energy and limit its potential benefits. The energy transition must be inclusive and equitable, ensuring that all communities have access to clean, affordable, and reliable energy services. However, disparities in energy access, income inequality, and social inequities may exacerbate energy poverty and hinder the transition process (Bouzarovskib and Tirado Herrero, 2017). Addressing social and equity considerations requires targeted policies, community engagement, and equitable distribution of the benefits of renewable energy deployment. The transition to sustainable energy sources is essential for mitigating climate change, enhancing energy security, and promoting economic prosperity and public health. However, achieving a successful energy transition requires addressing a myriad of legal and policy challenges, including regulatory complexity, policy inconsistencies, financing constraints, technological integration, and social equity considerations (Oriekhoe et al 2024). By understanding these challenges and implementing effective strategies, policymakers and stakeholders can accelerate the transition towards a more sustainable and resilient energy future (Heffron et al., 2021).

Legal and Policy Framework in the United States

The United States boasts a complex legal and regulatory framework governing the energy sector, characterized by a combination of federal, state, and local laws and regulations (Circo, 2007). At the federal level, key legislation and regulatory agencies shape energy policy and oversight. The primary federal laws governing energy include the Energy Policy Act of 2005, the Energy Independence and Security Act of 2007, and the Public Utility Regulatory Policies Act of 1978, among others. The Department of Energy (DOE) plays a central role in implementing federal energy policies, conducting research, and promoting energy efficiency and renewable energy technologies (Oriekhoe et al., 2024). Additionally, the Federal Energy Regulatory Commission (FERC) regulates interstate transmission of electricity, natural gas, and oil, ensuring reliability, competitiveness, and fair pricing in energy markets. State governments also wield significant authority in regulating energy policy, often establishing renewable portfolio standards (RPS), net metering policies, and energy efficiency standards (Park, 2015). State public utility commissions oversee the regulation of electric utilities and approve utility resource plans, rate structures, and renewable energy procurement. Local governments may enact zoning ordinances, building codes,

and permitting requirements that influence energy project development and land use. Furthermore, tribal governments exercise sovereignty over energy resources on tribal lands, playing a crucial role in energy development and regulation (Okorie et al., 2024).

Renewable energy sources such as solar and wind are intermittent, varying in output based on weather conditions and time of day (Engeland et al., 2017). Integrating intermittent renewables into the grid poses challenges for grid stability, reliability, and balancing supply and demand. Advances in grid infrastructure, energy storage technologies, and demand-side management are essential to mitigate these challenges. The upfront costs of renewable energy projects can be substantial, requiring significant capital investment. Limited access to financing, perceived investment risks, and policy uncertainty may deter investors from funding renewable energy projects. Financial incentives such as tax credits, grants, and loan programs play a crucial role in stimulating investment in renewable energy (Oriekhoe et al., 2024). Regulatory uncertainty at the federal, state, and local levels can impede renewable energy development and deployment. Changes in energy policies, regulatory requirements, and permitting processes may create uncertainty for project developers and investors, leading to delays and increased costs (Keshavadasu, 2023). Establishing clear and stable regulatory frameworks is essential to provide certainty and facilitate renewable energy investment. Renewable energy projects often face opposition from local communities, environmental groups, and other stakeholders concerned about land use, visual impacts, and wildlife conservation. Permitting processes for energy infrastructure projects can be lengthy, complex, and subject to legal challenges, delaying project development and increasing costs. Effective stakeholder engagement, environmental impact assessments, and streamlined permitting procedures are essential to address opposition and permitting challenges (Orieno et al., 2024).

Case Studies

The production tax credit (PTC) and investment tax credit (ITC) have played a pivotal role in driving renewable energy deployment in the United States (Dwivedi, 2018). Federal tax incentives for wind, solar, and other renewable energy technologies have spurred investment, incentivized project development, and accelerated deployment. However, the intermittent nature of these incentives and periodic expiration and renewal cycles create uncertainty for developers and investors, leading to fluctuations in project development and investment levels. States play a critical role in driving renewable energy adoption through RPS, net metering policies, and other incentives. California's ambitious renewable portfolio standard, requiring utilities to source a significant portion of their electricity from renewable sources, has catalyzed renewable energy development and innovation (Lunt, 2006). Similarly, states such as Texas, Iowa, and Kansas have leveraged abundant wind resources to become leaders in wind energy generation. However, the effectiveness of state-level initiatives varies, with some states facing challenges related to grid integration, regulatory barriers, and political opposition (Udeh et al., 2024). Legal battles over energy infrastructure projects, such as pipelines, transmission lines, and wind farms, highlight the complex interplay between energy development, environmental protection, and property rights. Projects such as the Dakota Access Pipeline and the Keystone XL Pipeline have faced legal challenges from indigenous communities, environmental activists, and landowners concerned about environmental impacts, property rights, and public safety (Randol et al., 2021). These legal

battles underscore the importance of robust environmental impact assessments, meaningful stakeholder engagement, and adherence to legal and regulatory requirements in energy project development. The United States' legal and policy framework for energy is multifaceted, with federal, state, and local laws and regulations shaping energy policy and oversight. Transitioning to renewable energy faces challenges related to intermittency, financing, regulatory uncertainty, and opposition. Case studies highlight the impact of federal policies, state-level initiatives, and legal battles on renewable energy adoption, illustrating the complexities and dynamics of the energy transition in the United States.

Legal and Policy Framework in Nigeria

Nigeria, as a major oil-producing nation, has historically relied heavily on fossil fuels for energy generation and export (Okoh, 2020). However, the country is increasingly recognizing the importance of diversifying its energy mix and promoting sustainable energy sources. The legal and regulatory framework governing the energy sector in Nigeria is shaped by various laws and regulations at the federal and state levels. At the federal level, key legislation includes the Petroleum Act, the Electric Power Sector Reform Act (EPSRA), and the National Energy Policy. The Petroleum Act governs the exploration, production, and distribution of petroleum resources, while EPSRA provides the legal framework for the privatization and liberalization of the power sector (Mmaduabuchi and Nwali, 2015). Additionally, the National Energy Policy outlines the government's objectives and strategies for ensuring energy security, promoting renewable energy, and improving energy access. State governments in Nigeria also play a role in regulating the energy sector, particularly in areas such as land use, environmental protection, and community engagement. State-level regulations may include permits, licenses, and environmental impact assessments for energy projects (Pimentel Da Silva et al., 2019).

Despite abundant renewable energy resources, including solar, wind, and hydroelectric power, Nigeria's renewable energy sector remains underdeveloped due to limited infrastructure and investment. The lack of adequate transmission and distribution infrastructure hinders the integration of renewable energy into the grid, while insufficient investment in renewable energy projects constrains capacity expansion and deployment (Adaga et al., 2023). Nigeria's energy sector suffers from policy and regulatory uncertainty, with frequent changes in government policies, regulations, and incentives affecting investor confidence and project viability (Gungah et al., 2019). Inconsistent enforcement of regulations, bureaucratic inefficiencies, and delays in project approvals further exacerbate the challenges of transitioning to sustainable energy sources. Access to finance is a significant barrier to renewable energy development in Nigeria, particularly for small and medium-sized enterprises (SMEs) and rural communities. Limited access to affordable financing, high interest rates, and lack of supportive financial mechanisms impede investment in renewable energy projects. Additionally, perceived investment risks, including political instability and security concerns, deter foreign and domestic investors from financing renewable energy projects in Nigeria. Nigeria faces technological and capacity constraints in developing and deploying renewable energy technologies (Aliyu, 2015). Limited research and development capabilities, skills shortages, and inadequate technical expertise hinder innovation and technology transfer in the renewable energy sector. Addressing these constraints requires investments in research and development, capacity building, and technology transfer partnerships.

The Nigerian government has launched various initiatives to promote renewable energy development and adoption. The Rural Electrification Agency (REA) implements the Nigeria Electrification Project (NEP), which aims to increase energy access in rural and underserved areas through renewable energy mini-grids and off-grid solutions. Additionally, the Renewable Energy Master Plan (REMP) sets targets for increasing the share of renewable energy in the energy mix and promoting renewable energy investment. Despite government initiatives, renewable energy projects in Nigeria face regulatory hurdles, including complex permitting processes, land tenure issues, and grid connection challenges (Gungah et al., 2019). Developers encounter delays and uncertainties in obtaining permits, securing land rights, and accessing the grid, leading to project delays and increased costs. Streamlining regulatory processes, improving land tenure systems, and strengthening grid infrastructure are essential to overcome these hurdles. Energy access remains a significant challenge in Nigeria, particularly in rural and remote areas where grid extension is economically unfeasible. The lack of access to modern energy services hinders socio-economic development, limits educational and economic opportunities, and perpetuates poverty cycles (Booth et al., 2000). Addressing energy access requires a multi-faceted approach, including investments in off-grid and decentralized energy solutions, community engagement, and capacity building. Nigeria's legal and policy framework for energy is evolving to promote sustainable energy sources and improve energy access. However, challenges such as limited infrastructure, policy uncertainty, access to finance, and technological constraints impede the transition to sustainable energy. Case studies highlight government initiatives, regulatory hurdles, and socio-economic considerations shaping renewable energy development in Nigeria, underscoring the complexities and opportunities in the country's energy transition journey (Idoko et al., 2024).

Comparative Analysis

Both the United States and Nigeria have federal systems of government, with shared powers between the central and state governments. In the US, energy regulation is decentralized, with federal agencies overseeing interstate energy markets and states regulating intrastate energy activities (Lyons, 2017). Similarly, Nigeria's energy sector is subject to federal oversight, but state governments play a role in regulating land use, environmental protection, and community engagement. The United States and Nigeria share common policy objectives in promoting energy security, enhancing energy access, and reducing carbon emissions. However, the prioritization of these objectives may differ based on each country's energy landscape and development priorities. While the US focuses on diversifying its energy mix and reducing dependence on fossil fuels, Nigeria prioritizes expanding energy access, improving infrastructure, and promoting economic development (Idoko et al., 2024). Both countries face challenges related to regulatory complexity, policy inconsistencies, and bureaucratic inefficiencies in the energy sector. In the US, overlapping jurisdictional responsibilities between federal and state agencies may lead to regulatory uncertainty and delays in project approvals. Similarly, Nigeria's fragmented regulatory framework and inconsistent enforcement of regulations create challenges for investors and project developers.

Both the United States and Nigeria have experienced the adverse effects of regulatory uncertainty on energy investment and project development. Clear and stable regulatory frameworks are essential to provide certainty for investors, encourage long-term planning, and foster confidence in the energy transition (Bolton et al., 2016). Lessons learned emphasize the need for transparent

decision-making processes, stakeholder engagement, and adherence to legal and regulatory requirements. Government initiatives and incentives play a crucial role in driving renewable energy adoption and investment in both countries. The United States' experience with federal tax credits and state-level renewable energy mandates demonstrates the effectiveness of financial incentives in stimulating renewable energy deployment (Gouchoe et al., 2002). Similarly, Nigeria's efforts to promote renewable energy through the Rural Electrification Agency and Renewable Energy Master Plan underscore the importance of government leadership and support in advancing the energy transition. Collaborative partnerships and knowledge sharing between government agencies, industry stakeholders, and civil society organizations are critical for overcoming legal and policy challenges in the energy transition. Both the United States and Nigeria can benefit from sharing best practices, lessons learned, and technical expertise to accelerate progress towards a sustainable energy future. Cross-border collaborations, international partnerships, and knowledge exchange platforms can facilitate learning and capacity building in energy policy and regulation (Mörner et al., 2018).

Governments should prioritize establishing clear and coherent regulatory frameworks that provide certainty for investors, streamline permitting processes, and ensure compliance with environmental and social safeguards. Financial incentives such as tax credits, grants, and feed-in tariffs can incentivize investment in renewable energy projects and drive deployment (Jacobs et al., 2013). Governments should explore innovative financing mechanisms and public-private partnerships to mobilize capital and support renewable energy development. Effective stakeholder engagement, including consultation with local communities, indigenous groups, and other stakeholders, is essential for building consensus, addressing concerns, and ensuring social acceptance of energy projects. Governments should prioritize inclusive decision-making processes and foster collaboration between government agencies, industry stakeholders, and civil society organizations (Lovan et al., 2017). Governments should invest in capacity building initiatives, research and development programs, and technology transfer partnerships to build local expertise, foster innovation, and accelerate the deployment of renewable energy technologies (Pigato et al., 2020). Training programs, knowledge exchange platforms, and academic partnerships can enhance technical skills and promote technology adoption. A comparative analysis of the legal and policy frameworks in the United States and Nigeria highlights similarities and differences in regulatory approaches, policy objectives, and challenges in the energy transition (Adewuyi et al., 2020). Lessons learned underscore the importance of regulatory clarity, government leadership, stakeholder engagement, and capacity building in navigating legal and policy challenges and advancing the transition to a sustainable energy future. Best practices emphasize the need for transparent decision-making processes, financial incentives, collaborative partnerships, and investments in technology and human capital to overcome barriers and accelerate progress towards energy sustainability (Nwokolo et al., 2023).

Conclusion

Both countries face challenges related to regulatory complexity, policy inconsistencies, and bureaucratic inefficiencies in the energy sector, which impede investment and project development. Government initiatives and incentives play a crucial role in driving renewable energy adoption and investment. Clear and stable regulatory frameworks, financial incentives, and

stakeholder engagement are essential for fostering confidence and promoting sustainable energy development. Collaborative partnerships, knowledge sharing, and investments in capacity building and technology transfer are essential for overcoming legal and policy challenges and accelerating the transition to a sustainable energy future.

Governments should prioritize regulatory reforms to streamline permitting processes, provide certainty for investors, and ensure compliance with environmental and social safeguards. Financial incentives such as tax credits, grants, and feed-in tariffs can stimulate investment in renewable energy projects and drive deployment. Governments should explore innovative financing mechanisms and public-private partnerships to mobilize capital and support renewable energy development. Effective stakeholder engagement, inclusive decision-making processes, and collaboration between government agencies, industry stakeholders, and civil society organizations are essential for building consensus, addressing concerns, and ensuring social acceptance of energy projects. Governments should invest in capacity building initiatives, research and development programs, and technology transfer partnerships to build local expertise, foster innovation, and accelerate the deployment of renewable energy technologies.

The future prospects for the energy transition in both the United States and Nigeria are promising, albeit with challenges and opportunities ahead. Continued advancements in renewable energy technologies, declining costs, and increasing public awareness of climate change are driving momentum towards a sustainable energy future. In the United States, continued federal and state-level support for renewable energy deployment, coupled with private sector investments and technological innovation, are expected to drive further growth in the renewable energy sector. However, challenges related to grid integration, regulatory uncertainty, and political dynamics may impact the pace of the transition. In Nigeria, efforts to improve energy access, promote renewable energy development, and diversify the energy mix are gaining traction. Government initiatives such as the Rural Electrification Agency and Renewable Energy Master Plan, coupled with international partnerships and investments, hold promise for expanding energy access and driving sustainable development. The energy transition presents significant opportunities for economic growth, environmental sustainability, and social development in both countries. By implementing the recommendations outlined above and leveraging lessons learned from each other's experiences, policymakers and stakeholders can accelerate progress towards a more sustainable and resilient energy future.

References

- Adaga, E. M., Okorie, G. N., Egieya, Z. E., Ikwue, U., Udeh, C. A., DaraOjimba, D. O., & Oriekhoe, O. I. (2023). The role of big data in business strategy: a critical review. *Computer Science & IT Research Journal*, 4(3), 327-350.
- Adewuyi, O. B., Kiptoo, M. K., Afolayan, A. F., Amara, T., Alawode, O. I., & Senjyu, T. (2020). Challenges and prospects of Nigeria's sustainable energy transition with lessons from other countries' experiences. *Energy Reports*, 6, 993-1009.
- Aliyu, A. S., Dada, J. O., & Adam, I. K. (2015). Current status and future prospects of renewable energy in Nigeria. *Renewable and Sustainable Energy Reviews*, 48, 336-346.

- Bolton, R., Foxon, T. J., & Hall, S. (2016). Energy transitions and uncertainty: Creating low carbon investment opportunities in the UK electricity sector. *Environment and Planning C: Government and Policy*, 34(8), 1387-1403.
- Booth, D., Hanmer, L., & Lovell, E. (2000). Poverty and transport. *Report for the World Bank, Overseas Development Institute*.
- Bouzarovski, S., & Tirado Herrero, S. (2017). The energy divide: Integrating energy transitions, regional inequalities and poverty trends in the European Union. *European Urban and Regional Studies*, 24(1), 69-86.
- Cevik, S. (2024). Climate change and energy security: the dilemma or opportunity of the century?. *Environmental Economics and Policy Studies*, 1-20.
- Circo, C. J. (2007). Using mandates and incentives to promote sustainable construction and green building projects in the private sector: a call for more state land use policy initiatives.
- Dwivedi, C. (2018). Influence of production and investment tax credit on renewable energy growth and power grid. In *2018 IEEE Green Technologies Conference (GreenTech)* (pp. 149-154). IEEE.
- Egieya, Z. E., Ewuga, S. K., Omotosho, A., Adegbite, A. O., & Oriekhoe, O. I. (2023). A review of sustainable entrepreneurship practices and their impact on long-term business viability. *World Journal of Advanced Research and Reviews*, 20(3), 1283-1292.
- Engeland, K., Borga, M., Creutin, J. D., François, B., Ramos, M. H., & Vidal, J. P. (2017). Space-time variability of climate variables and intermittent renewable electricity production—A review. *Renewable and Sustainable Energy Reviews*, 79, 600-617.
- Gouchoe, S., Everette, V., & Haynes, R. (2002). *Case studies on the effectiveness of state financial incentives for renewable energy* (No. NREL/SR-620-32819). National Renewable Energy Lab.(NREL), Golden, CO (United States).
- Gungah, A., Emodi, N. V., & Dioha, M. O. (2019). Improving Nigeria's renewable energy policy design: A case study approach. *Energy Policy*, 130, 89-100.
- Heffron, R. J., Körner, M. F., Schöpf, M., Wagner, J., & Weibelzahl, M. (2021). The role of flexibility in the light of the COVID-19 pandemic and beyond: Contributing to a sustainable and resilient energy future in Europe. *Renewable and Sustainable Energy Reviews*, 140, 110743.
- Idoko, I. P., Onuh, M. I., Kimberly, D. H., Chijioke, C. E., Ifeanyi, E. U., & Abutu, E. P. (2024). Renewable energy policies: A comparative analysis of Nigeria and the USA. *World Journal of Advanced Research and Reviews*, 21(01), 888-913.
- Idoko, I. P., Onuh, M. I., Kimberly, D. H., Chijioke, C. E., Ifeanyi, E. U., & Abutu, E. P. (2024). Renewable energy policies: A comparative analysis of Nigeria and the USA. *World Journal of Advanced Research and Reviews*, 21(01), 888-913.
- Jacobs, D., Marzolf, N., Paredes, J. R., Rickerson, W., Flynn, H., Becker-Birck, C., & Solano-Peralta, M. (2013). Analysis of renewable energy incentives in the Latin America and Caribbean region: The feed-in tariff case. *Energy Policy*, 60, 601-610.
- Keshavadasu, S. R. (2023). Regulatory and policy risks: Analyzing the uncertainties related to changes in government policies, regulations, and incentives affecting solar power project development and operations in Kenya. *Energy Policy*, 182, 113760.

- Lovan, W. R., Murray, M., & Shaffer, R. (2017). *Participatory governance: planning, conflict mediation and public decision-making in civil society*. Routledge.
- Lunt, R. J. (2006). Recharging US Energy Policy: Advocating for a National Renewable Portfolio Standard.
- Lyons, D. A. (2017). Protecting states in the new world of energy federalism.
- Miörner, J., Zukauskaitė, E., Trippl, M., & Moodysson, J. (2018). Creating institutional preconditions for knowledge flows in cross-border regions. *Environment and Planning C: Politics and Space*, 36(2), 201-218.
- Mmaduabuchi, G. S., & Nwali, U. (2015). Power sector reform in Nigeria: Institutional challenges and prospects for effective performance.
- Nwokolo, S. C., Eyime, E. E., Obiwulu, A. U., & Ogbulezie, J. C. (2023). Africa's Path to Sustainability: Harnessing Technology, Policy, and Collaboration. *Trends in Renewable Energy*, 10(1), 98-131.
- Okoh, A. S. (2020). *Oil mortality in post-fossil fuel era Nigeria: Beyond the oil age*. Springer Nature.
- Okorie, G. N., Egieya, Z. E., Ikwue, U., Udeh, C. A., Adaga, E. M., DaraOjimba, O. D., & Oriekhoe, O. I. (2024). Leveraging big data for personalized marketing campaigns: a review. *International Journal of Management & Entrepreneurship Research*, 6(1), 216-242.
- Okorie, G. N., Udeh, C. A., Adaga, E. M., DaraOjimba, O. D., & Oriekhoe, O. I. (2024). Digital marketing in the age of IOT: a review of trends and impacts. *International Journal of Management & Entrepreneurship Research*, 6(1), 104-131.
- Okorie, G. N., Udeh, C. A., Adaga, E. M., DaraOjimba, O. D., & Oriekhoe, O. I. (2024). Ethical considerations in data collection and analysis: a review: investigating ethical practices and challenges in modern data collection and analysis. *International Journal of Applied Research in Social Sciences*, 6(1), 1-22.
- Oriekhoe, O. I., Addy, W. A., Okoye, C. C., Oyewole, A. T., Ofodile, O. C., & Ugochukwu, C. E. (2024). The role of accounting in mitigating food supply chain risks and food price volatility. *International Journal of Science and Research Archive*, 11(1), 2557-2565.
- Oriekhoe, O. I., Adisa, O., & Ilugbusi, B. S. (2024). Climate change and food supply chain economics: a comprehensive analysis of impacts, adaptations, and sustainability. *International Journal of Applied Research in Social Sciences*, 6(3), 267-278.
- Oriekhoe, O. I., Ashiwaju, B. I., Ihemereze, K. C., & Ikwue, U. (2024). Review of big data in FMCG supply chains: us company strategies and applications for the African market. *International Journal of Management & Entrepreneurship Research*, 6(1), 87-103.
- Oriekhoe, O. I., Ashiwaju, B. I., Ihemereze, K. C., Ikwue, U., & Udeh, C. A. (2024). Review Of Technological Advancements In Food Supply Chain Management: A Comparative Study Between The Us And Africa. *International Journal of Management & Entrepreneurship Research*, 6(1), 132-149.

- Oriekhoe, O. I., Ashiwaju, B. I., Ihemereze, K. C., Ikwue, U., & Udeh, C. A. (2023). Review of technological advancement in food supply chain management: comparison between USA and Africa. *World Journal of Advanced Research and Reviews*, 20(3), 1681-1693.
- Oriekhoe, O. I., Ashiwaju, B. I., Ihemereze, K. C., Ikwue, U., & Udeh, C. A. (2024). Blockchain technology in supply chain management: a comprehensive review. *International Journal of Management & Entrepreneurship Research*, 6(1), 150-166.
- Oriekhoe, O. I., Ashiwaju, B. I., Ihemereze, K. C., Ikwue, U., & Udeh, C. A. (2024). Review of innovative supply chain models in the us pharmaceutical industry: implications and adaptability for african healthcare systems. *International Medical Science Research Journal*, 4(1), 1-18.
- Oriekhoe, O. I., Ilugbusi, B. S., & Adisa, O. (2024). Ensuring global food safety: integrating blockchain technology into food supply chains. *Engineering Science & Technology Journal*, 5(3), 811-820.
- Oriekhoe, O. I., Omotoye, G. B., Oyeyemi, O. P., Tula, S. T., Daraojimba, A. I., & Adefemi, A. (2024). Blockchain in supply chain management: a systematic review: evaluating the implementation, challenges, and future prospects of blockchain technology in supply chains. *Engineering Science & Technology Journal*, 5(1), 128-151.
- Oriekhoe, O. I., Oyeyemi, O. P., Bello, B. G., Omotoye, G. B., Daraojimba, A. I., & Adefemi, A. (2024). Blockchain in supply chain management: A review of efficiency, transparency, and innovation.
- Orieno, O. H., Udeh, C. A., Oriekhoe, O. I., Odonkor, B., & Ndubuisi, N. L. (2024). Innovative management strategies in contemporary organizations: a review: analyzing the evolution and impact of modern management practices, with an emphasis on leadership, organizational culture, and change management. *International Journal of Management & Entrepreneurship Research*, 6(1), 167-190.
- Park, S. (2015). State renewable energy governance: Policy instruments, markets, or citizens. *Review of Policy Research*, 32(3), 273-296.
- Pigato, M., Black, S., Dussaux, D., Mao, Z., Rafaty, R., & Touboul, S. (2020). *Technology transfer and innovation for low-carbon development*. World Bank Publications.
- Pimentel Da Silva, G. D., Magrini, A., Tolmasquim, M. T., & Branco, D. A. C. (2019). Environmental licensing and energy policy regulating utility-scale solar photovoltaic installations in Brazil: status and future perspectives. *Impact Assessment and Project Appraisal*, 37(6), 503-515.
- Randol, C., Jones, K. L., Klass, A. B., Hasselman, J., & Jensen, T. C. (2021). The Future of Pipelines.
- Steffen, B. (2020). Estimating the cost of capital for renewable energy projects. *Energy Economics*, 88, 104783.
- Udeh, C. A., Orieno, O. H., Daraojimba, O. D., Ndubuisi, N. L., & Oriekhoe, O. I. (2024). Big data analytics: a review of its transformative role in modern business intelligence. *Computer Science & IT Research Journal*, 5(1), 219-236.

- Wilkinson, P., Smith, K. R., Davies, M., Adair, H., Armstrong, B. G., Barrett, M., ... & Chalabi, Z. (2009). Public health benefits of strategies to reduce greenhouse-gas emissions: household energy. *The Lancet*, *374*(9705), 1917-1929.
- Worigi, I., Maach, A., Hafid, A., Hegazy, O., & Van Mierlo, J. (2019). Integrating renewable energy in smart grid system: Architecture, virtualization and analysis. *Sustainable Energy, Grids and Networks*, *18*, 100226.
- Wuebbles, D. J., & Jain, A. K. (2001). Concerns about climate change and the role of fossil fuel use. *Fuel Processing Technology*, *71*(1-3), 99-119.
- Zakeri, B., Paulavets, K., Barreto-Gomez, L., Gomez Echeverri, L., Pachauri, S., Rogelj, J., ... & Srivastava, L. (2021). Transformations within reach: Pathways to a sustainable and resilient world-Rethinking energy solutio