The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

THE NEXUS BETWEEN REMITTANCE AND RENEWABLE ENERGY IN NIGERIA

CHINWE R. OKOYEUZU

Department of Banking and Finance, University of Nigeria, Enugu Campus, Nigeria.
Email: Chinwe.okoyeuzu@unn.edu.ng

OKOROIWU KEMDI LUGARD

Accountancy Department, University of Nigeria, Enugu Campus, Nigeria.
Email: Lugard.okoroiwu@unn.edu.ng

WILFRED ISIOMA UKPERE

Department of Industrial Psychology and People Management, School of Management, College of Business and Economics, University of Johannesburg, South Africa. Email: wiukpere@uj.ac.za

Abstract

The study, which aimed to ascertain the relationship between remittances and renewable energy, was conducted to obtain potential socio-economic and environmental effects of remittance inflows on the adoption of renewable energy technology in Nigeria. Employing secondary data from World Bank indicators, the study adopted an ARDL model (autoregressive distributed lag). The findings show a positive relationship between remittances and renewable energy uptake in the country. The research outcome provides useful insights for policymakers, scholars, and organizations that are working towards sustainable development. The study recommends that attention should be given to remittances' potential as a source of finance for renewable energy projects. The findings reveal that some factors that influence the distribution of remittances towards clean energy initiatives should receive attention. Finally, the findings provide an all-inclusive understanding of how remittance-based renewable energy initiatives contribute to sustainable development. The study contributes to the body of knowledge within the domain of the remittances and renewable energy nexus towards achieving development in Nigeria.

Keywords: Remittances, Renewable Energy, Sustainability, Energy, Poverty, Nigeria.

JEL Classification Code: F24; Q43; Q400;

1. INTRODUCTION

The modern world faces problems of environmental degradation and climate change, which have garnered considerable global attention. The rising demand for growth has increased the utilization of diverse energy sources and natural resources, with an emphasis on conventional energy sources that emit greenhouse gases and accelerate global warming (Ahmad, et al., 2021). Literature on energy development reveals the relationship between energy consumption and economic growth (Ahmed, et al., 2015). Access to pure, low-cost, and modern energy services is essential to provide public services, socio-economic activity, and technological adoption. This is crucial to attain development objectives by 2023 (Agradi, 2023).

Due to its vital importance for economic growth and development, addressing energy poverty has emerged as a crucial scientific priority. The United Nations, through Sustainable Development Goal 7, as well as other international organizations, have emphasized the

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

necessity of providing all people with access to clean, cheap, and reliable energy by 2030. While progress has been achieved worldwide, it is nevertheless concerning that the gap between rural and urban communities in developing countries has not been closed. Factors like ethnic diversity, financial inclusion, renewable energy, household characteristics, and educational attainment, have all been explored as potential causes of energy poverty. There has not been a lot of research on how remittances might help reduce energy poverty in poor nations (Ronald, Henri, Sosson, and Brice, 2023). Remittances can affect recipient economies in a variety of ways. Through remittance inflow, funds are made available to households (Waheed, Ilhan, and Muhammad 2022). The World Bank (2019a) found that remittance inflows might help finance clean energy projects and renewable energy investments in low-income nations.

Many poor countries now rely heavily on remittances, or personal, non-commercial, overseas money transfers by migrant workers. (Karim, Mouyad, & Karim, 2023). Remittances have been extensively studied for their beneficial effects on mitigating household spending, investing in human and physical capital, decreasing poverty, and boosting economic growth. However, there has been few research studies on the contribution of remittances to the energy sector's growth. This research intends to close that knowledge gap by examining how money sent home can affect the growth of renewable energy in Nigeria. This analysis focuses on the link between remittance receipts and the use of renewable energy sources in Nigeria. Money sent back home by Nigerians who work abroad has become an increasingly important source of income and financial stability for many families in Nigeria.

There is a sizable Nigerian diaspora, and their remittances play a significant part in the country's economy and development in several areas, especially the energy sector. Money sent back home can fund clean energy initiatives, innovative technologies, and other forms of investment. However, energy poverty is also a problem in Nigeria, with many people lacking access to sustainable power. For Nigeria to achieve environmental sustainability, economic growth, job creation, and higher living conditions, it is essential to enhance renewable energy outputs.

A generous portion of Nigeria's population has left the country in recent years in search of better economic prospects. This shift in migration patterns has significant repercussions for Nigeria's economy and culture. Therefore, it is important to think about how migration can modify the connection between remittances, renewable energy, and sustainable development in Nigeria. Increases in the number of Nigerians leaving the country have the potential to boost remittance inflows into the country. Many Nigerian families rely heavily on money sent home by family members and friends who work abroad. Therefore, the availability of capital for investment in renewable energy projects and clean energy initiatives may be affected by the influx of remittances. To develop efficient policies and strategies, it is essential to know how much migration impacts remittance patterns and subsequent investments in renewable energy.

The rate of uptake of renewable energy technology in Nigeria may also be affected by migration. Migrants who visit nations with developed renewable energy infrastructures may pick up newfound expertise in the field of green energy. Migrants from Nigeria may help to spread and execute clean energy technologies once they return home. Thus, it is of significant

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

importance to study the impact of migration on the connection between remittance inflows, renewable energy outputs, and sustainable development. The potential benefits of migration for sustainable energy development in Nigeria can be realized if policymakers take the time to analyse how migration patterns affect remittance flows and how those flows, in turn, affect investments and technology transfers in renewable energy. Evidence-based decision-making for sustainable development in Nigeria will be made possible with empirical validation of the interplay between migration, remittances, and the impact of renewable energy.

Remittance inflows have been studied for their effect on a variety of societal and economic variables, including poverty alleviation, household consumption, and investment (Anupam, Adian, and Luc, 2021). The precise impact of remittances on renewable energy outputs in the Nigerian context, however, remains understudied. Research conducted in other nations has shown that remittances can help to fund renewable energy projects and encourage the use of clean technologies. Sustainability in energy development and diversification away from fossil fuels should be a positive move towards addressing climate risk in Nigeria. According to Mumtaz, Khalid, Atif Maqbool, and Salma (2015), the seventh Sustainable Development Goal (SDG) is to provide everyone with access to modern, cheap, dependable, and sustainable energy. Energy poverty, however, continues to be a major issue in Africa, especially in sub-Saharan Africa (SSA). The use of greener energy by families is hindered by cost considerations (Agradi, 2023). This has the effect of increasing the prevalence of energy poverty, increasing the use of dirty cooking fuels, and decreasing the adoption of new energy technologies. To attain overall socio-economic and developmental outcomes, it is vital to address energy poverty, as shown by the connections between SDG 7 and other development goals (Mahalik, et al., 2022).

Therefore, the goal of this study is to understand factors that contribute to energy poverty in Nigeria, whilst investigating the possibility of using remittance inflows as a demand-side remedy to alleviate issues with affordability. While prior studies have concentrated on supply-side aspects, the literature has ignored the demand side, particularly the significance of remittances. The greatest source of foreign financial inflows into Nigeria is remittances, which can increase household purchasing power and make renewable energy solutions more affordable. This study intends to provide empirical evidence around the influence of remittances on the uptake of renewable energy in a developing country like Nigeria by investigating the short-run and long-run effects of remittances on several characteristics of energy poverty, including multi-dimensional energy poverty, energy consumption, and energy access. This research is important because it can help to inform energy policy and business decisions in Nigeria. To achieve this important aim of the research study, the rest of the paper is structured as follows: the next section reviews related literature, followed by the study's data and methodology, results and findings and, finally, concludes with research implications.

This study helps to fill the gaps left by others and provides a more complete picture of the connection between energy and growth. The results can be used to inform policy choices in Nigeria that attempt to strike a healthy balance between energy efficiency and economic expansion.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

2. LITERATURE REVIEW

The impact of remittances on numerous factors, including currency rates, economic growth, the decrease in poverty, human capital, and institutional quality, has been the subject of an expanding body of scholarship. However, no study has considered the connection between remittances and energy poverty in developing nations in depth. By giving households, the resources to connect to the national electrical grid, remittances have the potential to significantly improve energy access. Additionally, they can improve energy availability indirectly by fostering the development of human capital, lowering income disparity, and fostering economic growth. These aspects point to a tenable connection between remittances and the reduction of energy poverty (Djeunankan, et al., 2023).

The absence of consistent and cheap access to electricity and clean cooking facilities is known as energy poverty, and it remains a major problem in the world today. In addition to the one billion people who live in unreliable power networks, about 1.2 billion people worldwide lack access to electricity, mostly in rural regions. Due to poor electricity availability in rural areas and an increase in the use of traditional fuels for cooking and heating, Africa faces considerable issues around energy access (Mouyad, Karim, and Karim, 2023). To reach the UN SDG targets for energy access and sustainable energy consumption, depends on addressing energy poverty, which remains a major problem in Africa (Hosan, et al., 2023). Most of the material that has been written about energy poverty in Nigeria has focused on supply-side restrictions, namely the production and sale of electricity for homes. Energy consumption has become expensive for many households in the nation owing to affordability issues brought on by high connection fees, consumption tariffs, sub-par living conditions, and inconsistent income. Recent research, however, points to the importance of demand-side restrictions, particularly affordability, to limit access to and the usage of energy. Energy poverty and affordability are highly interrelated, and the inability to pay for sustainable energy solutions encourages the use of dirty energy sources. Although the demand side is more responsible than the supply side for the hurdles to access energy, it has received less attention in the literature. This study seeks to fill the knowledge gap in this area and investigates the potential of remittance inflows as a privately funded remedy for energy poverty in Nigeria.

Millions of people's well-being and development possibilities are impacted by energy poverty, a grave issue with which emerging nations must grapple. The fundamental mechanisms by which this relationship functions must be examined to comprehend how remittances affect energy poverty in emerging nations. The Income Poverty Channel (Barkat, Alsamara, and Mimouni, 2023) is a well-known literary channel. Energy poverty can be influenced directly by remittances, which can also impact income poverty. The remittances sent home by migrant workers raise household incomes, allowing beneficiaries to pay for better energy services. Remittance inflows have increased household income levels, which may provide them with more money to spend on reliable energy sources, clean cooking facilities, and power connections. By lowering income poverty among recipient households, this pathway contends that remittances can improve energy availability. Again, through their effects on human development indices, remittances may also have an impact on energy poverty. Education,

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

health, and general well-being are a few of the aspects of human progress that correlate intimately with increased access to energy services. Remittance inflows can support investments in healthcare and education, which will enhance the development of human capital. Improved human capital can, therefore, make it possible for people and communities to access and use energy resources efficiently. Remittances may reduce energy poverty indirectly by fostering human development, which is linked to energy access.

According to Barkat, Alsamara, and Mimouni (2023), economic growth might be a useful way for remittances to drive economic activity, whilst contributing to total economic growth in recipient countries. As economies grow, there is more money available to invest in energy infrastructure, create renewable energy sources, and provide energy services to neglected areas. Therefore, remittances can promote economic expansion, which may result in better energy availability and a decrease in energy poverty. Additionally, income inequality, which is related to energy poverty, can be impacted by remittances. Remittance inflows sometimes reach households inequitably in many developing nations, as these may worsen income inequality and prolong energy poverty among marginalized populations if they benefit wealthier households or certain regions. Conversely, remittances can lessen economic inequality and combat energy poverty more effectively if these are directed towards fair investments in energy infrastructure and services (Ahmad, Ullah, Ozturk, & Majeed, 2021). Research studies show that low-income households often spend between 20 and 30 percent of their income on energy costs. The degree of deprivation, which focuses on communities that lack access to enough energy supplies to meet their fundamental needs, is one method of gauging energy poverty. These communities frequently deal with additional costs and dangers brought on by energy constraints (Barkat, Alsamara, and Mimouni, 2023)

3. METHODOLOGY

To investigate the relationship between remittances and renewable energy, the authors adopted an autoregressive distributed lag (ARDL). The study employed a time series, using data from 1990 to 2021, and selected sets of variables and justifications for the selected variables presented below.

Dependent variable

Renewable energy: The adoption of clean energy technology and practices by Nigerian households, communities, and regions is gauged by this variable. It can be measured, among other things, by the proportion of homes with solar panels, the number of clean cooking stoves in use, or the proportion of renewable energy in the energy mix.

Independent Variables

Remittance inflows: This variable shows how much money Nigeria receives in remittances. It can be calculated as the total amount of remittances received over a specific period or as the typical remittance amount per family or person.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

Household income: This variable represents the income status of Nigerian households. Because remittances are frequently received by certain homes within a larger community, they can be utilized to regulate the overall financial capacity of households.

Gini per person

The Gini coefficient is an indicator of income disparity within a population, offering information about the distribution of income among people or households. Understanding income inequality is essential in the context of renewable energy and remittances. It can reveal if the advantages of access to renewable energy and remittance inflows are allocated fairly or if there are inequalities between various socio-economic categories. Researchers can investigate the link between income inequality and the use of remittances or renewable energy by including the Gini per capita in their analysis.

A common metric to assess a nation's overall economic progress and standard of living is its GDP per capita. It offers details around the overall economic production per individual. Nigeria's economic capacity and potential for renewable energy investment and adoption may be evaluated by including GDP per capita in the analysis. A stronger economy with more available resources for sustainable energy efforts may be indicated by a higher GDP per capita.

GDP and energy demand are tightly correlated. The need for energy, especially renewable energy, tends to rise as the economy expands and people's living standards also rise. Researchers can examine the connection between economic growth and the consumption of renewable energy by including GDP as a variable. Policymakers and other stakeholders can use this information to help them make well-informed choices about energy investment and planning.

In a study on sustainable energy adoption and the use of remittance inflows in Nigeria, the GDP per capita and the Gini coefficient allow for a more thorough analysis of the economic conditions, income distribution, and policy consequences.

The ARDL approach incorporates lagged values of the variables to assess the long-run and short-run effects of remittances on renewable energy in Nigeria. The model is commonly stated as follows:

$$Yt = 0 + 1Xt + 2Xt\text{-}1 + \ldots + pXt\text{-}p + 3Yt\text{-}1 + 4Yt\text{-}2 + \ldots + qYt\text{-}q$$

Model specification

$RenE_t + \beta_0 + \beta_1 Y2_t + \varepsilon_t$……. Equation 1

$l_n\, RenE_t = \beta_0 + \beta_1\, l_n\, Remit_t + \beta_2\, l_n\, GPD_t + \beta_3\, l_n\, HShold_t + \beta_4\, l_n\, Gini_t + \varepsilon_t$ ….. Equation 2

$\Delta lnRenE_t = \delta_0 + \delta_1 lnRenE_{t-1} + \delta_2 lnRemit_{t-1} + \delta_3 lnGDP_{t-1} + \delta_4 lnHShold_{t-1} + \delta_5 lnGini_{t-1} + \sum_{j=1}^{i} \tau 1j \Delta lnRenE_{t-j} + \sum_{j=0}^{m} \tau 2j \Delta lnRemit_{t-1} + \sum_{j=0}^{n} \tau 3j \Delta lnGDP_{t-1} + \sum_{j=0}^{0} \tau 4j \Delta lnHShold_{t-1} + \sum_{j=0}^{p} \tau 5 \Delta lnGini_{t-1} + \varepsilon_{t-1}$…….. Equation 3

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

4. FINDINGS

Descriptive statistics 1

	Mean	Median	Maximum	Minimum	Standard deviation
GDP_PER_CAPITA	283362.9	280480.3	379251.6	202255.7	65696.9
GNI_PER_CAPITA_GROWTH__ANNUAL___	1.6924	0.977794	11.2585	-6.571951	4.355908
HOUSEHOLDS_AND_NPISHS_FINAL_CONSUMPTION_EXPENDITURE_PER_CAPITA_G	3.903566	-1.053347	55.21725	-18.23245	15.14132
REMITTANCES__RECEIVED____OF_GDP_	3.380671	3.819301	8.33383	0.018522	2.35612
RENEWABLE_ENERGY	85.06475	85.11064	88.68	80.64	2.278999

Source: Author's computation

According to the table's standard deviations, it is apparent that the data points for renewable energy and GNI per capita growth are clustered close to their respective means (2.278999 and 4.334286, respectively). This shows that both renewable energy consumption (Khatri, & Paija, 2022) and the yearly growth rate of GNI per capita in Nigeria are typically found near their respective long-term norms.

Standard deviations per capita gross domestic product (66,043.31) and per capita final consumption spending (15.19852) are both high, indicating elevated levels of dispersion or variability. This data reveals that GDP per capita and FCE per capita in Nigeria exhibit greater dispersion around their respective mean values. The correlation between mean and standard deviation might shed light on the consistency and stability of the variables under study. A lower standard deviation around the mean for Nigeria's consumption of renewable energy and GNI per capita growth may signify a more stable and consistent pattern in both areas. The higher standard deviations for final consumer spending per capita and GDP per capita, conversely, imply greater volatility and disparity in these economic indicators.

In general, examining the relationship between mean and standard deviation helps to understand the data's central tendency and variability and offers insightful information about the traits and trends that relate to renewable energy and economic indicators in Nigeria. A positive but modest (about 3.5) mean value for final consumption expenditure per person indicates moderate household spending. The high standard deviation points to significant differences in household consumption habits.

Income inequality and discrepancies in purchasing power between different income groups are two economic issues that may influence these values. The cost of living and changes in commodity prices impact how much money households spend. Government initiatives that have an impact on consumer spending and behaviour include taxes, subsidies, and social welfare programs. It is crucial to note that the interpretation is purely based on the statistical figures presented in the table and that additional data must be considered for a thorough understanding of Nigeria's economic situation. The next section investigates regression analysis.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

Regression Result Table 2

ARDL	
	RENENERGY is the dependent variable in this regression.
	Outcome is long run estimates
C	1.584388
	{3.8425}**
LN_RENENERGY(-1)*	-0.54003
	{-3.6585}**
REMITTANCES__RECEIVED____OF_GDP_(-1)	0.003012
	{2.8382}**
LNGDP_PER_CAP**	-0.101692
	{-3.5928}**
HOUSEHOLDS_AND_NPISHS_FINAL_CONSUMPTION_EXPENDITURE_PER_CAPITA_G(-1)	-0.000413
	{-2.4470}*
GNI_PER_CAPITA_GROWTH__ANNUAL___**	0.000565
	{1.5190}**
D(REMITTANCES__RECEIVED____OF_GDP_)	0.001315
	{2.0901}*
D(REMITTANCES__RECEIVED____OF_GDP_(-1))	-0.001455
	{-1.6154}
D(HOUSEHOLDS_AND_NPISHS_FINAL_CONSUMPTION_EXPENDITURE_PER_CAPITA_G)	-0.000202
	{-3.1715}**
CointEq(-1)*	-0.54003
	{-5.0191}**
Cusum	Stable
Cusum of square	Stable
The values in [.] are the t-statistics, and an ** denotes significance at 5% and an * shows significance at 10% level Source: Author's computation	

The authors obtained a positive response for the relationship between remittances, GDP per capita, and renewable energy. The coefficient was 0.003012, indicating that a one-unit increase in the lagged value of remittances received as a percentage of GDP overall leads to an increase in renewable energy. The coefficient for household income was -0.000413, suggesting that an increase in the lagged value of per capita consumption expenditure leads to a decrease in renewable energy overall. The coefficient was 0.001315, suggesting that a one-unit increase in the current period's remittances received as a percentage of GDP leads to an increase in renewable energy. In the short run, a one-unit increase in the current period's remittances received as a percentage of GDP leads to an increase in renewable energy, and this was apparent owing to the 0.001315 coefficient.

Similarly, in the lagged value the coefficient was -0.001455, indicating that a one-unit increase in the lagged value of remittances received as a percentage of GDP leads to a decrease in renewable energy in the short run.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

Considering that: (Household-and-NPISHD-final-consumption-expenditure-per capital-G), the authors obtained a coefficient of -0.000202. This implies that a one-unit increase in the current period's per capita consumption expenditure leads to a decrease in renewable energy in the short run.

Following the error correction, the coefficient was -0.54003. The cointegration (CointEq(-1)) was correctly signed, which indicates the speed at which long-run equilibrium was restored after a shock. A higher coefficient indicates that the system adjusts quicker to deviations from long-run equilibrium. The tests for stability using Cusum and Cusum of square were stable, as depicted in the above figure.

The ARDL study shows that remittances received as a percentage of GDP, per capita consumption expenditure, and per capita GDP growth, all have long-run and short-run effects on renewable energy in Nigeria. The lagged values of these variables also have a substantial impact on renewable energy. These findings can be utilized to better understand the relationship between remittances and renewable energy, whilst guiding policy decisions in Nigeria about sustainable energy development. Several things could explain the findings. Remittances, for example, are financial transfers from Nigerians who live abroad to their families or communities in Nigeria. These funds can be used to fund renewable energy projects such as solar panels, wind turbines, and biomass plants. The additional financial resources from remittances may help to expand the country's renewable energy infrastructure. It should be noted that the coefficient alone does not provide a complete picture of the relationship. Other factors that were not considered in the analysis may impact the observed association between remittances and renewable energy in Nigeria. Government policies, institutional frameworks, market conditions, and socio-cultural variables are examples of these.

Table 3: Summary of Bound Test Results

Test Statistic	Value	Significance	I(0)	I(1)
F-statistic	3.391161	10%	2.2	3.09

From the bound test results shown in the above table, a long-run relationship was found among the variables. This implies that the calculated F-statistics from the test are greater than the upper and lower bound critical values as presented in the above table. Having established that cointegration exists in the bound text, it was necessary to proceed with error correction, which was rightly signed, as shown in Table 2 above. The authors conducted further tests to show the model’s stability. The tests are presented below.

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.035721	Prob. F(2,19)	0.965
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	0.254737	Prob. F(8,21)	0.9739
Heteroskedasticity Test: ARCH			
F-statistic	0.553266	Prob. F(1,27)	0.4634

Source: Author

ISSN 1533-9211

DOI: 10.5281/zenodo.12800192

The P values all show that the model was stable.

The graphic representation of Cusum and Cusum of squares are all stable and presented below in Figure 1 and Figure 2, respectively.

Figure 1

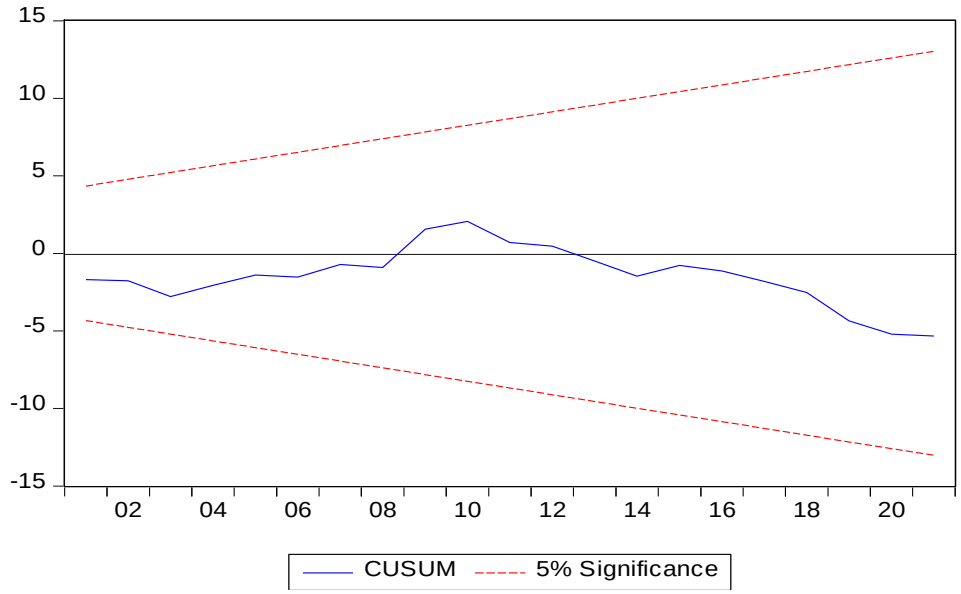
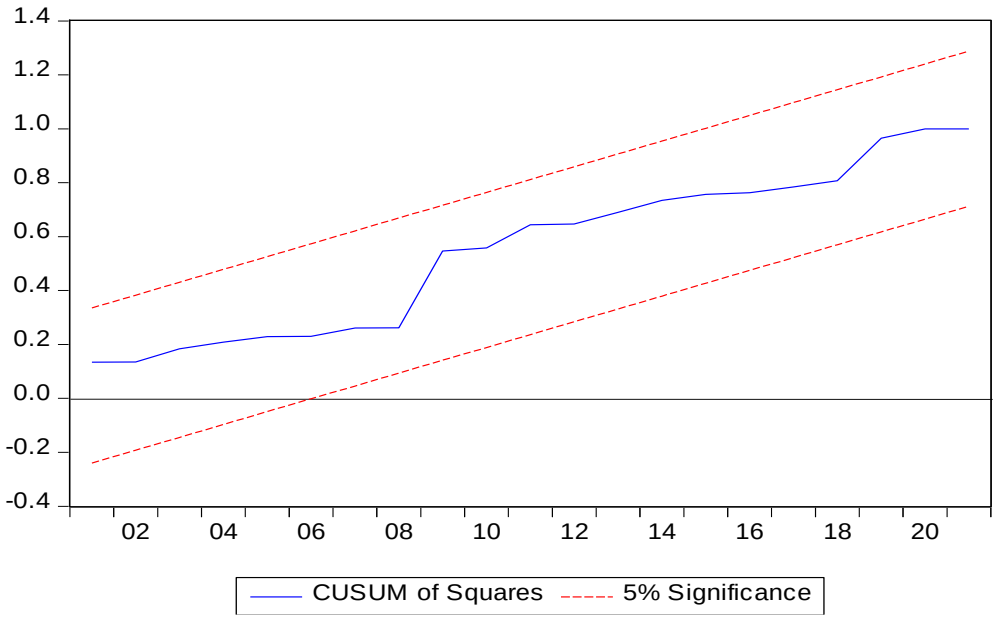
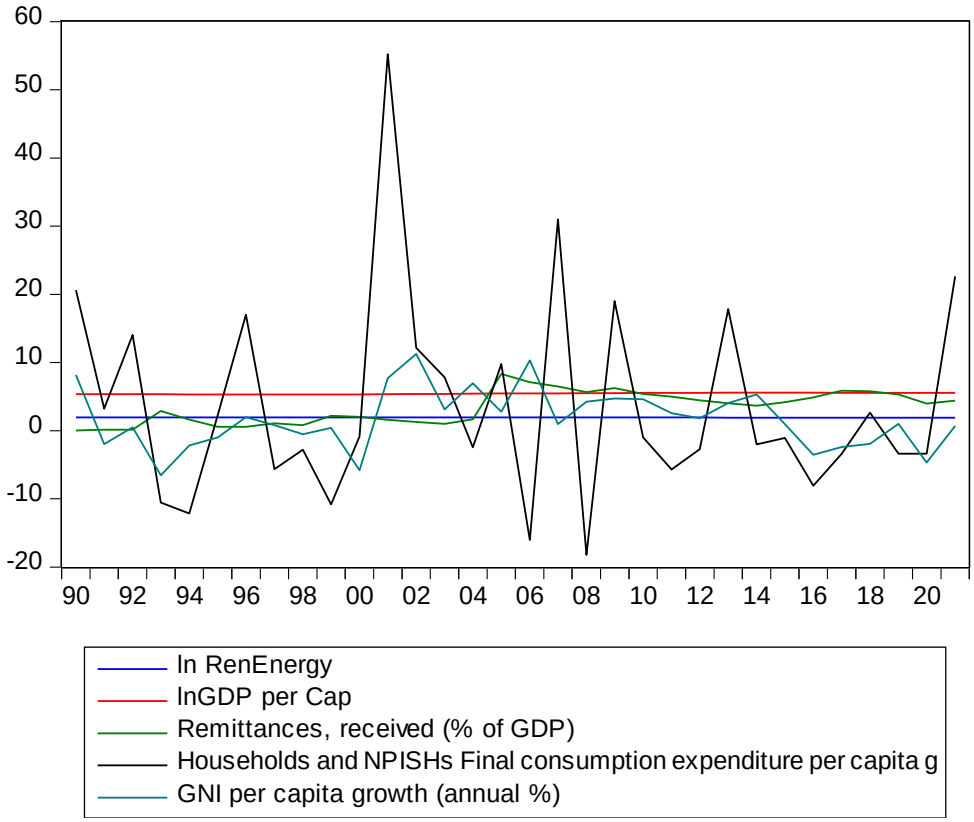


Figure 2



The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

The authors further confirmed that co-integration exists, using the Johansen system test and shown in the results presented in Figure 3 below.



This study has sought to offer insightful information for stakeholders and policymakers about Nigeria's energy sector. The results can assist to direct decision-making and encourage increased emphasis on remittance inflow and investments in renewable energy to support sustainable economic growth. Policymakers can devise effective methods to exploit this renewable energy source and address energy difficulties that the nation faces by understanding the potential of remittance inflows and their favourable influence on the economy. Additionally, by focusing on the environmental aspects of the climate debate, this study helps to promote sustainable growth and a future that is more environmentally friendly.

5. CONCLUSION AND POLICY CONSIDERATIONS

Policymakers and international organizations working towards SDG 7 would benefit from a better understanding of the role of remittances to reduce energy poverty. Policymakers can use the identified transmission channels to speed up the process of achieving universal energy access, especially in developing countries where energy poverty continues. This research investigated how money sent home from abroad affects the use of renewable energy sources in Nigeria, filling a major void in relevant literature. The study concluded that remittances help to reduce energy poverty in the country by evaluating time series data from 1990 to 2023.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

The study's results are consistent with those found in Barkat, Alsamara and Mimouni (2023). They offer real data, supporting the claim that worker remittances help to reduce energy poverty in emerging nations. The authors discovered that remittances have a critical role to play in enhancing access to electricity by studying a large panel dataset comprising 109 developing countries from 2000 to 2019. This highlights the significance of addressing remittances as a crucial variable to reduce energy poverty and ensure that all people have access to modern, inexpensive electricity.

The research advances knowledge of the potential channels by which remittances might affect the energy industry. The study's results have significant policy ramifications, pointing stakeholders and policymakers in the direction of successful tactics that use remittance inflows to improve the outcomes of renewable energy projects. A sustainable and clean energy future can be attained by using the study's findings to guide policy choices in Nigeria about energy planning, investments, and regulations.

The study's results are anticipated to provide Nigerian policymakers with useful information. Primarily, decision-makers should understand the potential of remittance inflows as a source of funding for initiatives and projects related to renewable energy. The growth of the renewable energy industry can be aided by creating a climate that encourages beneficiaries of remittances to participate in clean energy projects.

Assuring openness, accessibility, and efficiency, policy frameworks should be created to draw and direct remittances towards clean energy investments. Thirdly, partnerships and cooperation between government, financial institutions, and international organizations can help to encourage the use of renewable energy in Nigeria by facilitating the transfer of information, technology, and resources.

Nigerian policymakers should be aware of the potential for remittance inflows to serve as a source of funding for programs and projects by using renewable energy (World Bank, 2019b). The growth of the renewable energy industry can be aided by creating a climate that encourages beneficiaries of remittances to participate in clean energy projects. For governments and international organizations working to solve energy poverty in Nigeria and other developing nations, the study's findings have significant policy implications.

The authors propose that governments should establish policies that support an environment that facilitates remittance flows, including steps to lower transaction costs, whilst boosting the effectiveness of remittance channels. Secure and affordable remittance transfers can be made possible by financial institutions and technological platforms.

Policies that concentrate on fostering an environment, which is favourable to economic growth, are equally crucial. Governments can take steps to boost infrastructure, encourage entrepreneurship, and draw in investment, all of which will help to expand economic prospects and income levels.

The Seybold Report
ISSN 1533-9211
DOI: 10.5281/zenodo.12800192

References

1) Agradi, M. (2023). Does remittance inflow influence energy poverty? *Applied Energy*, 335, 120668. ISSN 0306-2619. https://doi.org/10.1016/j.apenergy.2023.120668

2) Ahmad, W., Ullah, S., Ozturk, I., & Majeed, M. T. (2021). Does inflation instability affect environmental pollution? Fresh evidence from Asian economies. *Energy & Environment*, 32(7), 1275–1291. https://doi.org/10.1177/0958305X20971804

3) Ahmed, M., Riaz, K., Khan, A.M. & Bibi, S. (2015). Energy consumption–economic growth nexus for Pakistan: Taming the untamed. *Renewable and Sustainable Energy Reviews*, 52, 890-896. ISSN 1364-0321. https://doi.org/10.1016/j.rser.2015.07.063. (https://www.sciencedirect.com/science/article/pii/S1364032115007108).

4) Anupam Das, Adian McFarlane, Adian McFarlane (2021). Empirical exploration of remittances and renewable energy consumption in Bangladesh. *Springer Nature*, 021; 5(1): 65–89. doi: 10.1007/s41685-020-00180-6.

5) Barkat, K., Alsamara, M., Mimouni, K. (2023). Can remittances alleviate energy poverty in developing countries? New evidence from panel data. *Energy Economics*, 119, 106527. https://doi.org/10.1016/j.eneco.2023.106527

6) Djeunankan, R., & Njangang, H., Tadadjeu, S., & Kamguia, B. (2023). Remittances and energy poverty: Fresh evidence from developing countries, Utilities Policy, Elsevier, vol. 81(C). https://doi.org/10.1016/j.jup.2023.101516

7) Khatri, A. & Paija N. (2022). A long-run nexus of renewable energy consumption and economic growth in Nepal., in Shahbaz, M., Tiwari, A.K., & A. Sinha, A. (eds), Energy-Growth Nexus in an Era of Globalization (pp. 27-66). Elsevier. ISBN 9780128244401. https://doi.org/10.1016/B978-0-12-824440-1.00017

8) Mahalik, M.K., Le, T-H., Le,H-C., Mallick, H. (2022). How do sources of carbon dioxide emissions affect life expectancy? Insights from 68 developing and emerging economies. *World Development Sustainability*, 1, 100003. ISSN 2772-655X. https://doi.org/10.1016/j.wds.2022.100003.

9) Hosan, S., Rahman, M.M., Karmaker, S.C., Chapman, A.J. & Saha, B.B. (2023). Remittances and multidimensional energy poverty: Evidence from a household survey in Bangladesh. *Energy*, 262 (Part A), 125326. ISSN 0360-5442. https://doi.org/10.1016/j.energy.2022.125326.

10) World Bank. (2019a). Record high remittances sent globally. Press Release, April 8, 2019, The World Bank. [Online] Available: https://www.worldbank.org/en/news/press-release/2019/04/08/record-high-remittances-sent-globally-in-2018. [17 June 2023].

11) World Bank. (2019b). Migration and remittances: Recent developments and outlook. *Migration and Development Brief*, 31. [Online] Available: https://www.knomad.org/sites/default/files/2019-04/Migrationanddevelopmentbrief31.pdf. [19 July 2023].