



Adoption of Solar Energy as a Renewable Energy Source in Ikeja Local Government Area of Lagos State, Nigeria

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Abstract

Nigeria's electricity sector faces persistent challenges characterized by inadequate generation capacity and unreliable supply, particularly in urban centres. Solar energy presents a viable renewable alternative, yet adoption remains poor. This study assessed solar energy adoption among households in Ikeja Local Government Area (LGA) of Lagos State, Nigeria, focusing on socio-economic characteristics, adoption levels, influencing factors, and financing mechanisms to support Nigeria's goal of achieving 30% renewable energy by 2030. The study employed structured questionnaires distributed via digital platforms among 400 respondents. Multi-stage non-probability sampling combining purposive and snowball techniques identified adult household energy decision-makers. Data was analysed using descriptive statistics, cross-tabulations, thematic analysis, and chi-square tests to examine variable relationships and provide a comprehensive understanding of adoption patterns. Findings revealed a 48.5% solar energy adoption rate among respondents, 68.5% had a tertiary education, 64.0% formal employment, and an average monthly income of ₦784,400. Among adopters, 68.6% used comprehensive solar home systems (average 3.90 kVA capacity) meeting 64.64% of household energy needs with 91.8% user satisfaction. Unreliable electricity supply was the primary adoption driver, while high upfront costs were the main barrier (52.3% of respondents). Financing relied on personal savings (93.8%) with limited institutional mechanisms. Government support awareness was critically low (only 2% comprehensive knowledge). Statistical analysis revealed a significant association between income levels and preferred support mechanisms ($\chi^2 = 210.85$, $p < 0.001$), with low-income households favouring subsidies (78.4%) and high-income households prioritizing awareness-based support. The study recommends implementing income-differentiated financing schemes, strengthening institutional financing infrastructure through specialised loan products, and expanding awareness campaigns.

Keywords

Solar energy adoption, Renewable energy financing, Household energy systems, Energy transition, Lagos State

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1. Introduction

Nigeria's energy landscape is characterized by a stark paradox: abundant renewable energy resources coexisting with chronic energy poverty. Despite possessing abundant solar resources with daily irradiation levels ranging from 4.42 kWh/m² in Lagos to 6.08 kWh/m² in northern regions (Adeleye et al., 2023), Nigeria continues to grapple with severe energy deficits. The country's solar potential is estimated at 427,000 MW, yet less than 1% of this capacity has been harnessed (Renewable Energy Association of Nigeria, 2023). The nation's rapid population growth, projected to reach 400 million by 2050, coupled with overreliance on fossil fuels, has created significant environmental, health, political, and economic consequences, resulting in severe socio-economic drawbacks and a widening gap

between energy demand and supply (Oyedepo et al., 2022). Current electricity generation capacity of approximately 13,000 MW falls far short of the estimated demand of 40,000 MW, resulting in one of the world's lowest per capita electricity consumption rates at 126 kWh annually (Nigerian Electricity Regulatory Commission [NERC], 2023). The Nigerian electricity sector is characterized by chronic underperformance, with the national grid experiencing frequent collapses and widespread system inefficiencies. Grid electricity meets less than 40% of national demand, with capacity utilization rarely exceeding 60% due to transmission and distribution losses, inadequate gas supply, and aging infrastructure (NERC, 2023).

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These challenges are compounded by poor governance, inadequate investment, and regulatory inconsistencies that have persisted despite multiple reform attempts since the early 2000s. Lagos State, Nigeria's commercial capital and most economically vibrant region, exemplifies this energy paradox. Despite hosting 60% of Nigeria's industrial activities, contributing over 30% to the national GDP, and maintaining the highest electricity consumption per capita in the country, Lagos experiences frequent power outages averaging 12-16 hours daily (Lagos State Government, 2021). The state's electricity demand of approximately 6,000 MW far exceeds the allocated grid supply of 1,500 MW, creating a massive supply-demand gap that constrains economic activities and quality of life (Lagos State Electricity Board, 2023). The energy access challenge extends beyond mere availability to encompass reliability, affordability, and sustainability concerns.

Globally, solar photovoltaic (PV) technology has emerged as a leading renewable energy solution due to rapid technological advancement, declining costs, and suitability for decentralized electricity generation. The levelized cost of electricity from solar PV declined by approximately 90% between 2010 and 2022, making it one of the most competitive sources of electricity worldwide (International Energy Agency-IRENA, 2023). Projections by the International Energy Agency indicate that solar PV could become the largest source of global electricity generation by 2050 (IEA, 2023). These developments are particularly relevant for sub-Saharan Africa, a region that simultaneously faces severe energy access deficits and possesses some of the world's highest solar irradiation levels (World Bank, 2022).

Nigeria presents a compelling case for examining solar energy adoption dynamics. Solar energy offers a viable pathway for addressing these challenges. Its modular nature, declining costs, and compatibility with distributed generation models make it well suited to urban electricity systems characterized by unreliable grids (Blimpo and Cosgrove-Davies, 2019). Empirical studies suggest that rooftop solar PV installations in Nigerian cities could meet between 40% and 60% of household electricity demand, depending on system capacity and consumption patterns (Ikemba *et al.*, 2024). Studies in Lagos further indicate that households exhibit

substantial willingness to adopt solar PV systems irrespective of tenancy status, reflecting growing interest in renewable alternatives (Ugulu and Aigbavboa, 2019).

Recent research has demonstrated significant potential for solar energy deployment in Nigeria's urban centres. Ikemba *et al.* (2024), using deep learning algorithms to assess solar potential in southeastern Nigerian cities, found significant untapped capacity for residential solar deployment. Their study revealed that rooftop solar installations could meet 40-60% of household electricity needs in urban areas, depending on housing types and consumption patterns. Similarly, investigations into urban households' willingness to pay for standalone solar photovoltaic systems in Lagos revealed above-average interest in photovoltaic-generated electricity irrespective of tenancy type (Ugulu and Aigbavboa, 2019).

The realization of the dynamics of solar energy adoption at the local government level is crucial for several reasons. First, it provides granular insights into consumer behaviour that national-level studies often miss. Second, it enables the development of targeted interventions that address specific local barriers and opportunities. Third, it contributes to Nigeria's ambitious renewable energy targets outlined in the National Renewable Energy and Energy Efficiency Policy (NREEEP), which aims to achieve 30% renewable energy in the electricity mix by 2030.

Despite these promising indicators, the gap between potential and actual adoption remains substantial. Studies across sub-Saharan Africa indicate that while solar mini-grid and standalone systems have gained traction in rural areas, urban solar adoption faces unique challenges including higher initial costs, complex installation requirements, and competition with subsidized grid electricity (Blimpo and Cosgrove-Davies, 2019).

The gap between potential and actual adoption is particularly pronounced in urban areas like Ikeja Local Government Area (LGA). As one of Lagos State's most developed and economically active districts, Ikeja presents favorable conditions for solar adoption, including higher income levels, better access to information, and proximity to renewable energy vendors. Yet preliminary observations suggest adoption remains limited and uneven across different household categories.

Therefore, an understanding of the solar energy adoption patterns in Ikeja LGA is critical for several reasons. First, it provides granular insight into how socio-economic characteristics influence household energy choices in dense urban environments. Second, it enables the identification of locally specific barriers and enabling factors that may be obscured in broader geographic analyses. Third, it supports evidence-based policy design aligned with Nigeria's renewable energy targets, including the goal of achieving 30% renewable energy in the electricity mix by 2030 under the National Renewable Energy and Energy Efficiency Policy (NREEEP).

This study, therefore, addresses these gaps by empirically assessing solar energy adoption among households in Ikeja LGA, Lagos State. Specifically, it examines household socio-economic characteristics, the level and nature of solar energy adoption, factors influencing adoption decisions, and the financing mechanisms used to acquire solar energy systems. Using data collected from 400 households, the study provides evidence on how income levels, education, employment status, and awareness interact with adoption outcomes and financing preferences.

The main objective of this study was to assess the adoption of solar energy as a renewable energy source among households in the Ikeja Local Government Area (LGA) of Lagos State, Nigeria. The specific objectives were to: (i) assess the socio-economic characteristics of households in Ikeja LGA; (ii) assess the level of solar energy adoption by households in Ikeja LGA; (iii) assess the factors that influence the adoption of solar energy among households in Ikeja LGA; and (iv) assess the financing mechanisms of the solar energy system of households in Ikeja LGA.

2. Methods

2.1 Study Area

This study was conducted in Ikeja Local Government Area (LGA), the administrative capital of Lagos State, Nigeria (see Figure 1). Ikeja is a highly urbanised district characterised by mixed residential, commercial, and industrial land use. It hosts key infrastructure, including the Lagos State Government Secretariat, Murtala Muhammed International Airport, and major commercial hubs such as Computer Village. The area is served by the Ikeja Electricity Distribution Company (IKEDC) but experiences frequent power outages, making

households heavily reliant on alternative energy sources, including diesel generators and solar photovoltaic (PV) systems (NERC, 2023).

Ikeja lies within the tropical rainforest climatic zone, with average temperatures ranging from 27°C to 32°C and annual rainfall between 1,500 and 2,000 mm. These climatic conditions provide favourable solar irradiation for PV deployment. The combination of high electricity demand, unreliable grid supply, and favourable solar potential makes Ikeja an appropriate case study for examining urban household solar energy adoption in Nigeria.

2.2 Research Design

The study adopted a descriptive survey research design to assess the adoption of solar energy among households in Ikeja LGA. This design was considered appropriate given the study's focus on documenting adoption levels, identifying influencing factors, and examining financing mechanisms rather than establishing causal relationships (Creswell, 2014). The survey approach enabled systematic data collection from a relatively large sample, allowing for quantitative analysis of household characteristics and adoption patterns.

2.3 Population and Sample size

Given the estimated population of Ikeja LGA at approximately 654,000 as of 2022 (National Population Commission, 2022 projections) and considering the resource and logistical limitations inherent in academic research, the Yamane (1967) formula was employed to determine the minimum sample size. The study population comprised households within Ikeja LGA, with particular focus on adult household members responsible for energy-related decision-making. These individuals were considered most suitable to provide accurate information on household electricity use, adoption decisions, and financing arrangements. Sample size was determined using the Yamane (1967) formula at a 95% confidence level and a 5% margin of error, resulting in a target sample of approximately 400 households. This sample size was deemed sufficient for descriptive and inferential analysis.

The Yamane (1967) formula employed to determine the minimum sample size is specified as:

$$n = N / (1 + N(e)^2)$$

Where:

n = required sample size

N = total population size

e = margin of error (0.05 for 95% confidence level)

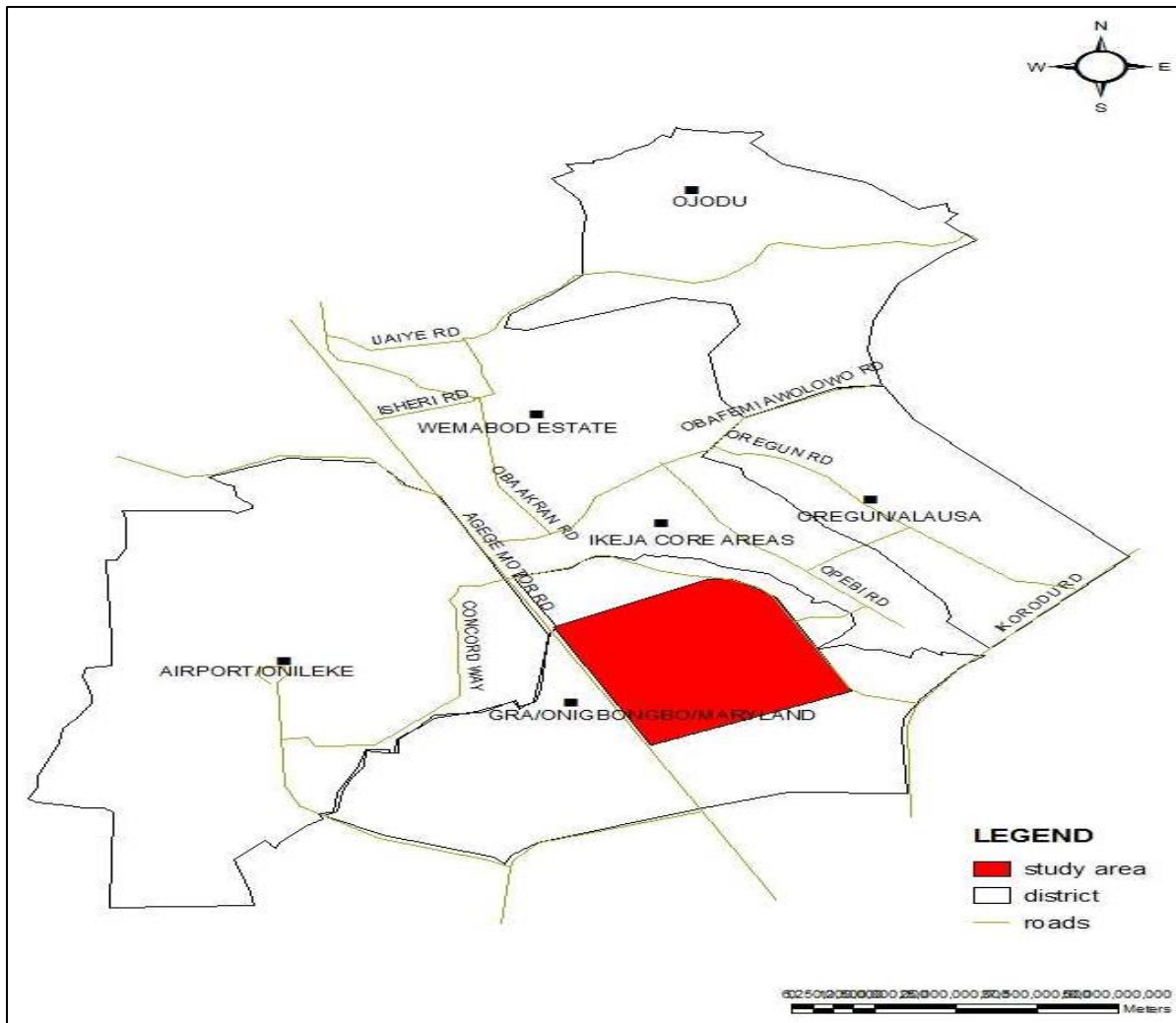


Figure 1: Map of Ikeja Local Government Area

2.4 Sampling Technique

A multi-stage non-probability sampling technique combining purposive and snowball sampling was employed. Purposive sampling was used to identify initial respondents who met the inclusion criteria, i.e., adult household members knowledgeable about household energy systems. Snowball sampling was subsequently applied by encouraging respondents to share the survey link with other eligible participants within their networks. This approach was particularly suitable given the online mode of data collection and the absence of a comprehensive household sampling frame for the study area. Despite being non-probabilistic, efforts were made to ensure diversity in socio-economic characteristics, residential locations, and household types across Ikeja LGA.

2.5 Data Collection

Primary data were collected through an online structured questionnaire administered using Google

Forms. The questionnaire was distributed via digital platforms, including WhatsApp, Facebook, and other relevant online community networks. The instrument captured information on respondents’ socio-economic characteristics, solar energy adoption status, system characteristics, factors influencing adoption decisions, and financing mechanisms. The online data collection approach was selected due to its cost-effectiveness, broad reach, real-time data capture, and suitability for an urban population with relatively high smartphone and internet penetration (Okoye et al., 2016). Participation was voluntary, and informed consent was obtained digitally before questionnaire completion.

2.6 Data Analysis

Descriptive statistics, including frequencies, percentages, means, and standard deviations, were used to summarise socio-economic characteristics, adoption levels, system capacities, and financing

patterns. Cross-tabulation analysis was employed to explore relationships between key socio-economic variables and adoption-related outcomes. In addition, chi-square tests of independence were used to examine the association between household income levels and preferred financial support mechanisms for solar energy adoption. A significance level of 5% was adopted for all inferential analyses. The open-ended responses were analysed using thematic analysis to identify recurring themes related to adoption barriers, motivations, and suggested interventions. Qualitative findings were used to complement quantitative results and provide contextual depth to the analysis.

3. Results and Discussion

The socio-economic profile of respondents comprised both male and female household decision-makers, with males (50.8%) than females (49.3%), the gender distribution of respondents showed a balanced representation (Table 1). The balanced gender distribution carries important implications for understanding household energy decision-making processes in urban Nigeria. The equal representation suggests that both men and women in Ikeja LGA are actively engaged in energy-related decisions, which has positive implications for solar energy adoption. The age distribution of respondents shows that respondents fell within the economically active age brackets, with most respondents (84.25%) aged between 31 and 50 years, indicating a population segment likely to make long-term investment decisions related to household energy systems. Educational attainment among respondents was relatively high. Approximately 68.5% of respondents possessed tertiary education, while a smaller proportion (9.0%) had secondary or primary education. This suggests, according to Umeh *et al.* (2024), a relatively high level of literacy and potential awareness of alternative energy technologies within the study area. In terms of employment status, 64.0% of respondents were formally employed, while others were self-employed or engaged in informal economic activities. Household size analysis indicates that most households comprised three to five members, which implies a high level of household electricity demand (see Table 1). This, according to Unegbu *et al.*

(2025), means that there is a need for system capacity requirements.

Table 1: Socio-economic characteristics of respondents

Variable	Frequency	Percent
Gender		
Male	197	49.25
Female	203	50.75
Marital status		
Married	262	65.50
Single	138	34.50
Age		
26-30	63	15.75
31-35	83	20.75
36-40	70	17.50
41-45	78	19.50
46-54	106	26.50
Employment status		
Employed	256	64
Self-employed	144	36
Household size		
One	69	17.25
Two	69	17.25
Three	62	15.50
Four	83	20.73
Five	75	18.75
Six	42	10.50
Educational Level		
Secondary	126	31.50
Tertiary	238	59.50
Postgraduate	36	9.00

Source: Survey, 2025

3.1 Socio-productive characteristics of respondents

Income analysis reveals considerable variation among respondents with a mean monthly income of ₦784,400. The mean monthly household income was approximately ₦784,400. Respondents were distributed across multiple income categories, reflecting the mixed-income nature of Ikeja LGA. This income diversity provides a useful basis for examining differential adoption patterns and financing preferences across income groups (Table 2). Analysis of system capacity indicates a mean installed capacity of 3.90 kVA, suggesting that most systems were designed to supplement grid electricity rather than fully replace it. Duration of use analysis (Table 2) shows that respondents had used solar energy systems for 1 to 5 years, reflecting increased uptake in recent years. Solar energy systems were reported to meet an average of 64.64% of household electricity needs (Table 2), highlighting their significant contribution to household energy supply.

Table 2: Socio-productive capacities of respondents

Variable	Mean	Std. Deviation
Monthly Income (Naira)	784,400	455,371
Solar System Capacity (KVA)	3.90	1.94
Duration of Solar Energy Usage (Years)	2.53	1.22
Energy Needs Met by Solar (Percentage)	64.64	18.76

Source: Survey, 2025

3.2 Level of Solar Energy Adoption by Households

The level of solar energy adoption shows the distribution of households by solar energy adoption status (Figure 2). Results indicate that 48.5% had adopted at least one form of solar energy system, while 51.5% had not adopted solar energy. This adoption rate is relatively low compared to national household solar penetration estimates reported by Ugulu et al (2019). This further reiterates that a significant proportion of urban households remain dependent on grid electricity and fossil-fuel generators. Furthermore, among households that had adopted solar energy, the type of system installed varied. However, the observed solar adoption rate of 48.5% among households in Ikeja LGA is considerably higher than national household-level adoption estimates reported in earlier Nigerian studies (Chanchangi et al., 2022; Statista, 2023). This suggests that urban contexts with higher electricity demand, frequent outages, and greater exposure to renewable energy markets may exhibit stronger adoption incentives. However, despite this relatively high uptake, solar systems were found to meet only about 65% of household electricity needs on average, indicating that adoption remains largely supplementary rather than substitutive. This aligns with previous studies showing that urban households often adopt solar energy to complement grid electricity rather than fully transition away from it (Blimpo and Cosgrove-Davies, 2019). Socio-economic characteristics played an important role in shaping adoption outcomes. High levels of tertiary education and formal employment among respondents likely contributed to awareness and acceptance of solar technologies, consistent with findings from earlier studies linking education and income to renewable energy adoption (Ugulu and Aigbavboa, 2019; Nnaji et al., 2023). However, income disparities within the study population highlight persistent affordability constraints, reinforcing evidence that capital-intensive

technologies such as solar PV remain unevenly accessible even in relatively affluent urban areas.

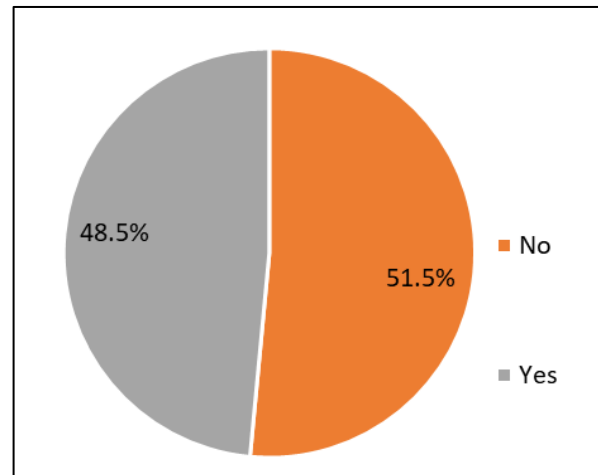


Figure 2: Solar energy adoption status among households

As shown in Figure 3, 68.6% of adopters utilised comprehensive solar home systems, while the remaining 31.4% relied on smaller systems designed primarily for lighting and limited appliance use. This has implications for the cost of obtaining a comprehensive solar home system which might be a bit too expensive for some households (Oyedepo et al., 2022).

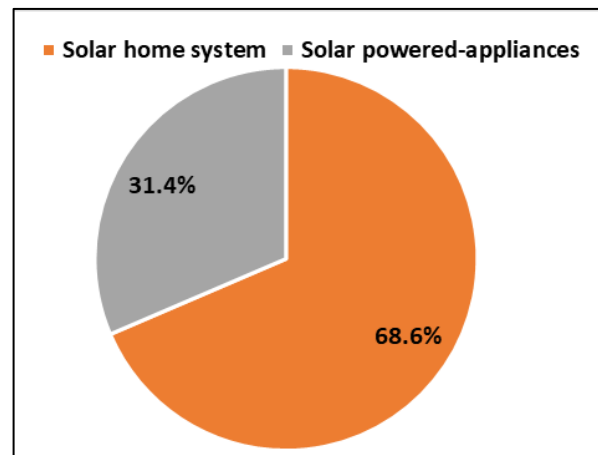


Figure 3: Type of solar energy system used by adopting households

Awareness of government support mechanisms for solar energy adoption was notably low. As shown in Figure 4, only 2% of respondents demonstrated comprehensive knowledge of existing government incentives or programmes, while the majority reported either limited or no awareness. This low level of awareness suggests weak policy communication and limited institutional outreach at the household level. Qualitative responses further

revealed concerns related to system quality, fear of substandard products, and limited access to reliable technical support. These factors collectively influence household confidence in solar energy technologies and contribute to delayed or foregone adoption decisions. Unreliable grid electricity supply emerged as the dominant driver of solar adoption, underscoring the central role of energy security concerns in household decision-making. This finding supports diffusion and technology acceptance theories, which emphasise perceived usefulness, particularly reliability and performance as a key determinant of technology uptake (Rogers, 2003; Davis, 1989). Environmental considerations and long-term cost savings were secondary motivations, suggesting that adoption decisions are driven more by pragmatic energy needs than by environmental awareness alone.

High upfront cost was identified as the most significant barrier to adoption among non-adopters, corroborating extensive literature on renewable energy diffusion in developing countries (Ohunakin *et al.*, 2014; Adelaja, 2020). Despite widespread interest in solar energy, limited access to suitable financing mechanisms constrains adoption, particularly for lower-income households. The overwhelming reliance on personal savings observed in this study highlights a critical gap in Nigeria’s household solar financing ecosystem and reflects weak integration between financial institutions and the distributed renewable energy market. Low awareness of government support programmes represents an additional institutional barrier. The finding that only 2% of respondents had comprehensive knowledge of existing incentives suggests weak policy communication and limited local-level implementation. This disconnect between policy formulation and household-level awareness has been widely documented in Nigeria’s renewable energy sector and continues to undermine the effectiveness of policy interventions (Adelaja, 2020; Ajia, 2025). We can deduce that while technical potential and household interest in solar energy are substantial in urban Lagos, adoption outcomes are shaped primarily by energy reliability concerns, affordability constraints, and financing availability, rather than by environmental motivations alone. Addressing these barriers is critical for scaling household solar adoption and reducing dependence on fossil-fuel-based self-generation.

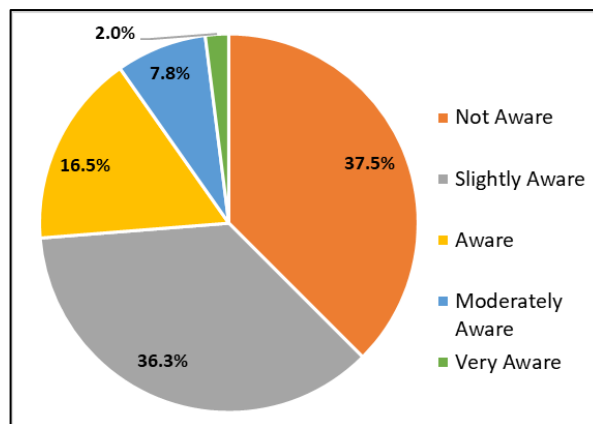


Figure 4: Respondents' Awareness of Government Support for Solar Energy

3.3 Financing Mechanisms for Solar Energy Systems

In the distribution of financing methods used by solar energy adopters, results indicate an overwhelming reliance on personal savings, with 93.8% of adopters funding system acquisition through out-of-pocket expenditure (Figure 5). Use of formal financing options such as bank loans, microfinance facilities, or pay-as-you-go arrangements was minimal. Respondents identified several financing challenges, including a lack of suitable loan products, high interest rates, and short repayment periods that are incompatible with the long-term cost recovery profile of solar investments (Figure 6). These challenges were reported across income groups but were more pronounced among lower-income households. The statistically significant association between household income level and preferred financial support mechanism further reinforces the importance of differentiated policy and financing approaches (Table 3).

Table 3: Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	210.845	8	<.001
Likelihood Ratio	242.542	8	<.001
N of Valid Cases	400		

Source: Survey, 2025

Lower-income households strongly favoured direct subsidies, while higher-income households preferred market facilitation and awareness-based support. This finding aligns with evidence from other developing-country contexts suggesting that uniform policy instruments are unlikely to achieve inclusive energy transitions (IRENA, 2023). Instead, layered

financing strategies that combine subsidies, concessional loans, and market-enabling measures are more likely to accelerate adoption across income groups.

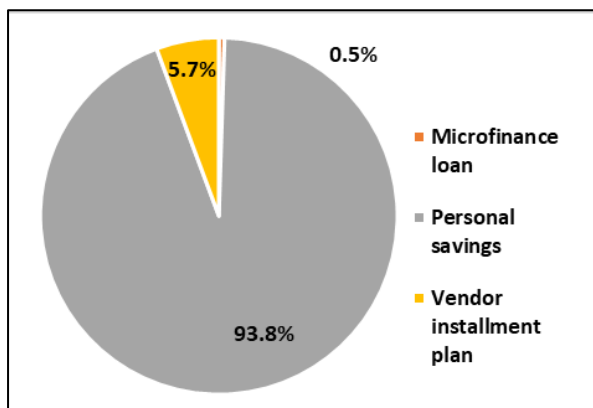


Figure 5: Distribution of Financing Methods for Solar Energy Users in Ikeja LGA

Preferences for financial support mechanisms are presented in Table 5. Respondents expressed strong preference for subsidies, low-interest loans, and flexible repayment structures as measures that could encourage wider adoption of solar energy systems. To further examine the relationship between income level and preferred financial support mechanism, a chi-square test of independence was conducted. Results show a statistically significant association between household income group and preferred support mechanism ($\chi^2 = 210.85, p < 0.001$) (Table 3). Lower-income households predominantly favoured direct subsidies (78.4%), while higher-income households showed greater preference for awareness-based support and market facilitation measures (Table 6). This finding highlights the importance of income-differentiated financing strategies in promoting inclusive solar energy adoption.

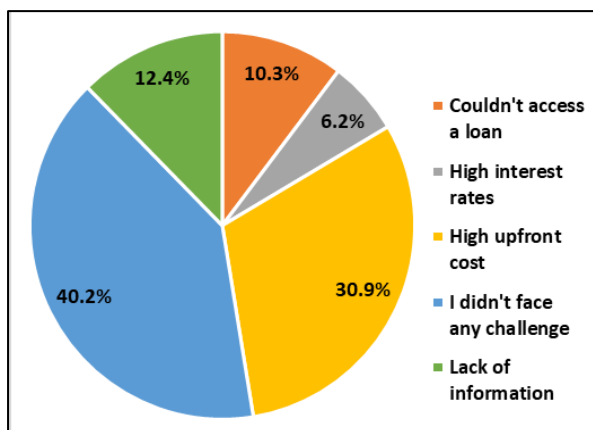


Figure 6: Financing Challenges Among Solar Energy Users in Ikeja LGA

3.4 Monthly income and preferred financial support mechanism

Low-Income Group ($\leq \text{₦}500,000$ per month) relies heavily on direct government intervention, reflecting limited disposable income and higher vulnerability. This income group (78.4%) depends more on government electricity subsidies. The group has minimal preference for loans (11.2%) and microfinance (10.3%) for solar-generated electricity based on its cost implication. This suggests risk aversion to debt and limited access to structured financial products. They showed no interest in awareness campaigns or vendor instalments, likely due to immediate survival needs rather than long-term financial planning (Table 4). Respondents in the middle-income group ($\text{₦}500,001\text{--}\text{₦}1,000,000$ per month) presented more diverse preferences unlike the low-income group. The middle-income earners embraced several mechanisms, government subsidies (23.4%), interest-free loans (26.8%), and vendor instalment plans (26.8%), showing willingness to manage debt responsibly. The awareness campaigns (12.4%) indicate openness to exploring financial options. Microfinance (10.5%) remains relevant, though not central. This group balances between needing support and leveraging structured financial tools.

Those in the high-income group ($> \text{₦}1,000,000$ per month) valued government subsidies (48.0%). Surprisingly, showing that even wealthy individuals value state support. There was a strong preference for awareness campaigns (50.7%). This income group wants information rather than direct aid, reflecting confidence in self-financing but interest in optimizing opportunities. There was minimal reliance on vendor instalments (1.3%) of solar electricity purchase, and there was no interest in loans or microfinance. Thereby indicating financial independence and avoidance of debt. Government subsidies cut across all groups, but their importance declines as income rises. This is indicative of the importance of support, which is appreciated by all, especially in relation to public goods which might be difficult for individuals to access (Okwanya et al., 2020; Olanrele, 2025). Debt instruments (loans, instalments) appeal mainly to the middle class, who balance affordability with aspirations. Awareness campaigns are crucial for high-income earners, suggesting that information dissemination could be a powerful policy tool (Okoye et al., 2016; Olanrele, 2025). Microfinancing is marginal across all groups, hinting at limited trust or relevance.

Table 4: Relationship between Monthly Income Group and Preferred Financial Support Mechanism

Financial Support Needed	Monthly Income Group (Income per month)		
	Low (≤ ₦500,000)	Middle (₦500,001– ₦1,000,000)	High (> ₦1,000,000)
Government subsidies	78.4%	23.4%	48.0%
Interest-free loans	11.2%	26.8%	0.0%
Microfinance support	10.3%	10.5%	0.0%
More awareness of available options	0.0%	12.4%	50.7%
Vendor instalment Plans	0.0%	26.8%	1.3%
Total	100.0%	100.0%	100.0%

Source: Survey, 2025

4. Conclusion and Recommendations

This study provides empirical evidence on household solar energy adoption in an urban Nigerian context, using the Ikeja Local Government Area of Lagos State as a case study. The findings demonstrate that solar energy adoption among households is relatively widespread but remains largely supplementary to grid electricity due to capacity limitations, cost barriers, and weak financing support.

The study contributes to literature by offering local government-level evidence on adoption dynamics, highlighting the central role of income and financing mechanisms in shaping household energy transitions. By linking adoption patterns to financing preferences, the research underscores the need for income-sensitive policy design in urban renewable energy planning.

From a policy perspective, several implications emerge. First, there is a need to strengthen household-level solar financing infrastructure through the development of specialised loan products with low interest rates and longer repayment periods. Partnerships between commercial banks, microfinance institutions, and renewable energy providers could improve access to finance and reduce reliance on personal savings.

Second, income-differentiated support mechanisms should be prioritised. Targeted

subsidies or grants for low-income households, combined with market facilitation and awareness campaigns for higher-income groups, would promote more inclusive adoption outcomes. Such differentiated approaches are more likely to accelerate uptake than uniform policy instruments. Third, policy communication and local-level implementation must be improved. Enhancing awareness of existing government incentives and programmes through local government channels, community engagement, and collaboration with private sector actors could significantly increase programme effectiveness.

Improving quality assurance and consumer protection through certification standards and installer regulation would help address trust-related concerns and enhance confidence in solar technologies. Accelerating household solar energy adoption in urban Nigeria requires coordinated interventions that address financing constraints, institutional weaknesses, and information gaps. Evidence from Ikeja Local Government Area of Lagos State suggests that with appropriate policy support and financing innovation, solar energy can play a significant role in improving urban energy security and supporting Nigeria's broader energy transition goals.

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