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Factors Affecting the Adoption of Renewable Energy (Solar) in Rhodes Park Area of Lusaka District, Zambia

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Abstract

Purpose: This study investigated the factors affecting the adoption of solar energy in Rhodes Park, Lusaka. The objectives of the study were to assess the awareness of solar energy benefit among residents and business, also to identify the challenges to adoption and to evaluate the effectives of existing incentives and policies.

Methodology: A mixed methods approach was used, with qualitative and quantitative data. A total of 240 respondents took part in the quantitative part through a questionnaire, while 12 respondents took part in the qualitative part through interviews.

Findings: The findings revealed that 75 percent of the respondents were aware of the benefits of solar energy, from this adoption was observed to be low due to financial constraints, lack of information as well as concerns about efficiency. The high upfront cost was recognized as the most significant barrier according to 63 percent of the respondents, it was followed limited awareness on government incentives. In addition to that social media and traditional media were the primary sources of information, yet government policy communication hindered adoption. To support these findings, they aligned with the Barrier theory, which explains the disconnect between awareness and actual implementation due to economic and informational challenges.

Unique Contribution to Theory, Policy and Practice: The study concluded that while awareness levels were higher, inadequate policy communication, financial problems and maintenance costs prevented the adoption. The study recommended that there is a need for financial support through subsidies and loans as well as technical education or training to address these challenges. This requires policy direction to guide the suppliers and beneficiaries of solar energy.

Keywords: *Solar Energy, Renewable Energy, Load-shedding, Climate Change*

Introduction

Energy is critical for socio-economic development, supporting sectors such as agriculture, healthcare, housing, education, and transportation. Reliable energy access promotes industrial growth, modern lifestyles, and improved public services, which are fundamental for social and economic stability. Globally, energy scarcity remains a pressing challenge, especially in developing regions like Africa, where millions still lack electricity access. In Zambia, the energy sector plays a pivotal role in national development but faces persistent challenges such as infrastructure deficits, power shortages, and frequent load-shedding (IEA, 2021).

Zambia's energy production is heavily dependent on hydropower, accounting for over 90% of the installed capacity (IEA, 2021). Although hydropower is renewable and low in emissions, it relies heavily on stable water levels. Prolonged droughts have severely affected reservoir levels, resulting in frequent power outages (Kambole et al., 2023). This over-reliance highlights the urgent need for energy diversification. Despite having immense solar potential approximately 5.5 kWh/m²/day and over 3,000 sunshine hours per year (Akinyemi et al., 2024) solar energy only contributes about 3% of Zambia's total installed capacity.

The National Energy Policy of 2019 emphasized expanding energy access and promoting investments in alternative energy sources (World Bank, 2022). However, high upfront costs, weak financing models, regulatory barriers, and limited public awareness continue to hinder widespread solar adoption. These challenges are exacerbated by bureaucratic bottlenecks and a lack of skilled technical support (Mumba and Phiri, 2022). In urban areas like Rhodes Park in Lusaka, residents experience frequent power interruptions. Yet despite high awareness of solar benefits, adoption rates remain disappointingly low (Chanda et al., 2021). Understanding the underlying barriers in such areas is critical for informing future energy interventions.

The urgency to diversify Zambia's energy sources has grown due to worsening energy shortages. Frequent load-shedding negatively impacts businesses, homes, and essential services, reducing productivity and threatening economic stability (Frost and Sullivan, 2019). Rhodes Park represents a microcosm of these national challenges, providing a fitting case study to investigate barriers to solar adoption.

Solar energy offers a sustainable solution to Zambia's energy crisis, particularly considering the country's excellent solar resource base (Hernandez & Cardoso, 2020). However, the low adoption rate, even in urban areas, indicates that technical and financial obstacles remain unresolved. By focusing on Rhodes Park, this study aimed to explore the factors preventing solar uptake, contributing to solutions aligned with Zambia's National Energy Policy objectives and global sustainability goals (Lungu et al., 2023).

Problem Statement

Despite abundant solar potential and worsening power shortages, solar energy adoption in Rhodes Park remains low. Zambia's continued reliance on hydropower, coupled with low investment in

alternative sources, has led to regular blackouts, severely affecting homes, businesses, and industries (IEA, 2021; Frost & Sullivan, 2019). Although Rhodes Park residents suffer from these energy challenges, many have not embraced solar power as an alternative (Karekezi and Kithyoma, 2024).

The barriers to solar energy adoption such as high installation costs, lack of affordable financing, regulatory inefficiencies, and limited public knowledge about available incentives need to be better understood. Addressing these issues is essential for boosting renewable energy uptake, improving energy security, and fostering economic resilience.

Purpose of the Study

This study sought to evaluate the factors affecting the adoption of solar energy in Rhodes Park, Lusaka. It aimed to assess awareness levels among residents and businesses, identify challenges hindering adoption, and evaluate the effectiveness of existing policies and incentives. Through this investigation, the research contributes practical insights that can inform policy reforms, financing innovations, and public awareness initiatives to accelerate Zambia's transition towards sustainable and reliable energy solutions.

Literature Review

A study by Zhang et al. (2020) looked at the awareness and use of solar energy among people and small businesses in Shanghai, China. The research used a descriptive study design and included 200 participants chosen through random sampling. The study found that 78% of respondents were aware of the environmental and cost-saving benefits of solar power. The study concluded that public education and government support played a big role in increasing both awareness and adoption of solar energy.

Another study by Gupta and Sharma (2021) looked at the awareness of solar energy among small business owners in Jaipur, India. The study included 180 participants selected through stratified random sampling and used both qualitative and quantitative methods. While 65% of respondents were aware of solar energy's environmental benefits, adoption was low due to concerns about system reliability and high upfront costs. The study found that while people were aware of solar energy, practical concerns stopped many from using it.

In a study by Schneider and Bauer (2023), researchers looked at solar energy adoption in both urban and rural areas in Berlin. They surveyed 500 participants and found that 95% were aware of solar energy, largely because of strong government support and educational programs. Adoption rates were high too, with 80% of participants using solar energy. The study showed how effective government incentives, education, and technical support were in encouraging people to use renewable energy.

A study by Miller et al. (2021) focused on solar energy adoption in California, looking at residential households. The study surveyed 250 participants and found that 85% were aware of

solar energy's environmental benefits, but only 30% had installed solar panels. The main obstacles were high installation costs and unclear information about financial incentives. The study suggested that simplifying access to subsidies and improving financing options could increase adoption rates.

Challenges in adopting solar energy

A study by Zhang and Li (2020) examined the obstacles to adopting solar energy among households in Shanghai, China. The research used a mixed-methods approach, including quantitative surveys and qualitative interviews, with a sample of 200 residential homeowners selected through stratified random sampling. The study identified major barriers to solar energy adoption, such as high installation costs and a lack of financial incentives from the government. Quantitative data showed that 65% of respondents cited the initial cost as the primary deterrent. Qualitative interviews revealed additional issues like insufficient information on long-term savings and poor customer service from solar companies. Despite these barriers, the study concluded that potential savings from reduced electricity costs and growing awareness of environmental benefits were strong motivators for households to consider adopting solar energy in the future.

A study by Patel and Singh (2022) investigated solar energy adoption among rural households in Gujarat, India. The research used a quantitative survey method with a sample of 250 households selected through cluster sampling. Findings showed that 70% of respondents were aware of solar energy's benefits, but only 25% had adopted it. The study highlighted financial barriers, particularly the inability to afford the initial installation costs, as the main challenge. The study also found that lack of access to reliable solar products and maintenance services deterred rural households from adopting solar energy. The study recommended offering government subsidies and creating financing schemes tailored for rural populations.

In Soweto, South Africa, Mpofu et al. (2023) investigated the challenges and opportunities associated with solar energy adoption in low-income communities. Using a qualitative approach, the study involved 50 households and interviews with local policymakers and energy providers. The findings revealed that affordability was the primary barrier, with 80% of respondents citing the inability to afford solar panels as the main challenge. The study also highlighted limited knowledge about solar technologies and a lack of skilled technicians. Despite these barriers, households with access to solar energy reported improvements in quality of life, including consistent lighting for education and reduced reliance on expensive paraffin. However, only 25% of households had adopted the technology. The study identified challenges in policy implementation, particularly the inefficiencies in solar subsidy programs, and recommended enhancing community awareness and simplifying access to subsidies to encourage adoption.

Ochieng et al. (2022) examined the effectiveness of solar energy initiatives in advancing rural electrification in Turkana County, Kenya. The study used a mixed-methods approach, combining survey data from 200 households with interviews from local government officials and solar energy

suppliers. The research found that high costs and inadequate technical support hindered solar adoption, despite strong government interest in promoting renewable energy. Quantitative data indicated that 60% of households found solar systems too expensive, and 45% faced challenges with system maintenance. However, households that adopted solar energy reported improvements in household income through extended business hours and better crop irrigation. The study also noted policy gaps, particularly the absence of a robust framework for regulating solar products and recommended targeted subsidies for rural households and better enforcement of quality standards.

Effects of incentives and policies in promoting solar energy adoption

In California, USA, a study by Johnson and Lee (2020) found that government incentives played a crucial role in encouraging homeowners to adopt solar energy. The research, which surveyed 300 homeowners, revealed that 75% of those who installed solar panels cited government tax breaks as a significant factor in their decision. Additionally, homeowners appreciated the ability to sell excess power back to the electricity grid, which made the investment in solar energy more appealing and financially viable.

However, in Tokyo, Japan, the situation was different. Business owners there struggled with the high installation costs, and the government assistance available was not sufficient to make solar adaptation feasible. The process of applying for help was overly complicated, and inconsistent regulations across different areas created confusion. These challenges made many business owners hesitant to invest in solar energy, as they were unsure of the benefits and support available (Nakamura et al., 2021).

Theoretical Framework

According to Grant and Osanloo (2014), "one of the most significant aspects in the research process is the theoretical framework." The framework explains how to apply a theory to one's research and gives solid proof in the form of well-researched academic findings on which a researcher would base his research variables. As accessed on www.afribary.com. "Theoretical framework is defined as the explanation of earlier established theories and how they may relate to one's new study."

Barrier Theory

Barrier Theory, developed in the 1980s, examines the obstacles to adopting new innovations. This theory is still important in studies on renewable energy, including solar energy. Recent research has applied this theory to understand real-world issues like financial, regulatory, and logistical barriers.

Ravindra et al. (2023) studied solar energy adoption in India and found that financial barriers were the biggest challenge. 70% of people said high upfront costs and limited financing options were major obstacles. Adebayo and Okafor (2022) also looked at government support in Nigeria. They

found that unclear policies and a lack of subsidies discouraged people from using solar energy. Both studies showed the need for better financial support.

Regulatory barriers are another issue. Mohamed et al. (2024) studied Nairobi, Kenya, and found that complicated permit processes and a lack of clear rules made it harder to install solar systems. They suggested simplifying the rules and making them consistent to help more people adopt solar energy.

Tunde et al. (2022) explored logistical issues in Ghana, focusing on problems like supply chain delays and a shortage of skilled workers. These issues slowed the spread of solar technologies. They recommended improving local supply chains and offering training for technicians to solve these problems.

In Rhodes Park, Zambia, Barrier Theory helps understand the challenges people face in adopting solar energy. Studies show that financial barriers like high upfront costs, along with regulatory and logistical issues, make it hard for people to use solar power. To overcome these challenges, Zambia can offer financial help, simplify regulations, and build capacity for local technicians.

Methodology

The methodology was carefully designed to ensure a strong investigation of factors influencing solar energy adoption in Rhodes Park, Lusaka. The study adopted a mixed approach, combining both quantitative and qualitative methods to gain a fuller and richer understanding of the research problem. The research was convergent and ensured that not only were the numerical trends captured, but also the underlying reasons and experiences behind these trends were explored, enhancing the validity and depth of the findings (Creswell and Clark, 2024).

A deductive approach was used to test existing theories such as the Barrier Theory and the Technology Acceptance Model, by applying them to the specific context of solar adoption in Rhodes Park (Musonda and Simukonda, 2023). Meanwhile, an inductive approach through open-ended interviews helped uncover new themes that existing theories might not have explained fully (Joseph, 2021). This balanced use of deductive and inductive reasoning strengthened the study's ability to validate existing knowledge while contributing new insights.

The study operated on a cross-sectional time horizon, collecting data within a six-month window. This snapshot approach allowed the researchers to gather timely and relevant information about solar energy adoption patterns without the risk of changing conditions altering the results mid-study.

For sampling, the study carefully defined its sampling frame to include all households and businesses in Rhodes Park, whether they had adopted solar energy or not. This inclusive frame minimizes bias and allowed for a broad perspective. The sample size was determined through Yamane’s formula (1967) at a 95% confidence level and a 5% margin of error, resulting in 240 participants for the quantitative component. This scientific calculation supported the statistical

validity of the quantitative findings. For the qualitative component, purposive sampling was used to select 12 key informants with deep knowledge about solar adoption issues, ensuring that the qualitative insights were rich and meaningful.

Both probability that is stratified sampling for quantitative and non-probability that is purposive sampling for qualitative research were applied. Stratified sampling ensured uniformity across demographic and business backgrounds, while purposive sampling targeted those with the most relevant experiences. This strategic use of sampling techniques enhanced the reliability and validity of the findings by ensuring representation and depth.

Validation of Instruments and Pilot Study

The instruments developed for data collection included structured questionnaires with both closed-ended and open-ended questions for the quantitative study and interview guides for the qualitative study. To ensure the validity and reliability of these instruments, a pilot study was conducted.

The pilot study involved a small, representative sample from Rhodes Park to pre-test the questionnaire and interview guide. Feedback from the pilot was used to refine the wording of questions, remove ambiguity, and adjust the structure of the instruments for clarity and flow. This step confirmed that the instruments were understandable, measured what they intended to measure, and could elicit reliable responses. Problems such as question misunderstanding or logical inconsistencies were corrected before full-scale data collection, boosting the content validity of the tools (Creswell, 2022).

The researchers also tested the interview recording process and transcription using Otranscribe software to ensure that qualitative data could be accurately captured. This ensured that the subsequent NVivo-based analysis would be based on clean, coherent data.

Data Collection and Analysis

Data collection incorporated both primary and secondary sources. Primary data were gathered directly from respondents via questionnaires and interviews, while secondary data from literature and previous reports offered a contextual background (Creswell, 2022).

Quantitative data was analyzed using SPSS Version 23. The process began with descriptive analysis to profile respondents, followed by bivariate analysis using Chi-square tests to identify relationships between independent and dependent variables. The significance level of $p<0.05$ was used to determine the statistical significance of results (Trochim, 2023). The findings were then visualized using MS Excel for easy interpretation.

Qualitative data was transcribed and analyzed thematically using NVivo software. Common themes were identified, coded, and connected to form meaningful narratives that complemented the quantitative findings. This dual analysis approach provided both breadth and depth, offering a comprehensive understanding of solar adoption in the study area.

Findings

Awareness of Solar Energy Benefits

The respondents were asked whether they were aware of the benefits of using solar energy. Figure 1 presented the responses collected from 240 participants. The distribution of responses indicated different levels of awareness.

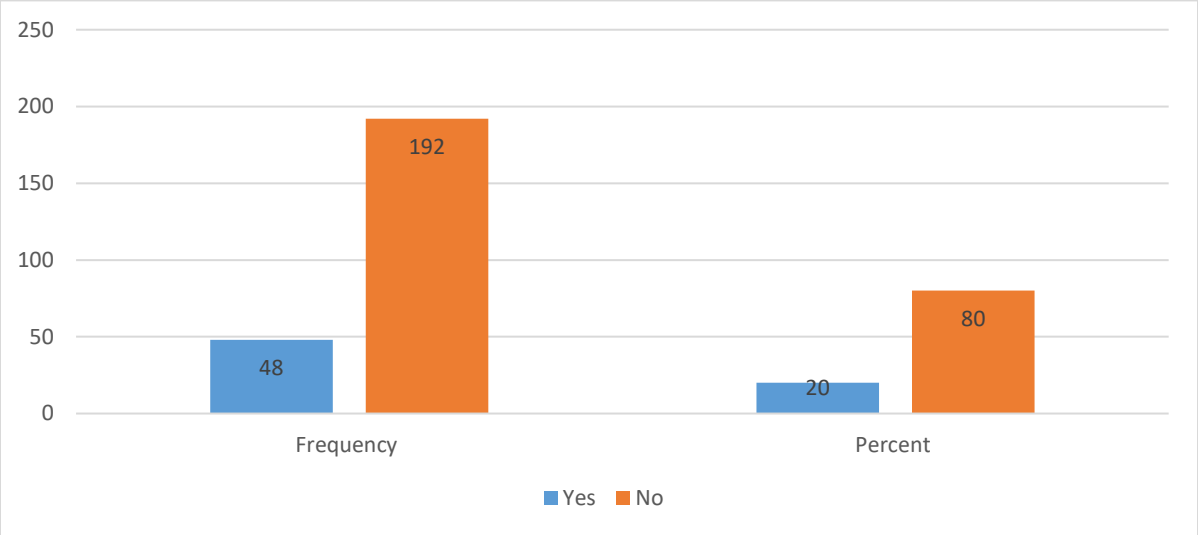

Figure 1: Awareness of solar energy benefits

Source: Researchers Field work (2025)

The findings highlighted that awareness levels were high, but a quarter of respondents remained uninformed about solar energy benefits.

Sources of Solar Energy Awareness

The researcher asked the respondents how they first learned about solar energy. Figure 3 shows the responses, indicating that different media played a role in spreading awareness. Among the respondents, 72 representing 30% cited social media as their first sources of information about solar energy, while 60 representing 25% mentioned television and radio. Additionally, 48 representing 20% learned about it through friends and 36 representing 15% gained awareness from community workshops. Lastly 24 representing 10% indicated other sources including newspapers articles and personal research.

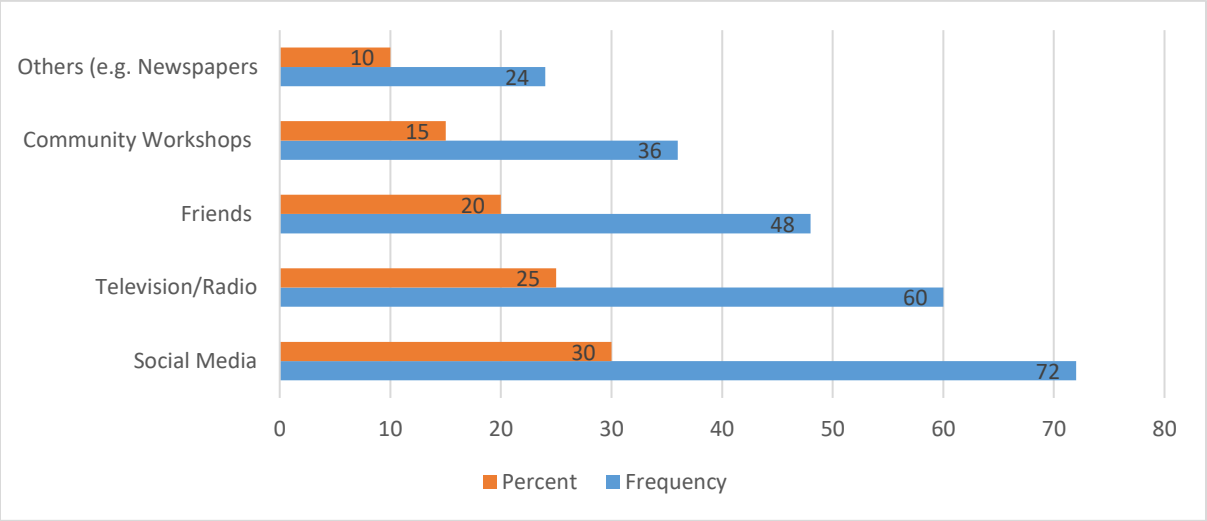

Figure 2: Sources of Solar Energy Awareness

Source: Researchers field work (2025)

The findings from the in-depth interviews with 12 respondents in Rhodes Park reveal that while most participants had a basic understanding of solar energy as power generated from the sun, their technical knowledge varied. Respondents commonly recognized solar energy as a clean, renewable alternative to grid electricity, often mentioning that it could help reduce electricity bills and provide power during load shedding. The main sources of information about solar energy were social media, word of mouth, and observing others who had adopted solar solutions. Several respondents shared that their interest in solar energy grew over time, particularly in response to increased load shedding and high electricity costs. Key perceived benefits included cost savings, energy independence, and environmental friendliness. Respondents noted that solar energy could reduce reliance on the national grid and help avoid high ZESCO bills, while also being a cleaner alternative to generators. Despite these positives, some expressed concerns about the high initial installation cost and doubts about solar energy's capacity to power heavy appliances.

The challenges in adopting solar energy in Rhodes Park, Lusaka.

Respondents were asked to express their level of agreement with statements regarding the main reasons preventing them from adopting solar energy. Table below shows the responses obtained from 240 residents and business owners in Rhodes Park, Lusaka. The distribution of the responses highlighted varying perspectives on the barriers to adopting solar energy

A significant proportion of respondents 63% perceived high initial costs as the biggest barrier to adopting soar energy. 20% believed that a lack of information was a major challenge. From the table Maintenance challenges and insufficient government support received relatively lower agreement levels, suggesting that while they are concerns, they may not be as pressing as the cost and awareness.

Table 1: Reasons preventing the respondents from solar energy adoption

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	High Initial Cost	151	63.0	63.0	63.0
	Lack of information	48	20.0	20.0	83.0
	Maintenance Challenges	24	10.0	10.0	93.0
	Insufficeint Government Support	17	7.0	7.0	100.0
	Total	240	100.0	100.0	

Source: Researchers Field work (2025)

The findings indicate that the high initial cost is the most significant barrier preventing solar energy adoption, followed by a lack of information. These two factors highlight the need for financial incentives and educational campaigns to improve solar energy adoption rates**.**

The in-depth interviews revealed several key obstacles that hinder the adoption of solar energy among residents and business owners in Rhodes Park. These challenges were mainly grouped into three categories: financial barriers, lack of adequate information, and doubts about efficiency and reliability. Many respondents highlighted the high initial cost of installing a solar energy system as the most significant deterrent. They noted that a complete setup, including panels, batteries, and inverters, could cost over K30,000, making it unaffordable for the average household or small business. Despite acknowledging long-term savings, most could not afford the upfront investment and suggested that government support in the form of loans or subsidies might help increase adoption. Another major concern was the lack of reliable and understandable information about solar energy. Respondents expressed confusion due to conflicting opinions online and uncertainty about whether solar systems could meet their specific energy needs. This uncertainty was further compounded by tenants, who felt discouraged from investing in fixed installations they couldn't move with.

Technical concerns also emerged, especially around system maintenance and battery issues. Many were unsure of where to find skilled technicians or how to maintain solar components if problems occurred. There were fears that solar batteries might not last long and would be expensive to replace. Some also doubted the effectiveness of solar systems during bad weather or questioned their durability based on negative experiences shared by others.

Effects of current incentives and policies in promoting solar energy adoption in Rhodes Park

Respondents were asked whether they are aware of any government incentives promoting solar energy, figure below shows the responses from 240 residents and business owners in Rhodes Park, Lusaka.

Among the respondents 48 representing 20% said Yes indicating that they were aware of the government incentives promoting solar energy while 192 representing 80% said no. the results suggested that a significant portion of the populations lacked awareness of the government initiatives supporting solar energy adoption, highlight the need for increased public information Campaigns.

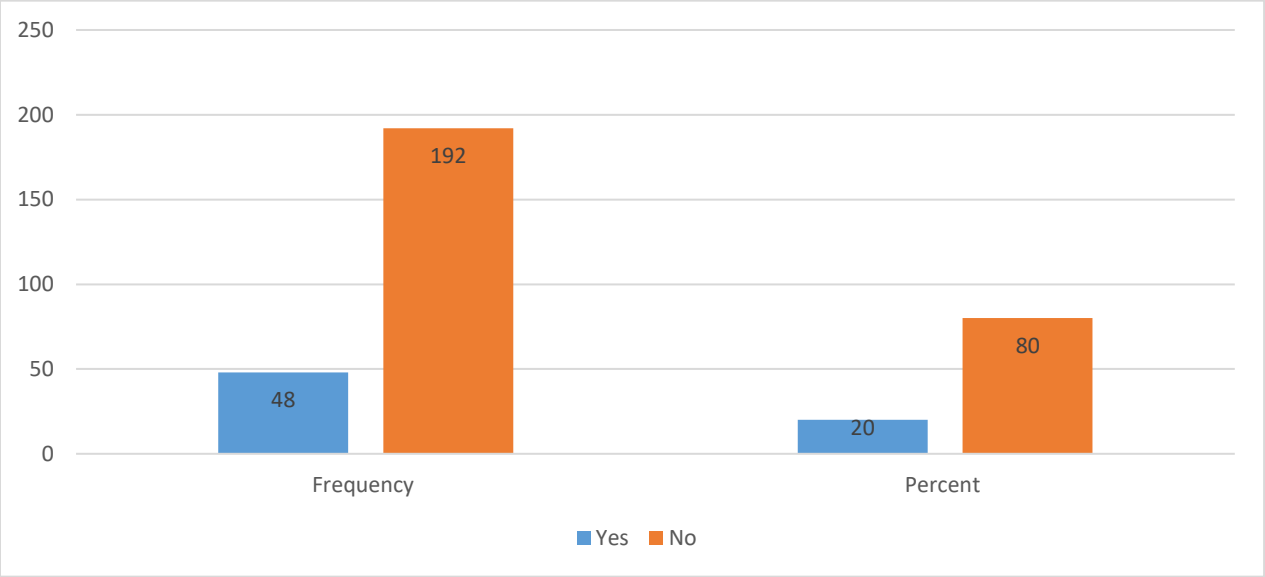

Figure 3: Awareness and government incentives for solar energy

Source: Researchers field work (2025)

The findings indicated that more than half of the respondents were unaware of government incentives for solar energy. This lack of awareness may be a barrier to adoption, suggesting a need for better outreach and communication from policymakers to inform residents and business about available support programs.

The interviews revealed that most respondents in Rhodes Park, Lusaka, had limited or no awareness of government programs or incentives supporting solar energy. While a few mentioned hearings about tax reductions or solar use in public institutions, they lacked detailed information and did not know how or where to access such support. This limited awareness has led to a perception that government initiatives, if they exist, are not well advertised or accessible to ordinary citizens. Even those who were vaguely aware of government initiatives felt that these programs had little visible impact. Respondents questioned why solar systems remained unaffordable despite claims of government support, suggesting that the benefits might only be

reaching businesses or large institutions. There was a strong sentiment that government efforts were not trickling down to the individual or household level due to poor communication and engagement strategies. There was consensus among all respondents on the need for more proactive government involvement to support solar energy adoption. Suggestions included financial assistance through subsidies, zero-interest loans, or tax exemptions; public awareness campaigns to educate citizens about solar energy benefits; and training programs to improve technical knowledge about solar installation and maintenance. Respondents also proposed that the government should collaborate with banks, NGOs, or private companies to create inclusive and accessible financing options for individuals and small businesses.

Discussion

Awareness of Solar Energy Benefits

The research conducted in Rhodes Park, Lusaka, revealed a generally high awareness of solar energy benefits, with 75 percent of respondents demonstrating knowledge of its advantages. This mirrors findings from Zhang et al. (2020) in Shanghai and Schneider and Bauer (2023) in Berlin, who found awareness levels at 78 and 95 percent, respectively. However, the persistence of a 25 percent awareness gap among local respondents underlines the need for more inclusive information campaigns. Kato and Nakimera's (2021) study in Kampala, which reported moderate awareness levels at 58 percent, reflects similar disparities found in developing urban contexts, where awareness is often stratified by socioeconomic status or access to information.

The dominant role of social media (30 percent) and traditional media (25 percent) in shaping awareness in Rhodes Park aligns with global patterns. Gupta and Sharma (2021) emphasized how digital platforms, including social media, have significantly boosted awareness in India, while Brown and Patel (2022) underscored the effectiveness of government-funded television campaigns in Australia. Moreover, the significant role of interpersonal communication (friends, family 20 percent) and community workshops (15 percent) confirms the importance of localized and trust-based knowledge sharing, reinforcing findings from Adeyemi and Ojo (2023), who emphasized peer influence in renewable energy knowledge spread across West Africa.

These findings support aspects of Barrier Theory, which suggests that the existence of financial, informational, and logistical obstacles limits the transition from awareness to adoption. As reported in studies by Ravindra et al. (2023) and Adebayo and Okafor (2022), high upfront costs and the absence of policy clarity are major deterrents to uptake despite widespread awareness. Similarly, Tunde et al. (2022) identified inadequate supply chains and a shortage of technical expertise as limiting factors in Ghana, issues also mentioned by Rhodes Park respondents. Financial concerns cited by many interviewees highlight the pressing need for financing options, such as zero-interest loans or government subsidies. These could help convert solar awareness into actual adoption by mitigating economic risks perceived by potential users.

Challenges in Adopting Solar Energy in Rhodes Park, Lusaka

The study found that the high initial cost is the most significant barrier to solar energy adoption in Rhodes Park, cited by 63% of respondents mirroring findings in China (Zhang and Li, 2020) and Ghana (Agyeman et al., 2020), where upfront costs were similarly prohibitive. Lack of information followed, with 20% of respondents unaware of solar energy benefits, aligning with studies from India (Patel and Singh, 2022) and South Africa (Mpofu et al., 2023), which emphasized limited awareness and technical knowledge. Although maintenance and lack of government support were less critical locally, studies in Kenya (Ochieng et al., 2022) and the U.S. (Johnson et al., 2021) show these factors can become major barriers if unaddressed. In conclusion, financial constraints and information gaps are the most pressing challenges in Rhodes Park. To overcome them, targeted subsidies, public awareness campaigns, and access to skilled technicians are essential for broader solar energy adoption.

Effects of Current Incentives and Policies in Promoting Solar Energy Adoption in Rhodes Park, Lusaka

The study found that only 20% of respondents in Rhodes Park were aware of existing government incentives for solar energy, indicating a major information gap that limits adoption. Qualitative responses confirmed this, with many expressing confusions about eligibility and accessibility, and some believe incentives mainly favor large businesses. These findings echo global patterns where poor communication weakens policy effectiveness. Key barriers included financial constraints, unclear policy details, and skepticism about solar reliability. To address these, respondents proposed subsidies, tax breaks, and awareness campaigns. Rooted in Barrier Theory, the study highlights that incentives alone are insufficient without strong outreach and accessible financing. Therefore, enhancing public engagement, simplifying access to incentives, and using media to inform citizens are critical steps to improve solar adoption and energy sustainability in Zambia.

Conclusion

The study concluded that while awareness of solar energy benefits in Rhodes Park is relatively high, actual adoption remains low due to key barriers such as high upfront costs, limited knowledge of government incentives, and technical concerns. Financial constraints were the most critical challenge, compounded by poor dissemination of information about existing support programs. Despite available policies and incentives, their effectiveness is limited due to inadequate outreach and bureaucratic complexity. The findings highlight that raising awareness alone is not enough—there is a clear need for targeted financial support, improved technical assistance, and streamlined policy implementation.

The findings of this study carry several important implications for policy, practice, and future research. Firstly, the persistent financial barriers and low awareness of incentives imply that existing government efforts are not reaching their intended targets effectively. This suggests a need for policymakers to redesign communication strategies and make financial support more accessible, particularly to low- and middle-income households. By improving public

understanding and reducing the cost burden, solar energy can become more inclusive and widespread.

Secondly, the lack of technical expertise and maintenance support signals a skills gap in the local workforce, which has implications for vocational training and employment creation. Government and private sector initiatives could use this opportunity to invest in capacity-building programs that not only support solar energy rollout but also generate jobs in the renewable energy sector.

Lastly, the study's alignment with global trends underscores the universal nature of the barriers to solar adoption, which strengthens the case for Zambia to learn from best practices in other countries. This includes implementing innovative financing models, such as pay-as-you-go systems or micro-leasing, which have proven successful elsewhere. Ultimately, the study highlights the need for a coordinated, multi-sectoral approach that combines financial, technical, and informational interventions to drive meaningful progress toward a sustainable energy future.

Acknowledgement

I would like to thank the residents of Rhodes Park in Lusaka district for being available and contribute meaningfully to this study. The residents took time to respond and give insights so variable to this article.

Ethical Issues

The researchers sought Ethical clearance from the ZCAS University Research Ethics Committee, and the study was conducted in line with the Ethical guidelines from the University.

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