

Reviewing the Effect of Energy Access on Operational Efficiency in the Hospitality Sector, Nigeria

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Abstract

Inadequate energy access continues to be a major obstacle to profitability, competitiveness and business continuity in the hospitality and tourism sector. This research studies the impact of insufficient electricity access on Nigeria's hospitality industry's operational efficiency. In particular, it investigates the broader impacts of energy inefficiency on hospitality sector growth, profitability, competitiveness, and proposes a framework of action. Findings showed that unstable energy access disrupts key operational areas such as guest comfort, kitchen services, ICT infrastructure, and staff productivity. Comparative regional evidence from Rwanda, Kenya, and Ghana demonstrates that strategic investment in renewable energy, policy reforms, and decentralized power systems significantly enhances energy resilience in hospitality operations. The study concludes that Nigeria's hospitality sector faces a cycle of high operational costs, service disruptions, and reputation risks driven by energy insecurity. Therefore, addressing this issue requires targeted policy reforms, renewable energy adoption, and efficiency-enhancing strategies.

Keywords: Energy access, Hospitality, Operational efficiency, Service quality, Nigeria

Introduction

Energy access and quality are among the major challenges in development and have been regarded as a dual crisis of both absolute deprivation and chronic unreliability in sub-Saharan Africa (Mulugetta, Hagan, & Kammen, 2019). Improving energy access and quality has become a global effort that has raised several concerns among world leaders, governments, development agencies, and individuals alike. This is because availability of inexpensive clean energy is a *sine qua non* for the sustainable development of developing countries. Increasingly, dependable and reasonably priced energy is seen as a key driver for improving health, education, gender equality, and economic productivity

in developing nations (Alstone, Gershenson & Kammen, 2015). Energy access refers to the provision of reliable, affordable, and modern energy services that are acquainted with and designed to address the complex, cross-cutting economic, social, political, environmental, and cultural facets of society to promote social and economic change and enable the eradication of poverty. (McCulloch & Ashford, 2021; Mulugetta, Hagan, & Kammen, 2019). Energy access has the capability to uplift lives, stimulate economic growth, improve health outcomes, and promote social equity for all people. Despite the fact that some progress has been made to enhance energy access, 789 million people in sub-Saharan Africa are thought to be without access to electricity (McCulloch & Ashford, 2021), with electrification growth slowing from 0.8% annually (2010-2018) to just 0.5% (2018-2020). At this rate, 670 million people will still lack access in 2030. Thus, to close this gap, 100 million people, including 80 million in Africa, must gain access every year until 2030 (Shittu, Saqib, Latiff, & Baharudin, 2024).

In 2015, the United Nations new universal agenda on “Transforming our world: the 2030 Agenda for Sustainable Development,” registered tremendous response from international leaders on an action plan for the earth, people, prosperity, and world peace. During the seventieth anniversary, the summit took place from September 25–27, 2015, at the United Nations headquarters in New York. 17 Sustainable Development Goals (SDGs) were agreed upon by world leaders to be accomplished by 2030. Among the identified 17 goals, the seventh goal (SDG7) is specifically aimed at taking immediate measures to guarantee that everyone has access to modern, affordable, dependable, and sustainable energy. With the inception of this goal, energy access received significant attention, with the goal of extending electricity access to individuals residing in regions experiencing energy poverty (Tarekegne, 2020). Yet, despite growing investments in clean energy in many developing countries, including Nigeria, the transition is happening much more slowly than needed. As rightly noted, inadequate infrastructure can hinder the development of a tourism destination with unique attractions (Egere & Anunobi, 2022). The central reason for this is poor energy governance. There were still an estimated 789 million people without access to electricity, mostly in sub-Saharan Africa. Even for those who do have access, reliability remains poor (McCulloch & Ashford, 2021).

Consequently, access to electricity is vital for eradicating extreme poverty and promoting shared prosperity. People without access to electricity suffer developmental setbacks, including adverse consequences for their health, education, gender equality, food security, livelihood, and poverty reduction (Hussain et al., 2023). Anunobi, Egere & Anyanwu, (2017) pointed out that tourism industry has suffered from neglect and the resultant effect is poverty in the midst of plenty. Akinyele and Adepoju (2023) emphasized that inadequate energy access, characterized by unreliable electricity supply, frequent outages, and high dependence on costly alternative power sources,

has become a critical bottleneck for hotels, restaurants, and resorts across Nigeria. According to the International Energy Agency (IEA, 2022), only about 55% of Nigeria's population had access to electricity in 2021, with actual supply often falling below demand due to poor transmission infrastructure, inadequate generation capacity, and systemic losses across the grid. Despite being Africa's largest economy and a major oil and gas producer, Nigeria continues to experience low electricity access and reliability, particularly in commercial and urban service sectors such as hospitality and tourism (Nweke, Irobiso, & Payman, 2025). This inconsistent service delivery across the hospitality and tourism sector continues to undermine Nigeria's global competitiveness (Okeke et al., 2023).

The hospitality and tourism sector in Nigeria heavily depends on reliable energy access for effective service delivery, yet the persistent energy challenges undermine its operational efficiency (Okeke et al., 2023). Marianne & Conrado (2025) and Wilson (2025) refer to operational efficiency as the capacity of hospitality establishments to attract, deliver services cost-effectively, consistently, and at a quality standard that meets customer expectations, restructuring processes, developing staff, resource utilization, and retaining of talents. Letsa and Asimah (2018) pointed out that service delivery failures can place hospitality service providers in a predicament and even put them out of business if attention is not paid to the causative problems. Consequently, the unreliability of Nigeria's national grid results in inadequate energy access, directly hampers critical functions such as refrigeration, lighting, air conditioning, and ICT systems, all of which are essential to guest satisfaction and operational efficiency. Literature demonstrates that when a service failure occurs, customer loyalty is affected by how the complaint is handled, the magnitude of the failure, and the overall satisfaction generated after the poor service. To maintain customer satisfaction by ensuring uninterrupted services, hospitality businesses depend on costly and polluting back-up generators that increase operational expenses (Ogunleye & Iwayemi, 2021). This financial burden reduces profit margins and limits their capacity to scale or meet global service standards (Letsa & Asimah, 2018).

Additionally, the high cost of self-generated electricity presents a barrier to profitability and growth. A recent study by Umenzekwe, Ochije & Okonewa (2025) noted that frequent power outages, high electricity tariffs, and the cost of alternative power sources significantly affect business operations. It also negatively affects productivity by causing delays and disruptions, reducing profitability through increased operating costs, and limiting cost competitiveness by raising production costs. These disproportionate energy burdens force operators to cut corners, reduce service hours, or limit facility usage, all of which compromise customer satisfaction and operational performance.

Furthermore, the high energy burden discourages investment and innovation in the sector (Akrivi, 2025). Hospitality operators are often forced

to divert funds from strategic improvements into recurring energy costs, creating a cycle of stagnation and inefficiency. As rightly noted, variability in service quality can adversely impact customer satisfaction and loyalty, which undermines brand reputation and diminishes the overall competitiveness of the sector (Hadi & Indradewa, 2019). Ultimately, the lack of dependable, cheap, and sustainable energy access remains a critical barrier to operational efficiency, service quality, and long-term growth in the hospitality industry and therefore requires critical analysis. The result of the analysis will no doubt contribute immensely towards ensuring that there is a holistic improvement in inexpensive, dependable, sustainable, and contemporary energy access for all before and after 2030, thereby achieving the Sustainable Development Goals.

Deriving from what has been said, the specific goals of the review were to (i) identify the key operational challenges caused by poor electricity access, including increased reliance on costly alternative power sources, reduced service uptime, and diminished customer satisfaction, (ii) highlight the operational trade-offs and coping strategies adopted by hospitality managers in the face of energy instability and; (iii) explore broader implications of energy inefficiency on sector growth, profitability, and competitiveness as well as existing policy frameworks and the extent to which they support or hinder sustainable energy adoption in hospitality and tourism industry.

It is believed that the outcome of the study will serve as valuable reference material for policy and academic discourses on energy reform, infrastructure investment, and support for the achievement of the SDGs by many nations. It offers practical insights into how reliable energy access could enhance operational efficiency and overall sector performance. The paper also fills knowledge gaps by employing interdisciplinary perspectives such as energy economics, hospitality management, and development policy, to guide stakeholders, including business owners, investors, NGO's, and policymakers, toward more resilient and energy-efficient hospitality operations in developing countries, particularly Nigeria.

Literature Review and Theoretical Framework

Energy access and hospitality operations

As rightly noted, energy access means the provision of reliable, affordable, and modern energy services that is acquainted with and designed to address the complex, cross-cutting economic, social, political, environmental, and cultural dimensions of society to enable poverty eradication and foster economic and social transformation (McCulloch, & Ashford 2021; Mulugetta, Hagan, & Kammen, 2019). Access to energy is essential for human growth in both developed and, especially, underdeveloped nations. Supporting developing nations' sustainable development is the main goal of ensuring access to inexpensive, clean energy. Encapsulating the global commitment to energy access requires that everyone have access to modern, affordable, dependable,

and sustainable energy by 2030 (Progress Toward Sustainable Energy, 2015). In addition to providing resilient, inclusive, and sustainable growth, expanded access to energy is crucial for maximizing synergies with other SDGs. Thus, having access to better energy services is a continuous process of improvement rather than an unexpected occurrence (Bilgic, 2017).

There is a strong relationship between energy access and economic development. No activity can be done without energy in areas such as industrialization, daily life, transportation, and communication (Bilgic, 2017). Access to electricity is essential for eliminate intense poverty and advancing shared prosperity. People without access to electricity suffer developmental setbacks, including adverse consequences for their health, education, gender equality, food security, livelihood, and poverty reduction (Hussain et al., 2023).

Energy access is important because a lack of reliable energy service can impede social (Tanaka, 2010) economic, and human development (Brini, 2021; Bourdais & Chung, 2022). It is widely believed that energy access is vital for addressing food security, human well-being (Surroop et al., 2018), and socioeconomic development (Nathaniel et al., 2020). Sarkodie and Adams (2018) documented that the lack of energy access costs the African region 2% to 4% of annual GDP, besides the loss of jobs and economic development. However, over-exploitation of energy sources can be detrimental to the climate and environment because energy access heavily depends on the use of fossil fuels (Vo et al., 2019). Hence, for sustainable development to be achieved, developing countries need access to clean and reliable energy sources (Shittu, Saqib, Latiff, & Baharudin, 2024).

Energy is fundamental to the day-to-day functioning and service delivery of hospitality operations (Karvounidi, Alexandropoulou & Foustieris, 2024). From maintaining ambient environments to ensuring food safety and seamless guest experiences, energy use in hospitality spans across critical functions such as lighting, air conditioning (AC), kitchen operations, and information and communication technology (ICT). Regarding Nigeria's hospitality industry, where energy access is often unreliable, these functions are heavily disrupted, leading to inefficiencies, customer dissatisfaction, and financial strain. In another dimension, the integration of energy-efficient systems in hotels, such as smart HVAC systems, motion-sensor lighting, and passive solar strategies are proven to have a high level rating on guest satisfaction (Ogunnaike, Oghenetega & Ogunbiyi, 2025). Lighting is an essential component of hospitality, affecting both the aesthetic appeal of spaces and the safety of guests. Inconsistent power supply often results in dim or unlit environments, impacting guest perception and service delivery (Onohwakpo & Stanfast, 2022). Air conditioning, another energy-intensive component, is essential for thermal comfort, particularly in Nigeria's tropical climate. Without stable electricity, hotels either overuse generators or leave rooms without AC, which reduces guest satisfaction and occupancy rates (Karvounidi et al., 2024).

According to Amaechi & Oga (2021), kitchen operations depend heavily on energy for refrigeration, cooking, and sanitation. Unreliable power supply compromises food preservation and safety, leading to spoilage and health risks.

In addition, ICT infrastructure such as reservation systems, Wi-Fi networks, security systems, and point-of-sale (POS) devices relies on continuous power to ensure seamless operations. Disruptions in ICT not only delay services but also damage a hotel's reputation in an increasingly digital and service-oriented marketplace (Ngene & Aviara, 2014). Energy, therefore, is not just a background utility in hospitality; it is a core enabler of operational efficiency, customer satisfaction, and business continuity. In a country like Nigeria, where energy supply is fragmented and costly, the lack of reliable access becomes a direct threat to the viability and competitiveness of hospitality establishments.

Theoretical Framework

Resource Dependence Theory (RDT)

The theoretical basis of the study is Resource Dependence Theory (RDT), which was created by Pfeffer and Salancik in 1978 and holds that organizations depend on outside resources to compete and thrive rather than being self-sufficient. Lack or inadequacy of these resources, such as capital, labor, information, or energy, often creates dynamic dependence that influences organizational behavior and strategic decision-making. The more critical and scarcer the resource, the greater its influence on organizational outcomes. Relating this theory to the hospitality sector in Nigeria, energy qualifies as a strategic and nonadjustable resource that directly affects operational continuity, service quality, and cost-efficiency. According to Resource Dependence Theory (RDT), when such a vital resource is unreliable or externally constrained, as with Nigeria's unstable electricity supply, organizations are forced to adapt through buffering strategies like generator use, energy rationing, or selective service offerings (Williams, Raji & Ekoh, 2024). These adaptations, however, often come at a financial and operational cost that undermines efficiency and limits competitiveness.

Resource Dependence Theory (RDT) further emphasizes that organizations strive to minimize dependency and manage uncertainty by either diversifying their resource base or integrating vertically to control key inputs. In relation to this, hospitality businesses in Nigeria may invest in solar panels and other alternative energy solutions, form partnerships with energy providers, or advocate for favorable policy reforms to secure more stable access. These strategic moves align with RDT's prediction that firms will act to reduce resource vulnerability and improve their positioning in volatile environments (Adedeji, 2025). Ultimately, RDT frames inadequate energy access not just as an operational issue but as a power imbalance, one that limits autonomy, increases costs, and exposes hospitality firms to environmental

risks. Nigerian hotels are highly dependent on unreliable external energy sources, forcing costly adaptation strategies. Therefore, highlighting energy as a strategic dependency, RDT helps to explain how the struggle for reliable electricity shapes both tactical decisions and long-term viability in Nigeria's hospitality sector.

Systems Theory

This paper also anchors on system theory, perceives an organization as a collection of interconnected and dependent parts that cooperate to accomplish a common objective. Systems Theory asserts that a failure in one component can lead to dysfunction across the entire system. In this framework, the hotel is conceptualized as an open system that interacts continuously with its external environment, receiving inputs (such as energy, labor, materials), transforming them through internal processes (e.g., service delivery, housekeeping, food preparation), and producing outputs (customer satisfaction, revenue, reputation) (Bertalanffy, 1968; Newman-Enyioko, 2025). Energy is a foundational input for all hotel operations, and its instability in Nigeria causes systemic failures, from food spoilage to failed reservation systems that disrupt service and guest experience (Oladipo, 2022). To adapt, hotels need to reconfigure processes by adopting alternative energy sources or efficiency measures, which represents a systems-based attempt to regain operational equilibrium amid input variability (Ogunleye & Iwayemi, 2021; Rane, Achari, & Choudhary, 2023).

SERVQUAL Model

A popular paradigm for evaluating service quality is the SERVQUAL model, which was created by Parasuraman, Zeithaml, and Berry in 1988. It measures the discrepancy between what customers anticipate from a service and how they perceive it to be performed. Five essential components of service quality are identified by it: tangibles, certainty, responsiveness, empathy, and dependability. Energy access plays a critical role across all five dimensions, directly influencing how guests experience and evaluate service delivery in the hospitality sector in Nigeria. For instance, tangibles, which include physical facilities, lighting, room ambiance, and equipment, are significantly impacted by power supply. Dim lighting, malfunctioning air conditioning, or inoperative elevators caused by outages create negative first impressions and reduce perceived quality (Hachem-Vermette & Yadaz, 2023). According to Adetunji and Musa (2022), reliability, the ability to perform promised services dependably and accurately, is compromised when hotels are unable to deliver consistent services like hot water, Wi-Fi, or food due to power disruptions. Responsiveness and assurance, which relate to timely service and staff competence, are also affected. Energy shortages delay operations, slow response times, and create frustration for both staff and guests. Ibrahim &

Nwosu (2023) assert that when critical systems such as reservation platforms or payment terminals go offline due to power failure, it undermines trust in the hotel's competence. Lastly, empathy, the ability to provide caring, individualized attention, is diminished when staff are preoccupied with managing outages or resolving customer complaints linked to energy disruptions. Hence, the dimensions of service quality (empathy, assurance, responsiveness, dependability, and tangibles) are all negatively impacted by power disruptions, leading to reduced customer satisfaction.

Thus, linking power access directly to each dimension of perceived service quality, the SERVQUAL model offers a powerful lens to evaluate how energy instability erodes customer satisfaction and brand reputation in Nigerian hospitality settings. It suggests that improving energy reliability is not just a technical fix, but a strategic lever to enhance perceived quality and retain customers.

Operational Disruptions Due to Power Shortage

One of the most immediate disruptions is the interruption of guest comfort services, such as air conditioning, lighting, elevators, and hot water. These are core expectations in the hospitality experience, and their absence due to power failure leads to dissatisfaction and negative reviews (Kwortnik, 2005). Moreover, kitchen operations, which depend on refrigeration, ovens, blenders, and hygiene equipment, often stall or become unsafe during outages, increasing the risk of food spoilage as a result of harmful bacteria, viruses, parasites, or chemical ingredients and compromising food safety (WHO, 2024). Unsafe food affects various segments of customers in the hospitality and tourism sector.

More so, administrative and digital operations are also disrupted as a result of poor energy access. ICT infrastructure, including booking systems, Wi-Fi, point-of-sale (POS) machines, and surveillance systems, typically crashes during power cuts, resulting in billing errors, service delays, and security vulnerabilities. This not only hampers day-to-day activities but also erodes guest trust and staff efficiency. Beyond immediate impacts, power shortages lead to increased reliance on diesel or petrol generators, which inflate operating costs and create logistical challenges around fuel procurement and maintenance (Onohwakpo & Stanfast, 2022). Frequent power fluctuations also damage sensitive electrical equipment, adding further financial strain. These disruptions often force hotels to adopt reactive strategies such as load shedding, service reduction, or shutting down non-essential areas, measures that degrade service quality and weaken brand competitiveness. Overall, energy instability creates an environment of operational uncertainty, making it difficult for hospitality businesses in Nigeria to plan, scale, or deliver consistent service. Therefore, it becomes essential for the hospitality and tourism industry to adopt cost-cutting transforming measures.

Cost burden and profitability impact

Inadequate energy access imposes a significant cost burden on hospitality businesses in Nigeria, directly affecting their profitability and long-term viability. Due to unreliable public electricity supply, hotels and restaurants are forced to rely on expensive backup solutions, primarily diesel and petrol generators, to maintain continuous operations. This shift results in high overhead costs, which reduce profit margins and hinder reinvestment into service improvements or facility upgrades (Bello & Akinyemi, 2023). A study by Shehu et al. (2019) found that a huge amount of energy is consumed in hotel which is linked to enormous energy costs. These costs are largely attributed to fuel purchases, generator maintenance, and occasional replacement of power-damaged equipment such as HVAC systems, refrigeration units, and ICT infrastructure (Kabeyi & Olanrewaju, 2023). The unpredictability of these expenses makes financial planning difficult, increasing exposure to liquidity risks. Additionally, funds diverted to energy provisioning could otherwise be invested in staff training, customer service enhancements, or digital transformation areas that drive competitive advantage. Smaller operators, in particular, struggle to cope, often passing costs onto customers through higher room rates or reducing service offerings to cut expenditure. These strategies, however, can backfire by lowering occupancy rates or reducing guest satisfaction, leading to declining revenue over time (Gaturu, Mutinda, & Miricho, 2022).

Furthermore, fluctuating energy supply undermines operational predictability, affecting workforce productivity, inventory control, and service delivery cycles. This instability not only diminishes immediate profitability but also stifles growth potential, discourages foreign investment, and erodes trust in Nigeria's hospitality sector as a viable business environment (Ibrahim & Ogundipe, 2023).

Staff Productivity and Workflow

Inadequate energy access significantly disrupts staff productivity and workflow in Nigeria's hospitality sector, undermining overall operational efficiency. The consistent availability of power is critical for enabling staff to perform routine tasks efficiently, whether it's front-desk operations, housekeeping, food service, or administrative functions. When power outages occur, many of these activities are either delayed, performed manually at lower efficiency, or abandoned altogether (Abotsi 2016). For example, front office staff rely on electronic systems for reservations, billing, and guest check-ins/outs. Power interruptions disable these systems, forcing employees to use manual logs, which slows down processes, increases the risk of errors, and frustrates guests (Hachem-Vermette & Yadav, 2023). Similarly, housekeeping and maintenance departments depend on electrically powered equipment like vacuum cleaners, laundry machines, and elevators. In the absence of power,

cleaning routines are delayed, room turnovers slow down, and service delivery becomes inconsistent.

Moreso, in kitchens, staff face workflow breakdowns when refrigerators, ovens, blenders, and water heaters are unusable during outages. These disruptions extend food preparation times and increase pressure on staff during peak service hours, often leading to burnout and diminished morale (Idris & Adebayo, 2023). Furthermore, an inconsistent power supply impairs ICT tools that enable internal communication and coordination across departments, leading to workflow misalignment and reduced team efficiency. Prolonged energy instability also contributes to employee stress and turnover. When staff are forced to compensate for structural inefficiencies, their job satisfaction drops, and absenteeism tends to rise. This creates a cycle of low morale, poor service delivery, and higher training costs due to frequent employee replacement (Onwuegbuchulam & Ezeani, 2022). Thus, energy access is not only a technical concern but a core enabler of human performance and workflow reliability in hospitality settings. Without stable electricity, hotels struggle to maintain a productive workforce capable of delivering high-quality service consistently.

Guest Experience and Brand Perception

Inadequate energy access has a direct and often damaging effect on guest experience and brand perception in Nigeria's hospitality sector. Modern guests expect reliable amenities such as lighting, air conditioning, internet access, hot water, and functional elevators as baseline features of any hotel or restaurant experience. When these services are disrupted due to power outages, it leads to dissatisfaction, negative reviews, and a lasting impact on the establishment's reputation (Hasan, Jagadeesh, & Ahmad, 2023).

Consequently, energy-related disruptions create uncomfortable and sometimes unsafe environments. For instance, the absence of functional air conditioning during Nigeria's hot seasons can make rooms unbearable, while outages affecting security systems, lighting, or elevators raise safety concerns. In a recent study by Isiaka et al. (2024), they discovered that customers usually express a low satisfaction level whenever hotel service quality is poor. They therefore recommend that hospitality managers should always provide adequate, useful, and technically quality services, which most consumers consider before using such services repeatedly. Inconsistent service delivery, such as interrupted internet, delayed check-ins due to system failures, or unavailable kitchen services, signals poor management and operational instability. This erodes trust and damages the hotel's brand image, particularly in the era of digital reviews and social media amplification (Bassey & Lawal, 2023). For business travelers and international guests, in particular, these lapses can be deal-breakers, pushing demand toward global chains or hotels with more stable infrastructure.

Frequent power outages render front desk staff unable to respond effectively, which increases guest frustration and creates a negative perception of service culture (Radu, 2025). Therefore, energy reliability is fundamental to shaping both the functional and emotional dimensions of the guest experience, directly impacting a hotel's ability to meet expectations and remain competitive.

Coping Mechanisms

In response to Nigeria's chronic energy access issues, hospitality businesses, especially hotels, have developed a range of coping mechanisms to sustain operations and reduce the impact on service delivery and profitability. These strategies are essential for survival and often come with trade-offs that affect operational efficiency, cost structures, and long-term sustainability. According to Ogunyemi & Eze (2023), the most common coping mechanism is the use of backup generators, typically powered by diesel or petrol. This ensures the continuity of essential services during grid outages; their use leads to significantly higher operational costs and increased environmental pollution. Businesses employ short-term adaptive measures such as load prioritization, inverters, and staff training to cope with outages, but these reactive strategies often diminish service quality and competitiveness while revealing structural limitations (Ajibola & Onwuegbuchi, 2022; Weitzel et al., 2025). In contrast, investing in renewable energy like solar power provides a sustainable solution, offering substantial long-term operational cost savings after the initial capital is recovered (RCREEE, 2023).

This study synthesized previous research on the topic using a systematic literature review process on relationship between energy access and operational efficiency within Nigeria's hospitality sector. The approach entailed a qualitative synthesis of peer-reviewed academic literature, industry analyses, and policy documents from organizations like the IEA (International Energy Agency) and Nigerian regulatory bodies.

This analysis was guided by a multi-theoretical framework integrating Resource Dependence Theory (RDT) to examine organizational adaptations, Systems Theory to understand operational inter-dependencies, and the SERVQUAL model to assess impacts on service quality dimensions. Literature was systematically sourced from academic databases, with inclusion criteria focusing on empirical studies related to electricity supply, backup generation, renewable energy adoption, and operational performance in hospitality. For contextualization, studies from other African nations (e.g; Kenya, Ghana, Rwanda) with relevant comparative insights were also examined. A thematic analysis was conducted to identify and analyze prevalent themes, including cost structures, adaptive coping mechanisms, and effects on guest satisfaction.

Regional and comparative perspectives

A comparative analysis of regional energy resilience reveals divergent trajectories within Africa's hospitality sector, underscoring how targeted

policy and infrastructure investment shape operational outcomes. While Nigeria contends with severe energy instability, several peer nations have implemented coherent strategies that offer instructive contrasts.

In Rwanda, sustained public investment in infrastructure and a focused renewable energy transition, particularly toward solar power, have enhanced commercial power reliability. This commitment to decentralized and off-grid systems enables hospitality businesses across both urban and rural areas to minimize operational disruptions, thereby supporting consistent service delivery and improved guest satisfaction (Rajuroy, 2025).

Kenya demonstrates the efficacy of public-private partnerships in energy development. The hospitality sector increasingly utilizes the country's robust geothermal resources, which constitute over 45% of the national electricity mix, and adopts hybrid systems that integrate grid power, solar energy, and battery storage. This approach reduces fossil fuel dependence and ensures operational continuity, enhancing efficiency and positioning Kenyan hotels as technologically advanced and sustainable (Otieno & Muriuki, 2023).

Similarly, Ghana has progressed through deliberate policy reform. Initiatives led by the Ghana Energy Commission, including targeted solar investments for hotels in northern and coastal regions, have decreased generator dependency. Although challenges persist, the sector reports fewer disruptions, lower operational costs, and better environmental performance compared to Nigeria (Ghana Energy Transition and Investment Plan, 2025).

In plain contrast, Nigeria's hospitality sector remains constrained by fragmented policy, unreliable grid supply, and insufficient support for renewable adoption. This forces operators into a reactive coping mode, predominantly reliant on costly diesel generators, which inflates expenses and stifles service innovation (Adebayo & Lawal, 2024). Collectively, these comparisons underscore that policy consistency, dedicated infrastructure investment, and renewable energy integration are important distinguishing factors in building the energy resilience necessary for a competitive and efficient hospitality industry.

National energy policies and subsidy frameworks fundamentally shape the operational landscape for the hospitality sector in energy-dependent economies. Coherent policies that promote infrastructure investment, renewable energy adoption, and market stability are prerequisites for operational efficiency and sustainable growth. In the Nigerian context, however, inconsistent policy implementation and poorly structured subsidies have historically exacerbated the sector's challenges.

The national policy focus has predominantly been on centralized grid expansion, neglecting the critical need for decentralized, commercial-sector solutions. This has entrenched the hospitality industry's reliance on expensive, private diesel generation without providing a viable pathway for transition (Akinyele & Adepoju, 2023). Furthermore, broad fuel subsidies have consumed significant public resources while failing to address underlying

infrastructure deficits. This distortion of the energy market inadvertently discourages private investment in energy efficiency and renewable technologies, as it perpetuates an artificial dependence on fossil fuels (Bazilian & Onyeji, 2012).

Contrasting policy approaches in other African nations highlight a more effective model. Kenya and Rwanda have fostered energy resilience in hospitality through targeted incentives for geothermal and solar adoption, facilitated by public-private partnerships (Otieno & Muriuki, 2023). Similarly, Ghana's provision of regulatory support and subsidies for solar mini-grids enables hotels to diversify their energy mix and reduce long-term costs (Takase et al., 2022). For Nigeria to enhance the competitiveness of its hospitality sector, a strategic policy shift is imperative. This must involve incentive's decentralized renewable energy solutions, streamlining access to green financing for tourism SMEs, and reorienting subsidies shifting away from the use of fossil fuels and toward efficient appliances and clean energy technologies.

1. Strategic integration of renewable energy sources: A predominant trend is the strategic adoption of on-site renewable energy sources, mostly wind and solar. This shift is motivated by the dual objectives of ensuring a reliable power supply amidst grid instability and reducing both operational costs and carbon footprints. The transition makes an impact, especially in developing regions, and aligns with the growing market demand for sustainable tourism and responsible business models (Nagabhooshanam et al., 2025).
2. Evolution of policy and subsidy frameworks: Energy subsidization and policy incentives are increasingly targeted to encourage sustainable practices within the sector. The effectiveness of these measures is contingent upon their design; well-structured policies that promote genuine investment in energy-efficient and renewable technologies can drive meaningful change. Conversely, poorly implemented subsidies risk fostering “green washing” and creating market distortions without delivering equitable benefits or environmental integrity (Paapa & Kambona, 2025).
3. Data-driven energy management: The implementation of systematic energy management frameworks, supported by defined Key Performance Indicators (KPIs), is becoming standard for optimizing consumption. Data-driven benchmarking allows hotels to pinpoint major energy loads such as HVAC (-30%), hot water (-25%), and kitchen operations (-20%) and prioritize high-impact efficiency interventions (Martínez Santos et al., 2025).
4. Adoption of adaptive and smart building design: Architectural and design innovations are proving to be foundational for energy conservation. The

use of adaptive building forms, including passive cooling techniques, energy-efficient materials, and flexible layouts, can lead to substantial efficiency gains. Case studies from Nigeria demonstrate that such smart design principles can improve energy performance by over 50% in four-star hotels, simultaneously enhancing guest comfort and reducing long-term operational costs (Adio et al., 2025).

In synthesis, the trajectory for improving energy access and efficiency in hospitality is increasingly defined by the convergence of renewable technology adoption and adaptive design, accelerated by targeted policy incentives. Evidence suggests that policy-driven support and strategic technology integration are the strongest predictors of enhanced operational efficiency, enabling hotels to achieve greater resilience and sustainability (Nagabhooshanam et al., 2025).

Findings and Discussion

The systematic review synthesizes several key findings that collectively illustrate how chronic energy insecurity fundamentally constrains the operational efficiency, financial viability, and competitive potential of the hospitality sector in Nigeria.

1. Foundational challenge: Systemic energy uncertainty

The primary finding identifies chronic energy insecurity, characterized by frequent grid outages and voltage fluctuations, as a core operational disruption in the hospitality sector. This instability directly undermines essential functions ranging from lighting and climate control to kitchen and ICT operations, which compromise service continuity and business sustainability. This confirms that reliable, affordable, and sustainable energy is not merely an operational input but a foundational prerequisite for the sector's performance and the broader national economic growth (Akerere et al., 2022).

2. Operational and financial consequences

In response to this uncertainty, the sector exhibits an overwhelming dependence on costly backup generators. While ensuring basic operational continuity, this dependency creates a significant financial burden, eroding profit margins and diverting capital from strategic investments in innovation, upgrades, and staff development (Musa & Batagarawa, 2024). This financial strain is exacerbated by unpredictable fuel costs, equipment damage from power surges, and high maintenance, disproportionately affecting smaller operators and threatening their competitiveness.

The operational disruptions directly degrade service quality and guest experience. Interruptions to air conditioning, refrigeration, Wi-Fi, and security systems lead to negative guest perceptions, lower occupancy rates, and damage to brand reputation, particularly among international travelers who

prioritize reliability. This validates the established positive correlation between consistent service quality and customer satisfaction (Burodo, Dakingari, & Iliyasu, 2024).

Furthermore, energy instability disrupts internal workflows and impacts staff productivity. Frequent power cuts force manual workarounds, leading to delays, errors in tasks like billing and reservations, and increased job dissatisfaction. This contributes to burnout and turnover, creating a negative work environment that further impedes service delivery (Kpurunee, Amadi, & Zeb-Obipi, 2024). Addressing this environment is thus critical for unlocking workforce potential.

3. Predominance of reactive coping strategies

The findings reveal that managerial responses are predominantly short-term and reactive. Strategies such as load prioritization, temporary shutdowns, and price increases are common, yet they often merely stabilize operations at the expense of long-term growth and guest satisfaction (Kent Local Business Network, 2024). Although some businesses are exploring renewable energy solutions like solar power, adoption is nevertheless constrained by significant upfront capital expenses and a dearth of logical policy incentives, suggesting a disconnect between awareness and execution.

4. Policy and Comparative Context

A comparative analysis with peer nations (Rwanda, Kenya, Ghana) highlights a significant policy-implementation gap in Nigeria. These countries have enhanced their hospitality sector's energy resilience through integrated policies supporting renewable integration and decentralized systems. In contrast, Nigeria's fragmented policy landscape and weak institutional support trap the sector in a cycle of high-cost, reactive coping mechanisms, stifling its transition to sustainable and efficient energy models.

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