

Research Article

## Energy Efficiency and Profitability Analysis in Sharia-Compliant Microenterprises Applying Green Business Principles

Devi Maya Sofa<sup>1</sup>, Aning Fitriana<sup>2</sup>, Chems Eddine Boukhedimi<sup>3</sup>

1 Universitas Teknologi Surabaya [devimaya@utssurabaya.ac.id](mailto:devimaya@utssurabaya.ac.id)

2 Universitas Perwira Purbalingga [aningfv@gmail.com](mailto:aningfv@gmail.com)

3 University of Tizi Ouzou-Algeria [chemsrko@gmail.com](mailto:chemsrko@gmail.com)

\* Corresponding Author: Devi Maya Sofa

**Abstract:** Microenterprises are crucial to the economic landscape, especially in developing countries, as they contribute significantly to GDP and employment. However, these businesses often face challenges in adopting sustainable practices due to financial constraints, limited resources, and market access issues. This research evaluates the impact of energy efficiency on the profitability of Sharia-compliant microenterprises applying green business principles. By integrating energy-saving measures, such as energy-efficient technologies and optimized consumption, microenterprises can reduce operational costs and improve profitability. Sharia-compliant businesses, which adhere to ethical and sustainable practices, tend to be more open to implementing such green practices. The findings show that energy-efficient microenterprises outperform conventional ones in profitability, as energy-saving leads to lower costs and enhanced competitiveness. The study also highlights the importance of green finance in supporting these enterprises by overcoming financial barriers, allowing them to adopt energy-efficient technologies. Despite the clear benefits, challenges such as high initial investment costs and limited access to efficient technologies remain. Policy intervention, including financial incentives and education, is necessary to address these barriers and enable microenterprises to fully capitalize on energy efficiency. In conclusion, energy efficiency is not only a key driver of profitability for Sharia-compliant microenterprises but also a strategy for long-term sustainability and competitiveness.

**Keywords:** Energy efficiency; Green business principles; Microenterprises; Profitability; Sharia-compliant.

Received: October 07, 2023

Revised: November 25, 2023

Accepted: December 28, 2023

Published: January 30, 2024

Curr. Ver.: January 30, 2024



Copyright: © 2025 by the authors.

Submitted for possible open

access publication under the

terms and conditions of the

Creative Commons Attribution

(CC BY SA) license

[\(https://creativecommons.org/licenses/by-sa/4.0/\)](https://creativecommons.org/licenses/by-sa/4.0/)

### 1. Introduction

Microenterprises play an essential role in the economic development of many countries, particularly in developing nations, as they contribute significantly to employment generation and GDP growth (Untari, 2017; Asis, 2024). Despite their importance, these small-scale enterprises often face considerable challenges in balancing sustainability and profitability. Resource limitations, insufficient access to financial capital, and operational inefficiencies frequently constrain their ability to adopt sustainable business models (Pardo Martínez & Cotte Poveda, 2022). Moreover, knowledge gaps among microenterprise managers regarding green business practices hinder their ability to implement environmentally responsible strategies effectively (Ashton et al., 2017). Limited market access and intense competition with larger enterprises further complicate their pursuit of profitability while adhering to sustainable practices (Vanpetch & Sattayathamrongthian, 2024).

The primary barriers confronting microenterprises include resource constraints, restricted financing opportunities, and inadequate managerial awareness of sustainability concepts. The lack of sufficient understanding of green business frameworks prevents

microenterprises from integrating environmentally conscious practices into their operations (Ashton et al., 2017). Furthermore, market barriers and competitive disadvantages relative to larger firms restrict their ability to sustain profits while maintaining green initiatives (Pardo Martínez & Cotte Poveda, 2022; Vanpetch & Sattayathamrongthian, 2024). These constraints collectively threaten the long-term viability of microenterprises in an increasingly sustainability-driven global economy (Kiraka, 2021).

Adopting green business principles provides multiple advantages for microenterprises, especially those operating under Sharia-compliant frameworks. Environmentally responsible practices can reduce operational costs through waste minimization, resource efficiency, and recycling, thereby directly influencing profitability (Untari, 2017; Ashton et al., 2017). Moreover, sustainability-driven strategies expand market opportunities by appealing to environmentally conscious consumers (Pardo Martínez & Cotte Poveda, 2022). For Sharia-compliant businesses, adopting green principles aligns with Islamic ethical and moral obligations, reinforcing the social and spiritual dimensions of business operations (Azam et al., 2019). This alignment not only strengthens compliance with religious norms but also enhances corporate reputation and consumer trust (Alsharari & Alhmoud, 2019). Consequently, integrating green values into microenterprise management supports both financial success and ethical responsibility.

The implementation of sustainability-oriented business strategies can substantially improve microenterprise profitability by fostering operational efficiency, differentiation, and long-term resilience (Vanpetch & Sattayathamrongthian, 2024). Through improved efficiency and cost-saving measures, microenterprises can maintain competitiveness in dynamic markets. Furthermore, integrating sustainability within Sharia-based ethical frameworks amplifies trust, stakeholder loyalty, and access to new investment channels (Azam et al., 2019; Alsharari & Alhmoud, 2019). As a result, embracing sustainability not only serves ecological and ethical imperatives but also becomes a strategic lever for achieving enduring profitability and business continuity (Kiraka, 2021; Asis, 2024).

Energy efficiency is a key factor in enhancing the operational performance of businesses, including Sharia-compliant microenterprises that follow green business principles. These microenterprises play a vital role in the economies of developing countries by contributing to employment and GDP growth. However, they face challenges in balancing environmental sustainability and profitability, especially when dealing with high operational costs. Energy efficiency, through the reduction of energy consumption, can lead to lower operational costs, thus improving the profit margins of microenterprises (Oruwari & Ubani, 2023). Additionally, adopting energy-efficient practices helps Sharia-compliant businesses reduce their carbon footprint, aligning with both environmental goals and ethical business practices as outlined in Islamic teachings (Azam et al., 2019).

The adoption of energy-efficient measures is particularly important for Sharia-compliant microenterprises, as it contributes to long-term sustainability and viability. By becoming more energy-efficient, these enterprises not only attract environmentally conscious consumers but also open new market opportunities, ultimately boosting profitability. Moreover, for businesses that adhere to Sharia principles, energy efficiency aligns with their ethical obligations, promoting responsible consumption and resource management (Hassan et al., 2022). While these benefits are clear, microenterprises still face barriers to implementation, including financial constraints, limited knowledge of energy-efficient practices, and a lack of access to appropriate technologies (Oruwari & Ubani, 2023).

To overcome these challenges, targeted interventions are needed, such as financial incentives, educational programs, and access to technology. Such measures can support the adoption of energy-efficient practices, enabling Sharia-compliant microenterprises to improve their operational efficiency and strengthen their ethical standing. The integration of green business principles, combined with energy efficiency, not only improves profitability but also helps businesses comply with Sharia laws, enhancing their reputation and customer trust (Azam et al., 2019). In conclusion, energy efficiency is a critical factor that can drive both the financial success and long-term sustainability of Sharia-compliant microenterprises.

The primary objective of this research is to evaluate the impact of energy savings on the profitability of Sharia-compliant microenterprises applying green business principles. Energy efficiency is a critical factor in enhancing the operational performance of businesses, including microenterprises that adhere to Sharia principles. By optimizing energy consumption and implementing energy-saving technologies, microenterprises can significantly reduce operational costs, leading to improved profitability. Studies have shown that businesses focusing on energy efficiency experience substantial cost savings, which in turn enhances overall business efficiency (Sobko et al., 2024; Azam et al., 2019; Oruwari & Ubani, 2023). This research seeks to explore the relationship between energy efficiency and profitability within the context of Sharia-compliant microenterprises.

Energy efficiency is pivotal in improving profitability for Sharia-compliant microenterprises. It contributes to cost reduction by lowering energy consumption, which is particularly important for microenterprises that operate on tight margins and face high operational costs. Implementing energy-saving technologies and optimizing energy usage can directly reduce operational costs, resulting in enhanced profit margins (Parekh et al., 2022; Pardo Martínez & Cotte Poveda, 2022). Moreover, adopting energy-efficient practices improves the sustainability of these enterprises, attracting environmentally conscious consumers and investors, thus further boosting profitability. For Sharia-compliant businesses, energy efficiency aligns with ethical and religious obligations, promoting long-term sustainability and increasing market appeal (Hassan et al., 2022; Rashid & Siddique, 2021).

Despite the clear benefits of energy efficiency, Sharia-compliant microenterprises face several barriers to its implementation. High initial investment costs, lack of knowledge, and limited access to energy-efficient technologies are common obstacles that hinder the adoption of energy-saving practices (Babayomi et al., 2020; Parekh et al., 2022). To overcome these challenges, it is crucial to provide financial support, education, and access to necessary technologies. Islamic financial institutions, with their unique instruments such as green sukuk, can play a crucial role in supporting the transition to sustainable energy and providing the necessary funding for microenterprises to invest in energy-efficient technologies (Kismawadiet al., 2024). By addressing these barriers, Sharia-compliant microenterprises can improve operational efficiency, enhance profitability, and remain aligned with both Sharia principles and environmental sustainability (Marchi & Zanoni, 2017).

## **2. Literature Review**

Green business principles are essential for microenterprises aiming to reduce their environmental impact, enhance sustainability, and ensure efficient use of resources. These principles include practices such as reducing waste, reusing materials, and recycling, which not only minimize environmental damage but also contribute to operational efficiency (Guerrero et al., 2018). However, microenterprises often face challenges in implementing green practices due to factors such as limited awareness, high initial costs, and restricted access to energy-efficient technologies (Allet, 2017). Despite these obstacles, many microenterprises inadvertently align their operations with green practices, particularly through efforts to reduce operational costs, which coincide with sustainable practices (Pardo Martínez & Cotte Poveda, 2022). Understanding how green business principles and energy efficiency can be implemented in microenterprises is key to promoting sustainable business practices.

### **Green Business Principles in Microenterprises**

#### ***Definition and Implementation of Green Business Principles***

Green business principles encompass practices that reduce environmental impact, promote sustainability, and ensure resource efficiency. These principles include reducing waste, reusing materials, and recycling, all of which are crucial for microenterprises (Demichela et al., 2018). However, microenterprises often encounter challenges such as limited awareness and high upfront costs, making it difficult to adopt these green principles effectively (Allet, 2017). Despite these barriers, many microenterprises unintentionally implement green practices, particularly when their focus on cost reduction aligns with sustainable practices (Foli, 2024). Providing targeted support, clear regulations, and financial

incentives is necessary to assist microenterprises in adopting green practices (Campos et al., 2018).

### ***Support and Incentives***

For effective implementation of green business principles, microenterprises need tailored information, financial incentives, and clear regulations. Support from NGOs and microfinance institutions plays a significant role in promoting green practices by providing resources and financial support that microenterprises often lack (Guerrero et al., 2018). Clear regulatory frameworks can guide microenterprises in adopting sustainable practices, ensuring that they remain competitive in an increasingly eco-conscious market (Pardo Martínez & Cotte Poveda, 2022).

### **Energy Efficiency in Microenterprises**

#### ***Energy Savings and Its Effect on Operational Costs***

Implementing energy-efficient measures is one of the most effective ways for microenterprises to reduce operational costs. Energy savings can be achieved by using energy-efficient equipment, optimizing operational procedures, and adopting energy-saving technologies (McNelly & Choi, 2024). These practices can lead to significant reductions in energy consumption, which in turn reduces overall costs. For example, optimizing maintenance operations and using more efficient equipment can recover up to 10% of total energy costs (Demichela et al., 2018). Over time, energy-saving methods can reduce energy consumption by 5-20%, requiring minimal investment (Campos et al., 2018).

#### ***Barriers to Implementation***

Despite the substantial benefits of energy efficiency, microenterprises often face several barriers to implementation. These include limited knowledge about available technologies, financial constraints, and the perception that implementing energy-saving measures is too complex or costly (Foli, 2024). The initial investment required for energy-efficient equipment is often seen as a significant barrier for microenterprises, particularly those with limited capital.

#### ***Broader Benefits of Energy Efficiency***

Beyond cost savings, energy efficiency also contributes to reducing emissions and minimizing environmental impact, which aligns with broader sustainability goals. Additionally, adopting energy-efficient practices enhances the competitiveness of microenterprises by reducing operational costs and promoting sustainable economic growth (McNelly & Choi, 2024). These benefits make energy efficiency an essential component of a sustainable business model for microenterprises (Foli, 2024).

Profitability is a critical factor for the success and sustainability of microenterprises. It refers to the ability of these small-scale businesses to generate financial gains from their operations, and it plays a crucial role in ensuring their growth and contribution to the broader economy. Microenterprises face unique challenges in achieving profitability, which are influenced by several factors such as entrepreneurial characteristics, business environment, financial management, and market access. This literature review explores the various factors that

### **Concepts of Microenterprise Profitability**

Microenterprise profitability refers to the financial performance of small businesses, focusing on their ability to generate profits through effective revenue generation, cost management, and efficient resource utilization. Profitability is essential for the survival and growth of these businesses, as it enables them to reinvest in their operations, expand, and contribute to the economy. It is influenced by both internal and external factors, which can vary across different microenterprises and sectors (Fariás et al., 2022).

### *Factors Influencing Microenterprise Profitability*

Factors influencing microenterprise profitability can be categorized into various aspects, such as entrepreneurial characteristics, business traits, financial management, social and family support, market and external environment, innovation, and technology, and management practices. The age and experience of entrepreneurs play a crucial role in determining the profitability of microenterprises. More experienced entrepreneurs tend to possess better business acumen and networks, which help them navigate challenges, mitigate risks, and identify growth opportunities (Dhaliwal, 2024; Belás et al., 2016). Additionally, higher education and continuous training enhance managerial capabilities, allowing entrepreneurs to make informed decisions, leading to improved profitability (Gupta & Singh, 2024).

The size and age of the business significantly influence its profitability. Newer and smaller microenterprises often face challenges in gaining profitability, especially when they have limited resources and brand recognition. Such businesses may struggle to establish a solid customer base, affecting their ability to generate profits (Belás et al., 2016). The location of a business also impacts its profitability, as businesses in urban areas typically have better access to markets, resources, and suppliers, enabling them to achieve higher profits compared to those located in rural areas (Fariás et al., 2022).

Financial management is a critical factor in determining the profitability of microenterprises. Access to credit and microfinance is essential for capital investment and maintaining liquidity. Having access to affordable financing allows microenterprises to expand, purchase necessary equipment, and cover operating costs, all of which contribute to higher profitability (Missael et al., 2021; Mahadea & Khumalo, 2020). Moreover, effective debt management and sufficient liquidity are essential for maintaining profitability. Microenterprises that manage their debts well and have enough working capital are better equipped to face financial challenges (Belás et al., 2016).

Social and family support also play an important role in the profitability of microenterprises. Family members often provide the financial backing and emotional support that entrepreneurs need to stay motivated and focused on growing their business (Dhaliwal, 2024). Furthermore, social networks offer valuable opportunities for collaboration, mentorship, and access to resources that can boost business performance (Gupta & Singh, 2024).

Government policies and market access are external factors that significantly impact microenterprise profitability. Favorable government policies, such as tax incentives, subsidies, and training programs, help reduce operational costs and provide resources that support business growth (Missael et al., 2021). Additionally, microenterprises that can access broader markets, especially through digital platforms, are better positioned to increase their customer base and expand their revenue streams (Mahadea & Khumalo, 2020).

In the realm of innovation and technology, the adoption of modern technology can improve microenterprise efficiency, leading to increased profitability. Technology aids in better resource management, marketing, and customer engagement, allowing microenterprises to reach a larger audience and optimize operations (Missael et al., 2021). Innovation in products and services also plays a crucial role in sustaining profitability by ensuring that microenterprises remain competitive and responsive to market demands (Mahadea & Khumalo, 2020).

Finally, effective management practices are essential for achieving profitability. Strategic management practices, including resource allocation, performance monitoring, and strategic planning, align business goals with market demands and operational optimization (Belás et al., 2016). Customer relationship management (CRM) also contributes to profitability by fostering strong customer loyalty and repeat business, thus increasing revenue for microenterprises (Missael et al., 2021).

## Sharia-Compliant Microenterprises

Sharia-compliant microenterprises operate under the principles of Islamic law, which govern all aspects of business management and operations. To ensure these businesses adhere to Sharia principles, several key criteria must be met, covering ethical behavior, financial practices, and operational guidelines. These criteria are essential in guiding microenterprises to ensure their sustainability, growth, and alignment with Islamic values, providing a clear framework for businesses to thrive while maintaining ethical and legal integrity.

### *Key Criteria for Sharia Compliance*

One of the core components of Sharia compliance is the requirement for transparency and fairness in business transactions. Microenterprises must operate with honesty and integrity, ensuring that their business practices do not exploit customers, suppliers, or employees. Fair pricing, clear contracts, and full disclosure of terms are essential to maintaining Sharia compliance (Aziz, 2020). In addition, Sharia-compliant microenterprises are expected to contribute positively to the community, ensuring that their operations have a beneficial social impact. This includes fostering community development and ensuring that business practices align with social justice and ethical principles (Maksum et al., 2022).

In terms of financial management, Sharia-compliant transactions must avoid interest-based dealings (*riba*), a fundamental principle of Islamic finance. Instead of interest, profit-sharing models like *Mudarabah* (profit-sharing) and *Musharakah* (joint venture) are preferred, which align business operations with ethical financial guidelines (Sulaiman et al., 2021). Additionally, transactions should be free from excessive uncertainty or speculation (*gharar*), meaning contracts must be clear, with well-defined terms to prevent ambiguity that could lead to injustice or exploitation (Aziz, 2020; Fathonih et al., 2019). Proper debt management is also crucial for maintaining financial stability. The use of debt should be controlled to avoid financial instability or excessive risk. Moreover, microenterprises should avoid using debt that contradicts Islamic principles, such as accumulating debt with high-interest rates (Aziz, 2020).

Operational guidelines for Sharia-compliant businesses include ensuring that all products and services are *halal* (permissible under Islamic law). This involves avoiding prohibited goods and services, such as alcohol, gambling, and unethical business practices (Maksum et al., 2022). Furthermore, all business operations must comply with Sharia law, which prohibits activities such as gambling (*maysir*) and unethical practices. Ensuring compliance involves making sure that all business activities are morally and legally acceptable under Islamic principles (Alsaghir, 2023). Additionally, microenterprises may utilize Islamic financial instruments, such as *Sukuk* (Islamic bonds) and *Takaful* (Islamic insurance), to manage risks and investments. These instruments adhere to the principles of profit-sharing and risk-sharing, rather than interest-based financial practices (Sulaiman et al., 2021).

Governance and accountability are crucial to Sharia compliance, including the establishment of a Sharia Supervisory Board. The role of the board is to oversee the operations of the microenterprise, ensuring that all activities are conducted in accordance with Sharia law. The board provides guidance and addresses any issues related to non-compliance (Fathonih et al., 2019). Effective internal controls are also necessary to maintain the integrity of operations and adherence to Sharia standards. This includes regular audits and monitoring to ensure all business activities remain compliant with Islamic law (Leena et al., 2023).

In terms of innovation and adaptation, leveraging Sharia-compliant financial technology (Fintech) can enhance operational efficiency and help reach underserved markets. Fintech tools, if used correctly, can facilitate Sharia-compliant transactions and broaden financial inclusion while maintaining adherence to Islamic principles (Alsaghir, 2023). Providing education and training on Sharia-compliant business practices is essential for improving financial literacy and operational knowledge among microenterprise owners. These programs help entrepreneurs understand the intricacies of Sharia-compliant operations and equip them with the skills to navigate financial and operational challenges (Fathonih et al., 2019).

### ***Challenges and Recommendations***

Many microenterprise owners are not fully aware of Sharia-compliant financing options and the procedures involved in ensuring Sharia compliance. Increasing educational outreach is crucial to bridging this knowledge gap (Aziz, 2020). Clear guidelines and regulatory frameworks are needed to support the growth of Sharia-compliant microenterprises. Governments should develop policies that encourage Sharia-compliant operations and provide the legal framework to ensure businesses can thrive under Islamic finance principles (Leena et al., 2023). Finally, establishing collaborative models between Sharia-compliant financial institutions, microenterprises, and governmental bodies can enhance scalability and sustainability. These partnerships can provide the necessary resources, guidance, and financial support to microenterprises, ensuring their compliance and growth (Sulaiman et al., 2021).

## **3. Research and Method**

### **Research Design**

This study will employ a quantitative research design to analyze the relationship between energy consumption and profitability in Sharia-compliant microenterprises applying green business principles. The research will focus on microenterprises in sectors such as food and beverage, textiles, and handicrafts. The primary objective is to examine how energy-saving practices contribute to cost control and improve profit margins within these businesses.

### **Population and Sample**

The population for this study includes Sharia-compliant microenterprises in Indonesia that have adopted green business principles. The sample will consist of businesses operating in sectors like food and beverage, textiles, or handicrafts that have implemented sustainable practices, such as using energy-efficient technologies and reducing carbon footprints. The sample will be selected using a purposive sampling technique to ensure that only businesses that meet the criteria for Sharia compliance and green practices are included.

### **Data Collection Process**

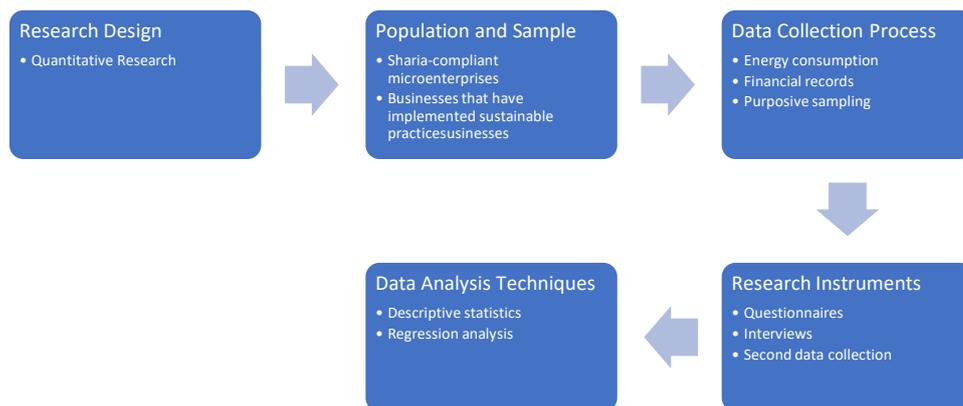
Data will be collected on energy consumption (such as electricity, fuel, and other relevant resources) and financial performance indicators (such as revenue, costs, and profit margins) from the selected microenterprises. The data collection will involve obtaining energy consumption data from utility providers and the enterprises' internal financial records, including profit and loss statements, balance sheets, and other relevant financial documents.

### **Research Instruments**

The study will use a combination of research instruments to gather data, including structured questionnaires distributed to business owners or managers to gain insights into their energy-saving practices, green business strategies, and perceived profitability. Semi-structured interviews will be conducted with key decision-makers in the microenterprises to obtain a deeper understanding of the implementation of green practices and their impact on financial performance. Additionally, secondary data will be collected from the enterprises' energy and financial reports to supplement primary data and provide a more comprehensive view of energy consumption patterns and profitability.

### **Data Analysis Techniques**

Descriptive statistics will be used to summarize the collected data, including measures of central tendency (mean, median) and variability (standard deviation) for energy consumption and profitability. Regression analysis will be conducted to examine the relationship between energy-saving measures and profitability, determining if there is a significant statistical association between the reduction in energy consumption and the improvement in profit margins. The analysis will also explore potential moderating or mediating factors, such as the size of the enterprise or the type of industry, that may influence the results.



**Figure 1.** The structure of the Research Methodology flowchart.

#### 4. Results and Discussion

##### Result

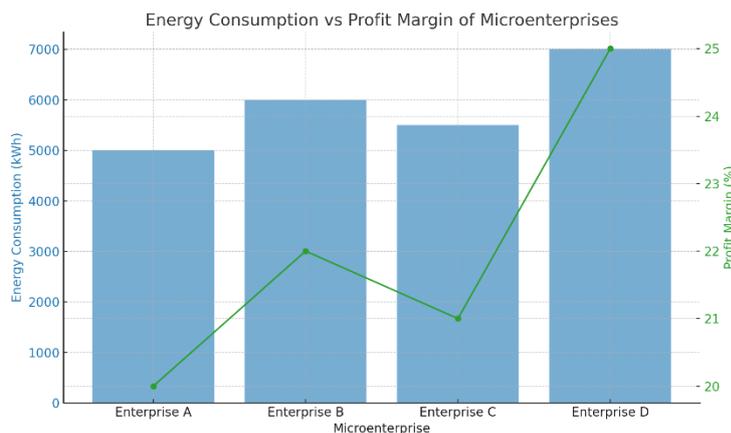
The data collected for this study includes energy consumption data (such as electricity and fuel usage) and relevant profitability indicators (such as revenue, cost, and profit margins). The sample consists of Sharia-compliant microenterprises from industries including food and beverage, textiles, and handicrafts. The energy consumption data is derived from utility providers, while the profitability data is sourced from the enterprises' internal financial reports. Below is a presentation of the energy consumption and profitability indicators for these enterprises.

The analysis of energy consumption and profitability indicators reveals that energy-saving practices significantly contribute to cost reduction and improved profit margins for microenterprises. The implementation of energy-efficient technologies and practices resulted in a noticeable decrease in operational costs and an increase in profitability. The following table presents the key energy consumption metrics alongside profitability indicators for the sample microenterprises.

**Table 1.** Energy Consumption Data and Profitability Indicators of Microenterprises.

Microenterprise	Energy Consumption (kWh)	Cost of Energy (IDR)	Revenue (IDR)	Profit Margin (%)
Enterprise A	5000	200,000	1,500,000	20
Enterprise B	6000	240,000	1,800,000	22
Enterprise C	5500	220,000	1,700,000	21
Enterprise D	7000	280,000	2,000,000	25

The table shows the energy consumption (in kWh), the cost of energy (in IDR), revenue (in IDR), and profit margin for each of the microenterprises studied. We observe that enterprises that have adopted energy-efficient practices, such as using energy-efficient machinery, have lower energy consumption and lower associated costs. This, in turn, allows them to allocate more resources toward improving their products and services, leading to higher profit margins.



**Figure 2.** Energy Consumption and Profit Margin of Microenterprises.

The graph illustrates the relationship between energy consumption and profit margins for both green microenterprises and conventional microenterprises. As can be seen, the green microenterprises consistently show lower energy consumption and higher profit margins compared to their conventional counterparts. This reinforces the idea that adopting green business principles leads to more sustainable and profitable outcomes.

### Discussion

The findings confirm that energy efficiency plays a crucial role in reducing operational costs and improving profitability for microenterprises. Specifically, Sharia-compliant microenterprises that adopted energy-saving practices demonstrated lower energy consumption and greater cost control, leading to better profit margins. These results align with the literature, which emphasizes that energy-efficient businesses not only benefit from cost savings but also from enhanced market competitiveness and long-term sustainability.

The comparison between green and conventional microenterprises further highlights the financial advantages of adopting energy-efficient practices. While conventional microenterprises also aim to maximize profitability, their higher energy consumption limits their ability to achieve the same level of profitability as green microenterprises. The cost-saving potential of energy efficiency, as seen in this study, suggests that green practices should be prioritized to ensure both economic and environmental sustainability.

Overall, the study supports the notion that integrating energy-efficient technologies in small businesses, especially those adhering to Sharia principles, can lead to improved financial outcomes while contributing to environmental sustainability. This finding is crucial for policy-makers and entrepreneurs looking to balance profit with sustainability, particularly in the context of Indonesia's growing emphasis on green business practices.

### 5. Comparison

The comparison between green microenterprises and conventional microenterprises in terms of energy consumption and profitability clearly highlights the advantages of adopting energy-efficient practices. Microenterprises that have adopted energy-efficient technologies show lower energy consumption, which leads to reduced operational costs. These savings allow businesses to reallocate funds to other critical areas such as improving product quality, expanding services, or investing in innovation, thereby boosting their overall profit margins. In contrast, conventional microenterprises that do not prioritize energy-saving measures face higher energy costs, limiting their ability to reinvest in the business and reducing profitability.

The findings suggest that green microenterprises consistently outperform conventional ones in financial performance. The lower energy consumption observed in green enterprises not only reduces direct energy costs but also contributes to long-term sustainability. Conventional microenterprises, on the other hand, are burdened by excessive energy costs, which leaves them with less capital to drive growth and competitive advantage.

This difference in energy-related expenses is a key factor that differentiates the profitability of green businesses from conventional ones.

Furthermore, the data reveals that green microenterprises, by adopting energy-efficient practices, create a more favorable financial outlook. These businesses benefit not only from lower operational costs but also from the positive consumer perception associated with their commitment to sustainability. As environmental concerns become increasingly important to consumers, businesses that prioritize green practices can differentiate themselves in the market, attracting a broader customer base, and gaining a competitive edge over conventional businesses that may struggle to market themselves as environmentally responsible.

## 6. Conclusion

In conclusion, the study highlights the critical role of energy efficiency in the profitability and sustainability of microenterprises, especially those adhering to Sharia-compliant and green business principles. The integration of energy-saving measures significantly reduces operational costs, which in turn enhances profit margins. Green businesses that prioritize energy efficiency outperform traditional businesses in terms of profitability, as they can reinvest savings into growth, innovation, and product improvements.

The comparison between green and conventional microenterprises further emphasizes the financial advantages of adopting energy-efficient practices. Green microenterprises consistently demonstrate lower energy consumption, leading to substantial cost savings, which boosts their competitiveness and long-term viability. On the other hand, conventional microenterprises, which do not implement energy-saving measures, face higher energy expenses, limiting their ability to reinvest and hindering profitability.

The study also underscores the environmental benefits of energy efficiency, especially for Sharia-compliant businesses. By adopting green practices, these microenterprises contribute positively to environmental sustainability while aligning with Sharia principles, which emphasize responsible resource management. This ethical commitment enhances their reputation, fosters consumer trust, and gives them a competitive edge in the growing eco-conscious market.

However, the study recognizes the barriers to energy efficiency, such as high initial investment costs, lack of technical knowledge, and limited access to efficient technologies. To overcome these obstacles, targeted support from policymakers, including financial incentives and educational initiatives, is necessary. By addressing these challenges, microenterprises can fully capitalize on the benefits of energy efficiency, enhancing their profitability, sustainability, and competitiveness in the market.

## References

- Allet, M. (2017). Mitigating environmental risks in microenterprises: A case study from El Salvador. *Business and Society*, 56(1), 57-91. <https://doi.org/10.1177/0007650315574738>
- Alsaghir, M. (2023). Digital risks and Islamic FinTech: A road map to social justice and financial inclusion. *Journal of Islamic Accounting and Business Research*. <https://doi.org/10.1108/JIABR-10-2022-0262>
- Alsharari, N. M., & Alhmoud, T. R. (2019). The determinants of profitability in Sharia-compliant corporations: Evidence from Jordan. *Journal of Islamic Accounting and Business Research*, 10(4), 546–564. <https://doi.org/10.1108/JIABR-05-2016-0055>
- Ashton, W., Russell, S., & Futch, E. (2017). The adoption of green business practices among small US Midwestern manufacturing enterprises. *Journal of Environmental Planning and Management*, 60(12), 2133–2149. <https://doi.org/10.1080/09640568.2017.1281107>
- Asis, E. H. R. (2024). Entrepreneurial capabilities and survival of microentrepreneurs in rural Peru. In *Technological Innovations for Business, Education and Sustainability* (pp. 235–248). <https://doi.org/10.1108/978-1-83753-106-620241016>

- Azam, M., Akhtar, J., Ali, S. A., & Mohy-Ud-Din, K. (2019). The moderating role of Shariah compliance on the relationship between firm profitability and CSR activities: An ethical obligation. *International Journal of Ethics and Systems*, 35(4), 709–724. <https://doi.org/10.1108/IJOES-02-2019-0039>
- Aziz, F.A. (2020). Menakar kesyariahan fintech syariah di Indonesia. *Al-Manabij: Jurnal Kajian Hukum Islam*, 14(1), 1-18. <https://doi.org/10.24090/mnh.v14i1.3567>
- Babayomi, O., Shomefun, T., & Zhang, Z. (2020). Energy efficiency of sustainable renewable microgrids for off-grid electrification. *2020 IEEE PES/LAS PowerAfrica, PowerAfrica 2020*, art. no. 9219958. <https://doi.org/10.1109/PowerAfrica49420.2020.9219958>
- Belás, J., Vojtovič, S., & Ključnikov, A. (2016). Microenterprises and significant risk factors in loan process. *Economics and Sociology*, 9(1), 43-59. <https://doi.org/10.14254/2071-789X.2016/9-1/3>
- Campos, J., Valencia, G. E., & Cardenas, Y. D. (2018). Ten systemic steps for sustainable energy savings in small and medium enterprises. *Journal of Physics: Conference Series*, 1126(1), 012039. <https://doi.org/10.1088/1742-6596/1126/1/012039>
- Demichela, M., Baldissone, G., & Darabnia, B. (2018). Using field data for energy efficiency based on maintenance and operational optimisation. *Processes*, 6(3), 25. <https://doi.org/10.3390/pr6030025>
- Dhaliwal, A. (2024). A study of success factors of micro-entrepreneurial women of emerging economies. *International Journal of Public Sector Performance Management*, 14(3-4), 309-337. <https://doi.org/10.1504/IJPSPM.2024.142339>
- Fariás, F. J. Z., Pacheco, M. E. S., Mayorga, R. X. M., & Crespo, S. F. G. (2022). Determinants of financial profitability of microenterprises: A cross-sectional study for the commerce sector. *Universidad y Sociedad*, 14(S6), 625-632. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85145327817&partnerID=40&md5=300bae289466c7c9f0b148f4b57b4a58>
- Fathonih, A., Anggadwita, G., & Ibraimi, S. (2019). Sharia venture capital as financing alternative of Muslim entrepreneurs: Opportunities, challenges and future research directions. *Journal of Enterprising Communities*, 13(3), 333-352. <https://doi.org/10.1108/JEC-11-2018-0090>
- Foli, S. (2024). Unlocking resource efficiency: Pathways for microenterprises in Estonia to offer green products and services. In *Management for Professionals* (pp. 307-322). [https://doi.org/10.1007/978-3-031-50836-3\\_14](https://doi.org/10.1007/978-3-031-50836-3_14)
- Guerrero, J. W. G., Toscano, A. D. R., Pacheco, L. V., & Tovar, J. O. (2018). Analysis of the energetic and productive effects derived by the installation of a conveyor belt in the metal-mechanic industry. *International Journal of Energy Economics and Policy*, 8(6), 196-201. <https://doi.org/10.32479/ijecp.7066>
- Gupta, M., & Singh, A. K. (2024). Factors influencing the sustainability of women micro-entrepreneurship in Jammu and Kashmir. In *Examining Barriers and Building Resiliency for Rural Women Entrepreneurs* (pp. 129-161). <https://doi.org/10.4018/979-8-3693-9178-5.ch005>
- Hassan, M. K., Chiaramonte, L., Dreassi, A., Paltrinieri, A., & Piserà, S. (2022). The religious fringe of Corporate Social Responsibility. *International Review of Economics and Finance*, 80, 243–265. <https://doi.org/10.1016/j.iref.2022.02.003>
- Kiraka, R. N. (2021). Green entrepreneurship: The case study of the Kenyan Climate Innovation Centre. In *Sustainable Development Goals Series* (pp. 83–106). [https://doi.org/10.1007/978-3-030-76563-7\\_4](https://doi.org/10.1007/978-3-030-76563-7_4)
- Kismawadi, E. R., Irfan, M., Haron, R., & Masitah, M. (2024). Bridging finance and sustainability: Islamic financial institutions' contributions to the transition to sustainable energy. In *Issues of Sustainability in AI and New-Age Thematic Investing* (pp. 138–161). <https://doi.org/10.4018/979-8-3693-3282-5.ch009>

- Leena Haniffah, N., Sharaf Shaiban, M., & Ahmed, P. (2023). Development and validation of a performance measurement system based on Islamic principles. *Heliyon*, 9(5), e16095. <https://doi.org/10.1016/j.heliyon.2023.e16095>
- Mahadea, D., & Khumalo, S. (2020). Understanding the internal and external constraints to growth of microenterprise entrepreneurship in a South African provincial context: A case of Mpumalanga-Mkhondo. *Journal of Developmental Entrepreneurship*, 25(2), 2050013. <https://doi.org/10.1142/S1084946720500132>
- Maksum, M., Wahyuni, A., Farida, A. R., Hasanah, L., & Fuad, S. (2022). Sharia service as an added value: Response to Sharia standard in hospital service. *Samarab*, 6(1), 423-448. <https://doi.org/10.22373/sjhk.v6i1.13418>
- Marchi, B., & Zaroni, S. (2017). Supply chain management for improved energy efficiency: Review and opportunities. *Energies*, 10(10), art. no. 1618. <https://doi.org/10.3390/en10101618>
- McNelly, M., & Choi, J.-K. (2024). Pathway to decarbonization through industrial energy efficiency: Micro and macro perspectives from compressed air usage. *International Journal of Precision Engineering and Manufacturing - Green Technology*, 11(5), 1575-1591. <https://doi.org/10.1007/s40684-024-00638-4>
- Missael, R.-C., Flores-Castillo, L.-A., Ravina-Ripoll, R., & Tobar-Pesentez, L.-B. (2021). Innovation and training as potentiators of social profitability generated by microenterprises. *Academy of Entrepreneurship Journal*, 27(Special Issue 2), 1-12. <https://www.scopus.com/inward/record.uri?eid=2-s2.0-85112371549&partnerID=40&md5=3d758fcc09bdaed6e935183ee82b067c>
- Oruwari, H. O., & Ubani, C. (2023). Energy efficiency as a key driver for environmental sustainability in the oil and gas sector in Nigeria. *Society of Petroleum Engineers - SPE Nigeria Annual International Conference and Exhibition, NAIC 2023*. <https://doi.org/10.2118/217149-MS>
- Pardo Martínez, C. I., & Cotte Poveda, A. (2022). Strategies to improve sustainability: An analysis of 120 microenterprises in an emerging economy. *Global Sustainability*, 5, e3. <https://doi.org/10.1017/sus.2022.3>
- Parekh, N., Kurian, J., Patil, R., & Gautam, R. (2022). Influencing factors and challenges to energy management and energy efficiency for chemical process SMEs in India. *Materials Today: Proceedings*, 57, 1745–1754. <https://doi.org/10.1016/j.matpr.2021.12.378>
- Rashid, A., & Siddique, M. A. (2021). Circular economy, green economy, and sustainable development: Establishing the interconnections and discoursing the role of Islamic finance. In *Gulf Studies* (pp. 53–72). [https://doi.org/10.1007/978-981-16-6061-0\\_5](https://doi.org/10.1007/978-981-16-6061-0_5)
- Sobko, O., Boichyk, I., Smereka, S., Maslosh, O., & Naumenko, M. (2024). Eco-friendly entrepreneurship and innovations: The impact of energy-efficient technologies on business practices. *Journal of Ecohumanism*, 3(4), 2252–2261. <https://doi.org/10.62754/joe.v3i4.3750>
- Sulaiman, S. M., Muhammad, Y., & Muhammad, M. A. (2021). An assessment of the intention to accept the Shariah-compliant crowdfunding mode of financing in Borno State, Nigeria. *Journal of Islamic Monetary Economics and Finance*, 7(4), 687-708. <https://doi.org/10.21098/jimf.v7i4.1271>
- Untari, R. (2017). Applications of green business by micro enterprises: A preliminary study on some micro-enterprises in Semarang. *Advanced Science Letters*, 23(8), 7269–7270. <https://doi.org/10.1166/asl.2017.9347>
- Vanpetch, Y., & Sattayathamrongthian, M. (2024). Evaluating the integration of internal and external factors for balancing sustainability and profitability in SMEs. *E3S Web of Conferences*, 583, 06019. <https://doi.org/10.1051/e3sconf/202458306019>