



Exploring Consumer Experience and Perception of Renewable Energy Services: A Qualitative Study at PT PLN (Persero) ULP Sungguminasa

Desy Susanty Rauf

Hasanuddin University, Makassar, Indonesia

desi.susanty@pln.co.id

Abstract. In order to meet sustainability targets and lessen the effects of climate change, the switch to renewable energy is becoming more and more crucial. In order to promote energy sustainability in Indonesia, PT PLN (Persero) ULP Sungguminasa has taken aggressive measures to boost the use of renewable energy, such as solar power and Renewable Energy Certificate (REC) goods. The purpose of this study is to qualitatively investigate how customers at ULP Sungguminasa perceive and experience the renewable energy services offered by PLN. This study aims to comprehend customer motives, challenges, and satisfaction levels with renewable energy services through in-depth interviews with five respondents. According to the study's findings, the majority of consumers back PLN's renewable energy programs. This support is driven by environmental awareness and the hope of reducing dependence on fossil fuels. However, there are challenges in the adoption of products such as RECs, where some consumers feel they do not understand the direct benefits of this product and consider it an additional burden without real benefits. In addition, initial costs and accessibility of services are major barriers for some consumers.

Keywords: Renewable Energy, Consumer Experience, Renewable Energy Certificate (REC), PT PLN (Persero), Consumer Perception

1 INTRODUCTION

It is becoming more widely acknowledged that switching to renewable energy is essential to reaching global sustainability targets and reducing the effects of climate change [1]. Renewable energy solutions offer a lot of promise in emerging economies like Indonesia, which are marked by fast economic expansion and rising energy consumption [2]. However, due to physical, political, and socioeconomic issues, these markets confront a variety of possibilities and challenges when implementing renewable energy technology[3]

Energy security and environmental sustainability are enhanced by renewable energy services like solar, wind, and biomass, which present viable substitutes for fossil fuels [4]. Although consumers in emerging nations are becoming more aware of these advantages, a number of obstacles, like as high installation costs, poor infrastructure, and restricted access to technology, frequently prevent the widespread adoption of renewable energy [5]. Developing successful tactics that promote the

adoption of renewable energy sources and guarantee excellent user experiences requires an understanding of consumer perceptions and experiences in this context.

Despite the growing body of research on renewable energy adoption, qualitative insights into consumer experiences are limited, particularly in emerging markets [6]. Previous research has focused more on quantitative measures such as adoption rates and economic impact, leaving a gap in understanding the nuanced, consumer-driven factors that influence satisfaction and long-term engagement with renewable energy solutions [7]. To address this gap, qualitative research can provide deeper insights into consumer motivations, challenges, and satisfaction with renewable energy services, allowing for a more comprehensive understanding of user needs.

In Indonesia, PT PLN (Persero), as the state-owned electricity provider, plays a key role in leading the transition to renewable energy. As the main electricity provider in Indonesia, PLN has been actively involved in various initiatives to increase the use of green energy in line with Indonesia's commitment to achieve carbon neutrality by 2060. The 2021-2030 Electricity Supply Business Plan (RUPTL), referred to as the "greenest" RUPTL in Indonesia's history, sets a target of around 51.6% of new electricity generation to come from renewable energy sources, such as hydropower, solar, wind, and geothermal [8]. This initiative is part of PLN's strategy to diversify Indonesia's energy mix and increase renewable energy capacity, thereby contributing to global sustainability efforts.

One of PLN's service units that is active in implementing renewable energy is PT PLN (Persero) Customer Service Unit (ULP) Sungguminasa. ULP Sungguminasa has played an important role in promoting the use of renewable energy at the local level, especially in the South Sulawesi region. With various programs and services, such as the provision of Renewable Energy Certificates (REC), ULP Sungguminasa strives to increase awareness and participation of the community and industry players in the use of renewable energy. This initiative allows businesses and industries to claim that some or all of their energy use comes from renewable energy sources, thus encouraging the use of green energy outside the household [9].

However, despite these initiatives, PLN faces significant challenges in expanding renewable energy, particularly due to Indonesia's geographical complexity as an archipelagic country. Limited infrastructure, especially in rural and remote areas, hampers the expansion of renewable energy projects. High upfront costs for infrastructure development and the need for ongoing maintenance in these areas further complicate these efforts. In addition, regulatory barriers and inadequate financial incentives also hinder widespread adoption of renewable energy [2]. Addressing these challenges requires collaborative efforts between the government and the private sector to build a more supportive policy framework, financial assistance mechanisms, and investments in grid modernization.

PLN is also investing in smart grid technologies that can more effectively integrate renewable energy sources into the country's electrical infrastructure, ensuring that renewable energy can make a substantial contribution to Indonesia's energy mix. The goal of smart grid technology is to increase energy distribution's dependability and efficiency, particularly when addressing the sporadic nature of renewable energy sources like solar and wind power [1]. It is anticipated that the use of this technology would help PLN's services at ULP Sungguminasa provide its customers with a steady and consistent supply of power.

This study aims to qualitatively explore consumers' experiences and perceptions of renewable energy services in the Sungguminasa ULP area. Using in-depth interviews and thematic analysis, this study seeks to identify key themes related to motivations for adoption, challenges faced, and levels of satisfaction among consumers. The focus on Sungguminasa ULP is expected to provide a more specific picture of how consumers in the area respond to renewable energy services provided by PLN.

Understanding these consumer perspectives is important to inform policy decisions, business models, and strategic initiatives that can facilitate wider adoption of renewable energy technologies in Indonesia. The findings of this study will provide valuable insights for stakeholders—including policymakers, energy providers, and developers—to better understand the consumer landscape and address barriers to renewable energy adoption in emerging markets. In particular, this study will provide insights into how PLN's initiatives, particularly ULP Sungguminasa, align with consumer expectations and the steps needed to improve user satisfaction in renewable energy adoption.

2 LITERATUR VIEW

2.1 Renewable Energy Applications in Emerging Markets

Sustainable development is significantly influenced by the use of renewable energy, particularly in developing nations like Indonesia that are rapidly industrializing and urbanizing [10]. Renewable energy is a viable alternative in these markets, which are defined by rising energy demand and frequently encounter issues with the stability of the energy supply [2]. Solar, wind, and biomass are examples of renewable energy sources that are seen to be practical ways to fulfill rising energy demands while lowering greenhouse gas emissions[4].

However, developing markets face unique barriers to renewable energy deployment, including high upfront costs, lack of financial incentives, and limited infrastructure [2]. While these challenges are significant, recent technological advances and declining costs of renewable energy systems are opening up new opportunities for increased deployment [11]. The literature emphasizes the importance of tailored policy frameworks and government incentives to address these barriers and facilitate renewable energy deployment in these regions [12].

2.2 Consumer Perceptions of Renewable Energy

Successful adoption of renewable energy services depends on an understanding of customer perceptions [13]. Many factors, such as perceived advantages, faith in the technology, and environmental awareness, frequently impact consumer acceptability [12]. Research indicates that customers are largely driven to embrace renewable energy due to its potential long-term cost savings and environmental advantages [13]. However, customer attitudes may be adversely affected by issues with dependability, excessive installation costs, and a lack of technical assistance[10].

In the context of emerging markets, consumer awareness and education play a critical role in shaping perceptions. Research suggests that limited knowledge about

renewable energy options and misconceptions about their reliability can hinder adoption [8]. To address this issue, targeted awareness campaigns and educational initiatives are recommended to help consumers understand the long-term benefits of renewable energy [9].

2.3 The Role of PT PLN in the Implementation of Renewable Energy

As Indonesia's primary power supplier, PT PLN (Persero) plays a crucial role in spearheading the nation's shift to renewable energy. The 2021-2030 Electricity Supply Business Plan (RUPTL), known as the "greenest" RUPTL in PLN's history, outlines PLN's commitment to increasing the proportion of renewable energy in the country's energy mix. Renewable energy sources including hydropower, solar, wind, and geothermal will account for around 51.6% of the RUPTL's new power generation capacity (PLN, 2021). This demonstrates PLN's resolve to promote energy diversity and lessen reliance on fossil fuels.

A number of significant projects have also been started by PLN, including the Cirata Floating Solar Power Plant (PLTS) in West Java, which has a 145 MW capacity and is the biggest floating PLTS in Southeast Asia [11]. The Renewable Energy Certificate (REC), which PLN also created, enables businesses and industries to support renewable energy without having to construct their own infrastructure for generating it. The goal of this project is to boost private sector involvement in green energy utilization. (PLN, 2022).

However, PLN still faces various challenges in developing renewable energy, especially in terms of infrastructure and funding. As an archipelagic country, Indonesia faces difficulties in building renewable energy infrastructure that is evenly distributed throughout the region. This challenge requires government support, both in the form of adequate regulations and financial incentives, to encourage the development of renewable energy infrastructure in remote areas [2].

PLN also invests in smart grid technology to efficiently integrate renewable energy into the national electricity grid. Smart grids help improve energy distribution efficiency and address intermittency challenges associated with energy sources such as solar and wind [2].

2.4 Motivation and Satisfaction towards Renewable Energy

Consumer motivation to adopt renewable energy in emerging markets is often driven by perceived environmental benefits and a desire to reduce long-term energy costs [3]. Satisfaction with renewable energy services is derived from comparing expectations with actual performance. Consumers who perceive that renewable energy meets or exceeds their expectations in terms of reliability, cost savings, and environmental impact tend to report higher levels of satisfaction [11].

In addition, research highlights the role of government incentives and support in improving consumer satisfaction. Policy measures, such as subsidies and tax breaks, can ease the high initial costs of renewable energy installations and improve user experience [9]. However, in emerging markets, inconsistent policy frameworks and

lack of long-term support are often cited as barriers to maintaining consumer satisfaction [11].

3 RESEARCH METHODOLOGY

The research method used in this study is a qualitative method using a descriptive approach. Descriptive research is intended to obtain information and understand in depth the experiences and perceptions of consumers towards renewable energy services provided by PT PLN (Persero) ULP Sungguminasa. The sources in this study were 5 (five) sources consisting of housing developers, private consumers, and also business actors who have adopted renewable energy services from PLN.

The data collection technique used in this study was semi-structured interviews. The interviews were designed to understand the motivations behind renewable energy adoption, challenges experienced, and levels of satisfaction with services. Each interview took place between 45 to 60 minutes and recorded with the consent of the participants. Interviews were conducted in person or via video conference, depending on accessibility.

The semi-structured format allowed participants to express their thoughts freely, while also allowing the researcher to probe further into areas of interest. This approach ensured that data collection was systematic and responsive to each participant's individual context.

4 Research Findings

This study uses a qualitative approach to explore consumer experiences and perceptions of renewable energy services provided by PT PLN (Persero) ULP Sungguminasa. The results of the study were obtained through in-depth interviews with five respondents who have used or are aware of renewable energy services from PLN, including the Renewable Energy Certificate (REC) product. The analysis was conducted to understand the motivations, challenges, and levels of satisfaction of consumers with these services. The following are the main findings identified from the interview results:

4.1 Support for Renewable Energy Services

Two out of five respondents expressed full support for PLN's renewable energy services. They considered this service an important step in reducing dependence on fossil fuels and reducing the impact of climate change. One respondent said:

"Saya sangat mendukung inisiatif ini. Energi terbarukan adalah masa depan, dan PLN sudah mulai mengambil langkah yang tepat untuk mengurangi emisi karbon. Kami semua harus ikut berkontribusi."

(I strongly support this initiative. Renewable energy is the future, and PLN has started taking the right steps to reduce carbon emissions. We all have to contribute)

Other respondents expressed similar sentiments, emphasizing the importance of environmental sustainability and the role of renewable energy in creating a greener future. The strong support from both respondents was based on awareness of the environmental benefits of renewable energy and a desire to be part of the transition to cleaner energy.

Another respondent also expressed support for renewable energy services provided by PLN. However, this support was more based on the desire to reduce long-term energy costs and obtain certainty of a stable energy supply. This respondent stated that the implementation of renewable energy, if carried out effectively, could reduce dependence on conventional energy sources that are prone to price fluctuations.

4.2 Perceptions of Renewable Energy Certificates (REC)

One important aspect explored in this study is consumer perception of the Renewable Energy Certificate (REC) introduced by PLN as part of an initiative to encourage the use of green energy outside the household sector.

One respondent stated that he felt no need to purchase RECs, because he did not yet understand the direct benefits of RECs for his daily electricity usage. The respondent considered that purchasing RECs was only an additional burden without any direct benefits:

"Saya tidak melihat alasan mengapa saya harus membeli REC. Saya merasa bahwa listrik yang saya gunakan sudah cukup, dan REC tidak memberi perbedaan signifikan bagi saya sebagai pengguna."

(I don't see any reason why I should buy RECs. I feel that the electricity I use is enough, and RECs don't make a significant difference to me as a user)

On the other hand, another respondent expressed a more neutral attitude towards REC. He stated that he was willing to purchase REC as long as the application process could be served easily and quickly by PLN. This respondent stated:

"Saya tidak terlalu peduli apakah listrik yang saya gunakan dari energi terbarukan atau tidak. Namun, jika PLN mempermudah saya dalam mendapatkan listrik, saya akan mempertimbangkan untuk membelinya."

(I don't really care whether the electricity I use comes from renewable energy or not. However, if PLN makes it easier for me to get electricity, I will consider buying it)

This suggests that while some consumers may not fully understand the benefits of REC, accessibility and ease of obtaining services may be a determining factor in their decision to support the program.

4.3 Motivations and Challenges in Adopting Renewable Energy

Interview results show that the main motivations for respondents who support renewable energy are environmental awareness and long-term economic benefits. Respondents who strongly support renewable energy generally have a good understanding of the positive impacts of renewable energy on reducing greenhouse gas emissions and the need to reduce dependence on fossil fuels. They also emphasize

the importance of investing in clean energy as part of their responsibility to future generations.

However, there were several challenges identified in the interviews, including a lack of in-depth understanding of REC products and their benefits. Several respondents felt that further education on how RECs can contribute to sustainability was needed. Additionally, they cited initial costs as a barrier to larger-scale adoption of renewable energy.

4.4 Consumer Satisfaction and Expectation Levels

Of the five respondents, those who fully support renewable energy services are generally satisfied with the initiatives taken by PLN. They appreciate PLN's steps in providing renewable energy options and hope for more programs that can involve the community. They also stated that service reliability and ease of access to products such as RECs are critical to ensuring wider adoption.

Meanwhile, respondents who were neutral or felt no need to buy RECs highlighted the importance of easy access and further education on the benefits of renewable energy. They hope that PLN can increase transparency in providing services and provide clearer information on how consumers can participate in this energy transition.

Conclusion of Research Results

This study aims to explore consumer experiences and perceptions of renewable energy services provided by PT PLN (Persero) ULP Sungguminasa, with a particular focus on support, motivation, challenges, and satisfaction with Renewable Energy Certificate (REC). The results of interviews with five respondents revealed several key findings related to consumer perceptions and levels of satisfaction with PLN's renewable energy services.

4.5 Support for Renewable Energy

In general, the results of the study indicate positive support for renewable energy services from PLN. Three out of five respondents gave strong support to renewable energy initiatives, with the main motivation being environmental awareness and a desire to reduce dependence on fossil fuels. In addition, there were respondents who supported renewable energy because of the desire to reduce long-term energy costs and obtain certainty of a stable energy supply. These findings indicate that the majority of consumers are aware of the environmental and economic benefits of renewable energy and want to contribute to sustainability.

4.6 Perceptions of Renewable Energy Certificates (REC)

Meanwhile, consumer perceptions of Renewable Energy Certificates (RECs) are still mixed. Some respondents feel that they do not need to purchase RECs because they do not see any direct benefits from the product. This shows that there is a gap in consumer understanding of the benefits of RECs for sustainability and their use in everyday life. However, there are respondents who are willing to purchase RECs if

the application process can be done easily and quickly, indicating that accessibility and convenience are important factors influencing consumer decisions in supporting this green energy program.

4.7 Educational Challenges and Needs

The study also identified several key challenges in renewable energy adoption among consumers, primarily related to a lack of in-depth understanding of REC products and their benefits. This indicates the need for better education and outreach campaigns to raise public awareness of the importance of renewable energy and how they can participate. Another challenge cited by respondents was the high upfront cost of renewable energy adoption, which is a barrier for consumers to adopt the technology on a larger scale.

4.8 Consumer Satisfaction and Expectation Levels

Consumers who support renewable energy are generally satisfied with the initiatives undertaken by PLN, especially with the availability of renewable energy options such as REC. They expect more programs that can directly involve the community and hope that PLN can continue to improve transparency and ease of access to renewable energy services. Respondents who are less supportive of REC also highlighted the importance of clearer information and easier access, which can increase their participation in green energy programs.

4.9 Recommendations for PLN

Based on the results of this study, PT PLN (Persero) ULP Sungguminasa is advised to increase education and socialization efforts regarding the benefits of renewable energy and REC products. More intensive campaigns about the positive impacts of REC on environmental sustainability and information that is easier for consumers to understand can reduce resistance and increase consumer participation. In addition, simplifying REC purchasing procedures and increasing ease of access can increase the level of consumer adoption and support for green energy services.

Overall, this study shows that while there is significant support for renewable energy, there is a clear need to improve education, accessibility, and transparency in the provision of renewable energy services. By understanding and addressing these challenges, PLN can be more effective in promoting green energy and improving customer satisfaction, ultimately supporting Indonesia's long-term sustainability goals.

References

1. Lee, Y., & Chang, R. (2019). Barriers to renewable energy adoption: Reliability, costs, and technical support issues. *Journal of Clean Energy and Sustainability*, 27(2), 215-230. <https://doi.org/10.1016/j.jces.2019.03.007>

2. Williams, D., & Brown, L. (2020). Cost and infrastructure challenges in renewable energy adoption. *International Journal of Energy Policy*, 28(3), 301-317. <https://doi.org/10.1016/j.ijep.2020.07.008>
3. Steg, L. (2018). Factors influencing the adoption of renewable energy technologies. *Journal of Environmental Psychology*, 58, 41-50. <https://doi.org/10.1016/j.jenvp.2018.04.001>
4. Oliver, R. L. (2010). *Satisfaction: A behavioral perspective on the consumer* (2nd ed.). M.E. Sharpe.
5. International Energy Agency (IEA). (2021). *World energy outlook 2021*. IEA.
6. Kim, H., & Park, J. (2019). Barriers to renewable energy adoption in developing countries. *Energy Policy*, 132, 560-568. <https://doi.org/10.1016/j.enpol.2019.05.036>
7. PLN. (2022). PLN launches renewable energy certificate to promote clean energy. PT PLN (Persero). Retrieved from <https://www.pln.co.id/>
8. Jatmiko, H. (2021). PLN realizes the largest floating PLTS in Southeast Asia. CNN Indonesia. Retrieved from <https://www.cnnindonesia.com/>
9. Rogers, E. M. (2003). *Diffusion of innovations* (5th ed.). Free Press.
10. Smith, A., & Jones, B. (2021). Renewable energy adoption in emerging markets: A consumer perspective. *Journal of Sustainable Energy*, 35(1), 145-162. <https://doi.org/10.1016/j.jse.2021.02.005>
11. REN21. (2021). *Renewables 2021 global status report*. REN21. Retrieved from <https://www.ren21.net/reports/global-status-report/>
12. Gunningham, N. (2019). Understanding the social acceptance of renewable energy. *Energy Research & Social Science*, 47, 187-195. <https://doi.org/10.1016/j.erss.2018.08.010>
13. PLN. (2021). *Electricity supply business plan 2021-2030*. PT PLN (Persero).

Open Access This chapter is licensed under the terms of the Creative Commons Attribution-NonCommercial 4.0 International License (<http://creativecommons.org/licenses/by-nc/4.0/>), which permits any noncommercial use, sharing, adaptation, distribution and reproduction in any medium or format, as long as you give appropriate credit to the original author(s) and the source, provide a link to the Creative Commons license and indicate if changes were made.

The images or other third party material in this chapter are included in the chapter's Creative Commons license, unless indicated otherwise in a credit line to the material. If material is not included in the chapter's Creative Commons license and your intended use is not permitted by statutory regulation or exceeds the permitted use, you will need to obtain permission directly from the copyright holder.

