

# Digital Marketplaces in Green Energy Governance: The "BuyMySun" Model

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## Abstract

This paper examines the transformative impact of e-marketplaces on the procurement and installation of solar energy systems, highlighting their role in addressing the challenges of accessibility, cost, and information standardization in the renewable energy sector. Through a comprehensive analysis of digital platforms such as the Government e-Marketplace (GeM) in India, "BuyMySun" by ANERT in Kerala, and similar initiatives by SECI and EnergySage, the study elucidates how these e-marketplaces have revolutionized the way solar energy solutions are procured and installed. By aggregating demand, standardizing offerings, and facilitating financing options, these platforms have significantly lowered barriers to solar energy adoption, making it more accessible to a wider audience. The paper further explores the integration of e-marketplaces into e-governance frameworks, enhancing transparency, efficiency, and public accountability in procurement processes. Through case studies and practical examples, the narrative underscores the crucial role of e-marketplaces in fostering a sustainable and energy-independent future, leveraging technological innovation to promote the widespread adoption of solar energy. This abstract encapsulates the essence of the narrative, presenting key findings on the pivotal role of digital platforms in accelerating the transition towards renewable energy sources and contributing to global sustainability goals.

**Keywords:** *e-marketplace, e-governance, BuyMySun, ANERT.*

## 1. Introduction

In the contemporary digital landscape, e-marketplaces have emerged as pivotal platforms, redefining the dynamics of commerce and public procurement with a particular resonance in the renewable energy sector. This narrative delves into the evolutionary trajectory of e-marketplaces from simple online listings to sophisticated ecosystems facilitating procurement, bidding, and supply chain management. Central to this exploration is the significant role these platforms play in the solar energy domain, where challenges such as high upfront costs, lack of standardized information, and complex installation processes have traditionally impeded adoption. By leveraging the capabilities of e-marketplaces, such as "BuyMySun" by ANERT in Kerala, alongside initiatives by SECI and EnergySage in India, a conducive environment for the procurement and installation of solar energy systems has been fostered. These platforms not only streamline the transition towards renewable energy sources but also exemplify the transformative impact of digital solutions on enhancing transparency, efficiency, and accessibility within the solar energy ecosystem. On this backdrop, let us review the significance of e-market place in channelizing the procurement and installation and deep dive in to the implementation of "BuyMySun" in detail.

## 2. Methodology

The study adopts a case study method, focusing entirely on secondary data to analyze the effectiveness of e-marketplaces in facilitating the adoption of solar energy systems. Specifically, it delves into the "BuyMySun" initiative by ANERT in Kerala as a primary case study, alongside comparative analysis of other similar platforms such as SECI and EnergySage. The methodology hinges on an exhaustive review of secondary sources including academic publications, industry reports, government documents, and digital platform analytics. This approach allows for a comprehensive understanding of the operational frameworks, challenges, and achievements of these e-marketplaces. Through this methodological lens, the paper seeks to contribute valuable insights into the scalability and replicability of the e-marketplace model in promoting sustainable energy solutions.

## 3. Literature Review

E-marketplaces are digital platforms that have revolutionized the way buyers and sellers interact, serving as a bridge for the exchange of goods and services. Initially starting as basic online listings, these platforms have undergone significant evolution to become complex ecosystems that offer a comprehensive suite of services, including procurement, bidding, and supply chain management. This transformation has not only expanded

their functionality but has also enhanced the efficiency and effectiveness of market transactions (Dahlquist, 2021)

The advantages of e-marketplaces are manifold, significantly impacting the dynamics of traditional commerce. They have drastically reduced transaction costs and time, making markets more accessible and inclusive for a broader audience. Furthermore, these digital platforms have introduced a new level of transparency and competitive pricing by providing detailed information on pricing and availability, fostering more competitive market conditions. Additionally, the wealth of data accessible through e-marketplaces empowers businesses with the ability to make more informed decisions, optimizing both supply and demand management. This convergence of efficiency, transparency, and data-driven decision-making underscores the transformative potential of e-marketplaces in today's digital economy (Cano et al., 2022).

### **3.1.1 The Significance of e-Marketplace in e-Governance**

E-marketplaces play a pivotal role in the integration of e-governance frameworks, significantly enhancing the transparency, accountability, and efficiency of public procurement processes. By facilitating the adoption of digital platforms for procurement, these marketplaces contribute to simplifying the acquisition of goods and services, minimizing corruption, and promoting fair and competitive bidding environments. The automation and digitization of procurement processes through e-marketplaces not only streamline operations but also ensure greater compliance with regulatory standards, leading to more equitable and transparent governance practices (Mpehle & Mudogwa, 2020)

Countries and regions around the globe have recognized the benefits of incorporating e-marketplaces into their public procurement strategies, with notable examples being the European Union's Tenders Electronic Daily (TED) and South Korea's Korea ON-line E-Procurement System (KONEPS). These implementations stand as testament to the transformative impact of digital procurement platforms, demonstrating substantial improvements in governance and operational efficiency. Through these case studies, it becomes evident that e-marketplaces are not just tools for enhancing e-governance but are essential components in the modernization of public sector procurement, setting benchmarks for transparency and efficiency on a global scale (Priest et al., 2018).

In India, the Central government rolled out an e-market called Government e-Marketplace (GeM). GeM has emerged as a pivotal platform for promoting sustainable procurement, including solar energy products and services. Launched in 2016, GeM has significantly enhanced micro and small enterprise participation in government tenders, promoted women-led businesses, and emphasized green procurement by listing environmentally sustainable products. This approach aligns with the broader objective of sustainable development by ensuring that procurement practices support the economic, social, and environmental needs of the present without compromising future generations. GeM's success in fostering a more sustainable and efficient procurement landscape serves as a model for integrating digital solutions in public procurement to support renewable energy initiatives (Mehra et al., 2020)

### **3.1.2 The Significance of e-Marketplace in Solar Energy Systems' Procurement and Installation**

The procurement and installation of solar energy systems are faced with several significant challenges that can deter potential adopters. High upfront costs, a lack of standardized information regarding solar products and services, and the complexity of installation processes are among the primary obstacles. These factors contribute to the hesitation among homeowners and businesses to invest in solar energy, despite its long-term benefits and sustainability advantages. Addressing these challenges is crucial to accelerating the adoption of solar energy systems and promoting a shift towards renewable energy sources (Mehra et al., 2020)

E-marketplaces have emerged as a viable solution to overcome the barriers associated with the procurement and installation of solar energy systems. By aggregating demand, these digital platforms enable economies of scale that can significantly reduce costs for end consumers. Moreover, the standardization of product specifications and service offerings simplifies the comparison and procurement process, making it easier for buyers to make informed decisions. Additionally, e-marketplaces facilitate connections between buyers and financing options, helping to mitigate the issue of high upfront costs and making solar energy systems more accessible to a wider audience (Gottschalk & Foss Abrahamsen, 2002)

Case studies and business use cases highlight the effectiveness of e-marketplaces in streamlining the solar energy procurement process. Google's Project Sunroof serves as an exemplary tool that leverages online resources to estimate potential solar savings for homeowners, based on factors like roof size, sunlight exposure, and local utility prices. Similarly, EnergySage is an online marketplace that empowers users to obtain quotes from multiple solar providers, compare their options, and select the best solution tailored to their needs (Leibowicz et al., 2019)

One notable e-marketplace initiative in India is the Solar Energy Corporation of India's (SECI) online platform, which facilitates the bidding process for solar projects and procurement of solar PV systems. SECI's platform aims to make it easier for stakeholders to participate in solar projects, offering a transparent and efficient process for procuring solar energy solutions. Additionally, platforms like EnergySage in India work as aggregators, where consumers can compare quotes from multiple solar providers, understand the financial benefits, and choose the best option for their needs. Although EnergySage is more globally recognized, its model is being emulated by various startups and companies within India, providing a marketplace for solar solutions that ensures competitive pricing and transparency (Kandpal & Dhingra, 2021)

These initiatives reflect the growing trend of digital platforms in facilitating the transition to renewable energy sources in India. By leveraging technology, these e-marketplaces are not only making solar energy more accessible but are also playing a crucial role in India's journey towards sustainability and energy independence.

### 3.2 BuyMySun – the e-marketplace by ANERT

The "BuyMySun" initiative by the Agency for New and Renewable Energy Research and Technology (ANERT) in Kerala is a pioneering e-marketplace designed to accelerate the state's adoption of renewable energy, aligning with Kerala's broader commitment to sustainable and eco-friendly energy solutions. Kerala's progressive embrace of renewable energy, demonstrated through milestones like establishing the country's first solar park, the world's first solar-powered airport, and several floating solar power plants, sets a vibrant backdrop for "BuyMySun." This platform emerges against a rich tapestry of initiatives aimed at reducing reliance on conventional energy sources. Specifically, the installation of solar power generation units across thousands of homes in Thiruvananthapuram, under the Soura scheme, highlights Kerala's ambitious strides towards becoming a solar city. "BuyMySun" aims to further this momentum by offering a streamlined process for procuring and installing renewable energy systems, thus making solar energy solutions more accessible to residents and institutions across Kerala (Bedi, 2019) (ANERT, 2024).

At its core, "BuyMySun" seeks to bridge the gap between vendors and consumers in the renewable energy sector, providing a centralized marketplace for an array of solar energy products. This initiative not only facilitates ease of access and increased choice for consumers but also encourages a competitive marketplace where vendors can showcase their best offerings. Furthermore, the platform prioritizes transparency and customer education by providing detailed product information, thereby enabling informed purchasing decisions. The integration of government subsidy processes into the platform exemplifies "BuyMySun's" commitment to simplifying the adoption of solar energy, making financial incentives more accessible and understandable for the general public. Through these efforts, "BuyMySun" embodies a significant leap towards meeting Kerala's environmental and energy sustainability goals, promoting the widespread adoption of solar energy by leveraging technological innovation and strategic incentives to foster a cleaner, greener future (Murdan & Jeetun, 2021) (ANERT, 2024).

### 3.3 BuyMySun - Implementation Strategy:

The implementation strategy of the "BuyMySun" project by ANERT in Kerala is a comprehensive approach that encompasses various technical and operational aspects. This strategy is designed to ensure the effective deployment and utilization of the platform by both vendors and customers.

At the heart of "BuyMySun's" implementation strategy is a robust technical framework designed to support a seamless online marketplace experience. This involves the development of a user-friendly website that serves as an e-marketplace for renewable energy products, particularly solar energy systems. The website is engineered to handle a large volume of products and user interactions, ensuring reliability and efficiency. From a technical standpoint, the platform incorporates features such as product listing, order processing, and transaction management. Operationally,

the project involves coordinating with various stakeholders, including vendors, ANERT officials, and customers. This coordination is crucial for ensuring that the platform operates smoothly, with vendors providing accurate and up-to-date product information and ANERT officials overseeing the overall functioning of the marketplace (ANERT, 2024).

The "BuyMySun" platform is designed with distinct features that cater to the needs of both vendors and customers. For vendors, the platform offers an opportunity to list their products, along with all necessary details like certifications, test reports, and payment information. This visibility in an e-marketplace enables vendors to reach a broader customer base and facilitates the marketing of their products. On the customer side, the platform allows individuals to browse and compare different solar products at their convenience, making informed purchasing decisions. Customers can view comprehensive product details and take advantage of subsidy programs, which are integrated into the platform. This dual approach ensures that both vendors and customers benefit from a transparent, efficient, and user-friendly online marketplace- (ANERT, 2024).

Complementing the "BuyMySun" e-marketplace is the m-ANERT mobile app, an internal tool used by ANERT officials and vendors for operational purposes. The app plays a critical role in the implementation process, particularly in the areas of feasibility reporting, installation reporting, and verification. Technicians and officials can use the app to prepare and submit reports complete with geotagged photographs, which are essential for verifying installations and ensuring compliance with standards. This mobile app integration demonstrates an innovative use of technology in streamlining the implementation and monitoring processes. It enhances the efficiency of the project by enabling real-time data collection and reporting, which is vital for the swift and effective execution of solar energy installations (ANERT, 2024).

Overall, the implementation strategy of the "BuyMySun" project is a well-thought-out blend of technical proficiency, operational coordination, and innovative use of mobile technology. This strategy is pivotal in ensuring that the platform effectively bridges the gap between renewable energy vendors and customers in Kerala, promoting the adoption of solar energy across the state

### 3.4 BuyMySun - Key Challenges in Implementation and Adoption:

The implementation and adoption of initiatives like the "BuyMySun" project, or similar renewable energy marketplaces, often encounter several challenges. These challenges can range from technical issues to user adoption and regulatory complexities.

One of the primary challenges in implementing projects like "BuyMySun" is the technical complexity involved in setting up a robust digital infrastructure. Ensuring that the online platform is user-friendly, secure, and capable of handling a large volume of transactions and data is critical. Technical issues such as website downtime, slow loading times, and data security concerns can significantly hinder user experience and trust. Additionally, the integration of a comprehensive solar product catalog with accurate and up-

to-date information requires constant coordination with vendors. On the ground, the actual installation of solar panels can face hurdles, such as the suitability of rooftops, the strength of the existing electrical infrastructure, and the geographical variability in solar irradiance, all of which can impact the feasibility and efficiency of solar energy systems.

Another significant challenge is user adoption, which is often influenced by the level of public awareness and perception of solar energy. Despite the environmental and long-term economic benefits of solar energy, many potential users may be hesitant due to the initial investment costs or a lack of understanding of the technology. This is compounded by the challenge of disseminating accurate information and educating consumers about the benefits and practicalities of adopting solar energy. Misconceptions about the effectiveness, maintenance, and cost of solar energy systems can also deter potential users. Furthermore, navigating subsidy programs and understanding the financial incentives can be complex for users, potentially leading to underutilization of available government support.

Implementing a project like "BuyMySun" also involves navigating a complex regulatory landscape. Compliance with various standards and regulations set by energy authorities and government bodies is essential but can be a daunting task for both vendors and customers. The process of obtaining necessary approvals, certifications, and meeting quality standards for solar equipment can be time-consuming and challenging. Operational difficulties such as coordinating between different stakeholders, including government agencies, vendors, installers, and consumers, add another layer of complexity. Ensuring timely and effective communication and maintaining a streamlined process for registration, installation, and after-sales service are crucial for the success of the project.

These challenges highlight the need for a well-coordinated approach that includes robust technical solutions, effective consumer education and engagement strategies, and a streamlined regulatory process. Overcoming these hurdles is essential for the successful implementation and widespread adoption of renewable energy initiatives like "BuyMySun." (ANERT, 2024)

### 3.5 BuyMySun - Adoption and Trends:

The "BuyMySun" initiative has witnessed a remarkable trend in adoption and significant achievements since its inception, reflecting a growing awareness and acceptance of solar energy in Kerala. The platform's success is underscored by several key metrics:

*Widespread Beneficiary Engagement:* To date, the platform has successfully served over 6000 beneficiaries. This substantial number indicates a high level of public engagement and trust in the platform, highlighting its effectiveness in reaching a wide audience. The number of users utilizing "BuyMySun" for solar installations and other services signifies a growing interest in renewable energy solutions among the residents of Kerala.

*Financial Transactions and Process Streamlining:* An impressive financial throughput exceeding 150 crore has been channeled through the "BuyMySun" platform. This

remarkable figure not only underscores the platform's financial robustness but also indicates the elimination of third-party involvement in procurement and subsidy processes. By streamlining these processes, "BuyMySun" has enhanced transparency and efficiency, ensuring that financial transactions are direct and beneficiary-focused.

*Significant Installation Capacity:* The platform has played a crucial role in the installation of solar energy systems with a total capacity exceeding 23MW across various locations in Kerala. This milestone is indicative of the platform's substantial contribution to the state's renewable energy capacity, demonstrating its effectiveness in promoting large-scale solar installations.

*Growing Trend in Adoption:* There is a noticeable increase in the trend of adoption, as more individuals are turning to the "BuyMySun" platform for availing various services. This uptrend is particularly evident in the context of projects like 'Sauramitra' and other related initiatives. The increasing user base reflects the rising awareness and acceptance of solar energy solutions, propelled by the ease of access and user-friendly nature of the "BuyMySun" platform (ANERT, 2024).

These statistics and trends not only highlight the success of the "BuyMySun" project in facilitating solar energy adoption but also reflect the changing attitudes towards renewable energy in Kerala. The platform's impact extends beyond mere numbers; it symbolizes a transformative shift in how renewable energy is perceived, accessed, and utilized in the state, paving the way for a more sustainable and energy-independent future.

### 3.6 BuyMySun - Key Benefits Realized:

The "BuyMySun" project, initiated by ANERT in Kerala, has realized several significant benefits since its implementation, fundamentally altering the landscape of solar energy adoption in the state. Here are some of the key benefits:

One of the most notable achievements of the "BuyMySun" initiative is the increased accessibility of solar products for the general public. By providing a centralized online platform, the project has made it easier for customers to explore and purchase a wide range of solar energy products. This accessibility is particularly important in a market where solar technology might previously have been perceived as niche or inaccessible. The platform's user-friendly interface and the comprehensive listing of products have enabled customers to make informed decisions based on their specific needs and budget, thereby democratizing access to solar energy solutions.

"BuyMySun" has significantly streamlined the process of buying and selling solar products. For vendors, the platform offers a straightforward and efficient way to list their products, reach a wider audience, and manage transactions. This has opened up new market opportunities, especially for smaller vendors who might not have the resources for extensive marketing or outreach. For customers, the e-marketplace simplifies the purchasing process, from product comparison to transaction completion. The integration of subsidy programs into the platform also makes it easier for customers to understand

and avail themselves of financial incentives, reducing the bureaucratic hurdles that often accompany such processes.

The project has significantly influenced Kerala's use of solar energy. By simplifying the process of purchasing and installing solar systems and making information and products more accessible, "BuyMySun" has played a crucial role in promoting the use of solar energy across the state. This increased adoption is not only beneficial from an environmental standpoint but also contributes to the state's energy independence and sustainability goals. Additionally, the project supports Kerala's broader ambitions in renewable energy and aligns with national objectives to increase the use of clean energy sources.(ANERT, 2024)

Overall, the "BuyMySun" project has been instrumental in transforming the solar energy market in Kerala, making it more accessible, efficient, and user-friendly. These benefits are a testament to the project's success in leveraging technology and e-governance to promote renewable energy adoption, setting a model that other regions could potentially replicate

#### 4. Findings

The review and analysis presented underscores a significant shift towards more efficient, transparent, and accessible solar energy procurement through the integration of e-marketplaces within India's commerce and public procurement sectors. Notably, the effectiveness of these digital platforms is evidenced by their capacity to overcome barriers traditionally hindering solar energy adoption, such as high upfront costs and complex installation processes. Initiatives like "BuyMySun" in Kerala demonstrate the tangible impact of aggregating demand, standardizing offerings, and connecting buyers with financing options, which are key factors in broadening the accessibility of solar energy systems. The data highlighting the success of "BuyMySun," with its facilitation of substantial solar installations and the enhancement of customer engagement, directly supports the claim that e-marketplaces significantly contribute to increasing solar solution adoption in India. Moreover, the adoption trends and financial transactions processed through these platforms illustrate their role in not only simplifying procurement processes but also in fostering sustainable energy practices. Therefore, the observed outcomes from these digital initiatives validate the conclusion that e-marketplaces are instrumental in advancing the renewable energy landscape, underscoring the indispensable role of technological innovation in promoting sustainable energy solutions.

#### 5. Limitation & Future Scope

This study's exploration of e-marketplaces in the renewable energy sector, particularly through initiatives like "BuyMySun," confronts limitations primarily stemming from its dependence on secondary data and a narrow focus on specific case studies, potentially limiting the depth of real-time insights and broader applicability of its findings. Future research avenues are rich and varied, emphasizing the need for empirical studies leveraging primary data collection to capture the nuanced impact of e-marketplaces.

Comparative and longitudinal investigations could further enrich our understanding of digital platform optimization across diverse settings and their long-term contribution to sustainable development. Additionally, examining the role of emerging technologies within these e-marketplaces could unlock new efficiencies and user engagement strategies, paving the way for innovative approaches to promoting renewable energy adoption.

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