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Ethical Dilemmas in Renewable Energy Transition in Siargao Island: Balancing Innovation, Justice, and Environmental Sustainability

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Abstract

The global transition to renewable energy remains imperative for addressing climate change and reducing dependence on fossil fuels. However, this transition presents distinct ethical, social, and environmental challenges, particularly for island communities such as Siargao Island in the Philippines. This study explores the ethical dimensions of Siargao Island's renewable energy transition by examining local stakeholder perspectives, assessing existing policy frameworks, and analyzing potential environmental impacts. Employing a narrative review methodology aligned with the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines, the study draws from secondary data sources to highlight the complexities embedded in the energy transition. Ethical dilemmas including land use disputes, ecological degradation, and the marginalization of low-income households underscore the need for inclusive and context-sensitive energy policies. The analysis demonstrates that energy transitions, when not guided by principles of justice and equity, tend to exacerbate existing social inequalities and prioritize external investors over local communities. The study advocates for participatory governance models, improved financial accessibility, and strengthened institutional and environmental regulatory frameworks. It also supports the development of decentralized renewable energy systems and inclusive decision-making processes to ensure equitable access and community empowerment. By integrating energy justice principles, Siargao Island offers a valuable model for ethically grounded and sustainable energy transitions in similar island contexts.

Keywords: Renewable energy transition, energy justice, ethical dilemmas, social justice, environmental sustainability, governance, policy frameworks.

Introduction

The transition to renewable energy is a global imperative for addressing climate change and reducing reliance on fossil fuels. However, for island communities like Siargao Island in the Philippines, this transition presents ethical challenges that extend beyond the mere technological viability of sustainable energy alternatives. It raises moral questions about how to strike a balance between social fairness, environmental preservation, and technical advancement. Global economic expansion necessitates the production of more electricity from both conventional and renewable sources to meet the increased energy demands. However, due to the depletion of fossil fuel supplies and the pollution that conventional power plants inflict on the environment, the development of renewable energy sources is prioritized (Monika et al., 2022).

The transition to renewable energy sources, such as solar, wind, wave power, and micro-hydro power, raises important issues regarding land use, environmental effects, costs, and the involvement of marginalized groups in the decision-making process. Policymakers and scholars have paid close attention to the link among energy consumption, emissions, and economic growth throughout the years, as the accomplishment of sustainable economic growth progressively becomes a key global issue (Antonakakis, Chatziantoniou & Filis, 2017). A just

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transition provides a new opportunity to develop an interdisciplinary approach that is mindful of changes in analyzing and promoting distributional, procedural, and restorative justice (McCauley & Heffron, 2018). Moreover, promoting renewable energy and transitioning to a low-carbon economy across all countries requires the incorporation of the intricate aspects of energy governance, along with environmental justice concerns and their interconnections (Govindarajan & Ganesh, 2022). Energy justice is a significant issue, as certain communities may face restricted access to sustainable energy due to economic inequalities or infrastructure challenges.

While many island communities in Southeast Asia face comparable energy issues, Siargao Island's situation is notable due to its expanding tourism-based economy, inadequate infrastructure, and environmental vulnerability. For instance, islands such as Palawan and Bohol have launched hybrid renewable systems with varying levels of community involvement and environmental compromises. These comparative scenarios emphasize how localized governance, stakeholder engagement, and socio-economic frameworks significantly impact the success and equity of energy transitions. Analyzing Siargao within this broader regional framework highlights the island's unique energy justice issues, such as reliance on external entities, geographic isolation, and economic inequalities. Although there is increasing discussion about renewable energy in the Philippines, studies on the ethical aspects of its implementation in island communities remain scarce. Present studies have not adequately addressed significant issues regarding social and economic justice, particularly concerning how energy transitions impact local communities and limited-income families who may struggle to access renewable energy. Another significant issue is community involvement, as decision-making processes are often controlled by outside investors and policymakers, leading to concerns about how much local stakeholders are involved and empowered. Moreover, policy and governance are essential in shaping Siargao's energy transition; however, doubts continue about the effectiveness of current frameworks in promoting a just, fair, and environmentally sustainable transition toward renewable energy. Addressing these gaps is essential for creating a more equitable and sustainable energy transition framework for the island.

Objectives of the Study

This study carefully analyzes the ethical aspects of Siargao's energy transition, emphasizing the importance of reconciling technological advancement, social equity, and environmental sustainability. Moreover, the study facilitates the development of ethical, inclusive, and sustainable energy policies specifically designed for the needs and challenges of island communities like Siargao by examining local stakeholder perspectives, evaluating policy frameworks, and analyzing environmental impacts. Specifically, this study explores the ethical dilemmas of Siargao's energy transition by considering these essential questions:

1. What are the key ethical challenges related to the adoption of renewable energy in Siargao?
2. In what ways do energy policies and investment patterns influence justice and equity regarding energy access for local communities?
3. What approach can Siargao take to create and implement an equitable and eco-friendly energy transition model that harmonizes innovation with sustainability?

Scope and Limitations

This study focuses exclusively on Siargao Island, analyzing ongoing and proposed renewable energy projects, examining the perspectives of key stakeholders—including local communities, policymakers, businesses, and environmental advocates—assessing the economic and social impacts of the energy transition on Siargao's

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communities, and evaluating the effectiveness of policies in addressing ethical concerns related to energy justice and sustainability.

However, the study has certain limitations:

- **Geographical Focus:** The study is limited to Siargao and may not necessarily apply to other island communities.
- **Time Constraints:** Research findings depend on data available at the time of the study, potentially limiting long-term evaluations.
- **Data Accessibility:** Some government or corporate data on energy projects may be restricted or incomplete.
- **Stakeholder Bias:** Varying interests among stakeholders (e.g., government, investors, communities) may influence the objectivity of responses.
- **Secondary Data:** This study relies solely on secondary data sources due to time constraints and challenges in data accessibility.

Despite these limitations, the study provides significant contributions to understanding the ethical challenges of the renewable energy transition, its effects on socio-economic equity, and environmental sustainability in Siargao Island. It also offers valuable recommendations to local communities and the government for a sustainable and fair energy transition.

Related Literature

Socioeconomic Impacts of Renewable Energy Transitions

The transition to renewable energy has extensive socio-economic implications, particularly in developing regions and island communities. Transitions toward decarbonized and efficient energy systems influences economic structures, employment opportunities, and social equity (Füllemann et al., 2020). There is growing evidence that the rapid expansion of renewable energy technologies can trigger social tipping dynamics, accelerating a broader energy transition (Alkemade et al., 2024). However, renewable energy often entails higher initial costs compared to traditional resources, potentially straining local economies. Additionally, the transition away from fossil fuel-based energy sources can lead to job losses in conventional energy sectors, posing challenges for affected workers and industries (Persson, 2016). Nevertheless, the adoption of renewable energy presents opportunities for economic diversification, technological innovation, and job creation in emerging energy sectors (Iriogbe et al., 2024).

Equity in Energy Access and Just Transition

We begin with a brief overview of the Just Transition movement's history and development, followed by an illustration of how the term has evolved to encompass more specific interest groups and communities, evident in the growth of the Just Urban, Rural, Circular Economy, and Energy Transition movements (Otlhogile & Shirley, 2023). The concept of a 'just transition' is central to global discussions on climate change mitigation and sustainable development (Bainton et al., 2021). Recognizing the disparities in the distribution of benefits and burdens associated with fossil fuel extraction, energy production, and distribution, scholars and policymakers increasingly advocate for transition policies that integrate both decarbonization goals and social equity considerations (Shelton & Eakin, 2022). Ensuring equitable access to renewable energy is a key aspect of just transitions, as marginalized communities often face economic and infrastructural barriers to sustainable energy

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solutions. A fair energy transition necessitates policies that prioritize inclusive participation, equitable resource allocation, and protections for vulnerable populations.

Environmental Sustainability and Renewable Energy Development

The relationship between renewable energy adoption and environmental sustainability is complex, shaped by evolving economic and technological landscapes (Chen et al., 2022). The negative ecological impacts of conventional energy production, such as pollution and habitat destruction, have heightened societal awareness of sustainability issues and reinforced the urgency for a transition to cleaner alternatives (Brodny, Tutak, & Bindzár, 2021). Eco-friendly and clean energy harvesting are of primary importance today, as they play a crucial role in attaining the Sustainable Development Goals (SDGs), while also promoting social advancement and improving living conditions (Elavarasan et al., 2020). While renewable energy sources like solar, wind, and hydroelectric power offer substantial environmental benefits, their implementation also requires careful consideration of land use, resource extraction for technology production, and potential disruptions to local ecosystems.

Governance and Policy Frameworks for Renewable Energy

The successful transition to renewable energy necessitates robust policy and regulatory frameworks that facilitate the deployment of sustainable energy systems, such as micro-grids and energy storage solutions (Agupugo et al., 2022). The patterns and changes in renewable energy (RE) policy governance across states are assessed, focusing on the efficacy of policy tools in utilizing RE sources for electricity generation (Park, 2015). As the global society faces the combined challenges of climate change and resource depletion, renewable energy has become a vital component of sustainable development strategies (Sharma, 2024). Effective governance structures must ensure meaningful local participation in energy decision-making processes, fostering greater accountability and public trust. For island communities like Siargao, policies should be tailored to address unique geographical and economic challenges while promoting long-term sustainability and energy justice.

Synthesis of Related Concepts

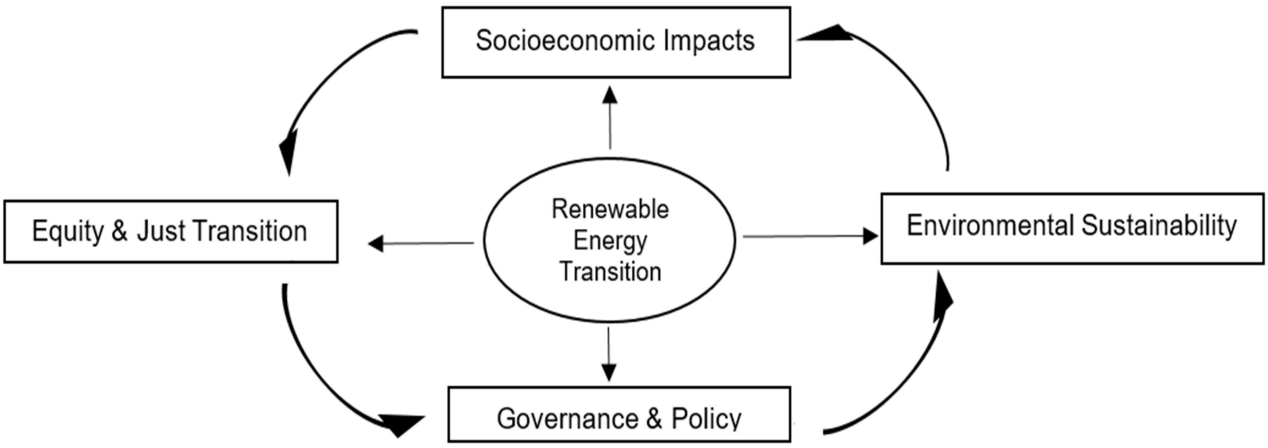

Figure 1. *Conceptual Framework of Siargao Island's Renewable Energy Transition – Developed by the Author. The framework illustrates the cyclical interconnectedness between socioeconomic impacts, environmental*

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sustainability, governance and policy, and just transition principles in shaping renewable energy transition on the island.

A critical examination of existing literature highlights several interconnected themes essential to understanding the ethical dimensions of Siargao's energy transition. First, while renewable energy presents significant socio-economic benefits, challenges related to affordability and employment displacement must be addressed through targeted policies. Second, ensuring a just transition requires equity-focused frameworks that protect marginalized groups and promote inclusive participation in energy governance. Third, the environmental sustainability of renewable energy systems depends on responsible resource management and minimizing ecological disruptions. Lastly, governance and policy structures play a crucial role in shaping an equitable and sustainable energy transition, necessitating participatory decision-making and adaptive regulatory mechanisms.

By synthesizing these significant issues, this study contributes to a more comprehensive understanding of Siargao Island's renewable energy transition, emphasizing the ethical considerations that must guide its implementation.

METHODOLOGY

Research Design

There are different types of literature reviews, including narrative, systematic, and scoping reviews. This study employs a narrative review methodology, following the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) guidelines (Tong et al., 2012). The ENTREQ guidelines were deliberately selected to guarantee transparency, thoroughness, and accuracy in integrating qualitative research. ENTREQ offers a checklist of 21-items designed to enhance the clarity and quality of qualitative evidence syntheses by detailing optimal practices in reporting methods for literature selection, data extraction, thematic synthesis, and interpretation. Its relevance to this research stems from its focus on organized reporting and methodological clarity, which aligns with the study's aim to generate a strong and credible analysis of the ethical aspects of the energy transition in an island community. By following to ENTREQ, this research complies with established protocols for identifying, selecting, and interpreting pertinent qualitative data, thereby increasing the reliability and replicability of the review. A narrative review is suitable for synthesizing existing literature on the ethical, social, and policy implications of renewable energy transitions, particularly in island communities such as Siargao Island. This methodology allows for a thematic and integrative approach to analyzing diverse sources, including academic journals, policy reports, and institutional documents. According to Sarkar and Bhatia (2021), narrative reviews provide a concise overview of the literature while allowing for the freedom to pose questions and encourage further study. The narrative review method is intended for subjects that have been approached from various angles and examined by different teams of researchers from diverse fields, which hinders the completion of a thorough systematic review process (Snyder, 2019). This study examines the ethical dilemmas of Siargao Island's transition to renewable energy using a narrative review methodology. This approach is especially suitable for this research because it enables an interdisciplinary investigation of ethical issues, such as social justice, environmental sustainability, and governance challenges in the transition to renewable energy. To ensure a comprehensive understanding of the ethical issues posed by Siargao Island's transition towards renewable energy, this study will thoroughly examine the perspectives of significant stakeholders, including local communities, policymakers, businesses, and environmental advocates, evaluating the economic and social impacts of the energy

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transition on Siargao Island's communities and assessing the effectiveness of policies in addressing ethical concerns related to energy justice and sustainability.

Data Collection

The study primarily utilizes secondary data sources, such as policy papers, peer-reviewed journal articles, and reports from international organizations, NGOs, and government agencies. To ensure accuracy and relevance, the data collection process is systematic:

Database Selection: To find literature on renewable energy transitions, energy justice, and sustainability governance, academic databases, including Scopus, Web of Science, Google Scholar, and ScienceDirect, were searched.

Inclusion Criteria: To ensure current relevance, studies published in the last ten years (2015–2025) were prioritized. However, significant works that provide fundamental theoretical perspectives were also included. The following were among the selection criteria:

- Studies that concentrate on island populations' transition to renewable energy;
- Studies that address social justice, ethical considerations, and governance concerns related to renewable energy;
- Papers that discuss environmental sustainability and just transitions in energy policy; and
- English-language reports from institutions and peer-reviewed journals.

Involved exclusion criteria: Studies that have little bearing on the governance and ethics of renewable energy. Articles that only address the technical features of renewable energy systems without discussing the ramifications for society or policy. Non-peer-reviewed sources lack empirical support or credibility.

Search Keyword: To find pertinent papers, a combination of keywords including "renewable energy transition," "energy justice," "sustainability ethics," "policy governance," and "island energy systems" was employed.

Screening Procedure: The titles, abstracts, and full texts of selected publications were examined to ensure they matched the goals of the study. Duplicates and research that did not specifically address moral issues in energy transitions were excluded.

Data Extraction and Thematic Analysis

The collected literature was analyzed using thematic synthesis, a qualitative method that allows for evaluating and combining qualitative information from several research studies. It is an organized and open approach to integrating evidence for practice and policy. The data analysis process adhered to the following steps:

***Reading and Familiarization*:** Recognizing important ideas and points of contention regarding governance, socioeconomic effects, and ethical issues.

Thematic Categorization: Data was categorized into themes such as socioeconomic impacts, equity in energy access, environmental sustainability, and governance frameworks.

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Comparative Analysis: Findings were compared to identify converging and diverging viewpoints, ensuring a balanced evaluation.

***Coding and Categorization*:** Organizing information into general topic groups, including environmental sustainability, policy frameworks, and energy equity.

***Interpretation and Synthesis*:** Integrating data to identify patterns, gaps, and implications for Siargao Island's energy transition.

Ethical Considerations

Even though this study only uses secondary data, ethical standards were maintained by ensuring:

- To preserve academic integrity, all referenced works must be properly cited and acknowledged in accordance with ethical standards.
- To maintain impartiality and dependability in research, selective reporting must be avoided.
- Including a range of viewpoints to support an inclusive research methodology, especially those from underrepresented groups.
- Transparency in the selection and evaluation of the literature to avoid confirmation bias.

The methodology employed ensures a thorough, multidisciplinary, and ethical analysis of Siargao Island's transition to renewable energy despite these challenges. By utilizing this structured narrative review methodology, the study offers a comprehensive and ethically grounded examination of Siargao Island's transition to renewable energy, emphasizing the connections between environmental sustainability, social justice, and governance.

Results and Discussion

This section presents a structured discussion of the findings, guided by a conceptual framework (Figure 1) that integrates four interlinked dimensions: Socioeconomic Impacts**,** Equity and Just Transition**,** Governance and Policy**,** and Environmental Sustainability. The model highlights the dynamic interplay between these dimensions and their collective influence on Siargao Island’s renewable energy transition.

Ethical Dilemmas in Renewable Energy Transition, Socioeconomic Impacts and Environmental Sustainability

Many ethical issues arise from Siargao's transition to renewable energy, particularly those related to governance, social justice, and environmental sustainability. Gaps in access to renewable energy sources are one of the primary ethical concerns that have been noted. Financial constraints for low-income families aggravate existing inequities, while wealthier homes and businesses may afford the initial costs of solar panels and other green technologies. This aligns with findings by Dorman and Ciplet (2022), who highlight that achieving global energy justice for all communities is still hindered by significant economic disparities.

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The impact of land use and environmental disruption represents a significant ethical concern in the renewable energy sector. Large-scale projects such as solar farms, wind turbines, wave power installations, and hydropower facilities often require extensive land and may lead to the displacement of communities, disruption of local ecosystems, and biodiversity loss. These environmental trade-offs raise ethical questions about whose land is being used and whether the affected communities are adequately consulted or compensated. Although renewable energy is often promoted as an environmentally benign alternative to fossil fuels, its implementation presents challenges regarding land use, biodiversity, and ecological health. Large-scale renewable energy projects such as solar farms and hydropower plants can lead to deforestation, habitat destruction, and conflicts over land ownership if not properly managed. In the case of Siargao Island, well-known for its ecological richness and tourism-related conservation efforts, renewable energy development should align with environmental protections. As Oduro, Simpa, and Ekechukwu (2024) emphasize, incorporating environmental justice into clean energy policy is essential to ensuring that the shift toward renewables does not come at the expense of marginalized groups. Despite the cleaner nature of renewable energy compared to fossil fuels, the sector's exploitation of raw materials and resulting ecological degradation remain largely overlooked (Qian, Zhu, & Wang, 2020). Elavarasan et al. (2020) highlight that the rapid deployment of renewable technologies has, in some instances, contributed to deforestation and habitat loss, particularly where planning has not accounted for local ecological sensitivities. Implementing comprehensive environmental evaluation systems, promoting ecosystem-focused planning, and enforcing land-use laws can prevent unforeseen ecological impacts. In Siargao Island, concerns over fairness and inclusivity emerge due to insufficient consultation with local communities regarding renewable energy projects. Comparative insights from rural communities in India suggest that inclusive planning can significantly improve quality of life by providing access to affordable and reliable energy (Karthik et al., 2024). Therefore, to ensure energy equity and a sustainable future, stakeholders and policymakers must prioritize community engagement, inclusion, and ecological preservation in the development of renewable energy infrastructure (Pacaldo, Bilgera, & Abundo, 2022). Implementing comprehensive environmental evaluation systems, promoting ecosystem-focused planning, and enforcing land-use laws can prevent unforeseen ecological impacts.

Siargao Island's transition to renewable energy raises multiple ethical issues concerning governance, social justice, and environmental sustainability. Economic inequalities lead to unequal access to renewable energy, benefiting affluent households while low-income families face financial challenges. Significant renewable initiatives pose threats to land use and local ecosystems, necessitating thorough planning to avoid environmental destruction. Additionally, the lack of community engagement raises concerns regarding equity and inclusiveness in the decision-making process. Addressing these challenges is vital for achieving a fair and sustainable energy transition in Siargao Island.

Impact of Energy Policies and Investment Patterns on Justice, Just Transition and Equity

Siargao Island's just transition process is heavily influenced by investment trends and policy frameworks. Although current policies encourage the use of renewable energy, they often overlook infrastructure deficiencies and affordability concerns. A prominent national framework, the Renewable Energy Act of 2008 (Republic Act No. 9513), was established to accelerate the development of renewable energy resources through fiscal incentives, feed-in tariffs, and the creation of a Renewable Portfolio Standard (RPS). While this legislation has spurred investment in large-scale renewable energy projects, its implementation has largely benefited commercial developers rather than local communities. According to Antonakakis, Chatziantoniou, and Filis (2017), energy justice frameworks recommend that transition policies prioritize equitable access to energy. However, government incentives under the Renewable Energy Act often flow to large-scale developers, not to private households or

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small-scale initiatives. Disparities in accessibility are exacerbated by private sector financing trends that favor profit-oriented ventures—such as solar energy systems for tourism resorts over community-driven or decentralized energy solutions. This dynamic perpetuates energy inequity, particularly as majority of locals continue to rely on costly and to the local electric cooperative.

Ubaldo et al. (2024) emphasize that the Philippines, with its centralized energy system, archipelagic geography, and policy-driven energy inequities, represents a compelling case for directing financial resources toward Renewable Energy (RE) and Distributed Energy Resources (DER) in low- and middle-income regions. Despite this, regulatory barriers and bureaucratic inefficiencies continue to limit the reach of decentralized technologies like microgrids and community-based solar programs. The absence of explicit provisions for these decentralized solutions within the Renewable Energy Act limits their deployment in remote areas such as Siargao Island. A case study by De Los Reyes (2022) further underscores that to achieve an equitable low-carbon transition, the Philippines must address longstanding structural disparities in its energy system. One way forward for Siargao is to localize the implementation of national policies like the Renewable Energy Act by integrating guidelines that support decentralized, inclusive energy systems. Establishing localized policy instruments or community-based energy planning under this broader legislative framework could improve energy access, enhance resilience, and reduce dependence on external investors.

Strategies for an Equitable and Sustainable Energy Transition in Siargao

Siargao Island can employ several tactics based on the results to strike a balance between environmental sustainability, social justice, and innovations:

a. Community-Driven Renewable Energy Projects

Energy equity can be improved by supporting micro-hydropower, solar projects, and other renewable energy sources that are anchored in communities. Models of local ownership, such as energy cooperatives, can aid in more equitable benefit distribution among residents. Community engagement with renewable energy is becoming more widespread across various activities and scales, fueled by larger processes of environmental, social, political, and technological change (Mey & Hicks, 2015). Otlhogile and Shirley's (2023) just transition concepts, which support locally managed energy systems that prioritize the needs of the community over corporate profits, align with this. The concept of establishing local energy communities or community-based energy projects has gained interest from around the world due to the advantages that employing renewable energy sources offers for the economy, environment, and efficiency (Ahmed, Ali, & D'angola, 2024). Although it is generally agreed that small-scale, decentralized, and community-owned renewable energy is a desirable aspect of low-carbon futures, it faces several obstacles within the context of traditional, centralized energy systems (Strachan et al., 2015). Moreover, the study by Islar & Busch (2016) explained that projects involving renewable energy in the community help communities act more like citizens than like consumers.

b. Financial Support and Incentives for Low-Income Households

The government should implement flexible financing options and targeted incentives to encourage low-income families to adopt renewable energy, thereby removing financial obstacles. Persson (2016) suggests that financial mechanisms such as pay-as-you-go solar schemes and microloans can enhance accessibility and affordability. Renewable Energy Communities (RECs) take a sustainable approach to energy use, seeking to lower

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the amount of energy needed to satisfy a household's daily demands by implementing strategies (such as insulating buildings), suitable equipment, and other elements that help with energy conservation and efficiency enhancement (Botsaris et al., 2021). According to Skjeflo et al. (2023), the more generous incentive package provided has a major and substantial impact on the resilience of the new or modified homes.

c. Strengthening Environmental Safeguards

The development of renewable energy is crucial, but it should not come at the expense of environmental damage. Protecting Siargao Island's natural resources can be achieved by implementing strict environmental assessments and mitigation strategies. It serves as a valuable resource for government agencies to utilize assistance in enhancing the environmental protection interview system, boosting the efficiency of environmental protection interview policies, and prolonging the relevance of the effectiveness of these policies (Zhimai, 2021). Additionally, environmental regulations have a significant influence on businesses' investments in environmental protection (Chang et al., 2021). In addition to environmental regulations, effective environmental governance also involves institutional arrangements, accountability frameworks, and implementation strategies (Zhang et al., 2016). Environmental investment and the performance of environmental responsibility are more conducive to the sustainable development of businesses when more green executives or green investors are involved (Zhou & Jin, 2023). A study on Environmental Protection through Nuclear Energy indicates that the adoption of green energy for environmental preservation is gradually becoming a routine occurrence (Petrescu et al., 2016).

d. Inclusive Governance and Stakeholder Participation

Policies for energy transition should include decision-making processes that are inclusive, ensuring that local perspectives are recognized. Establishing multi-stakeholder platforms that involve policymakers, community advocates, environmental organizations, and private investors can foster transparency and accountability. The participation of stakeholders in the management of natural resources has become widespread, even in nondemocratic contexts, motivated by the expectation of positive outcomes such as reciprocal learning (Mohedano, 2017). Incorporating a range of stakeholder perspectives into the policymaking process can lead to laws and regulations that are more legitimate and widely endorsed (Crow, Albright, & Koebele 2019). A study by Kusters et al. (2020) suggests that to enhance governance moving forward, it is typical to advocate for the creation of multi-stakeholder processes, enabling various participants to engage in discussions, negotiations, and collaborative actions to tackle landscape-level issues.

e. Integrated Policy Frameworks for Renewable Energy Development

Policymakers must develop cohesive frameworks that link the growth of renewable energy with economic and social justice goals. Regulatory advancements should focus on eliminating bureaucratic obstacles to decentralized energy options while promoting long-term sustainability objectives. Market participants not only contribute to the advancement of technical and service-oriented innovations but are also actively involved in developing and advocating for concepts regarding future regulatory frameworks (Wassermann, Reeg, & Nienhaus, 2015). Williams et al. (2015) highlight that strong and effective institutions and policies must support all of these public interventions. Using insights from past electrification initiatives in the Philippines, a tailored policy roadmap for Siargao Island could ensure equitable energy access and address environmental limitations.

Conclusions

The transition to renewable energy is essential for addressing climate change and reducing reliance on fossil fuels. However, for island communities such as Siargao Island, this transition presents ethical dilemmas that

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extend beyond practical technological implementation, encompassing issues of social justice, environmental sustainability, and fair access to energy. As global economic growth increases the demand for electricity, the depletion of fossil fuels and environmental harm necessitates a stronger focus on renewable energy sources. While discussions on renewable energy in the Philippines are ongoing, the ethical aspects of its application in island communities remain insufficiently examined, particularly regarding social and economic justice, community involvement, and governance effectiveness.

The study highlights various ethical dilemmas in Siargao Island's energy transition, including land use disputes, the environmental impacts of renewable initiatives, and the marginalization of low-income households that may struggle to afford sustainable energy options. Energy policies and investment trends play a crucial role in shaping justice and equity in energy access, often favoring external investors and policymakers over local communities. Without inclusive decision-making, energy transitions risk deepening social inequalities. For a fair and environmentally responsible transition, Siargao Island must adopt a participatory approach that empowers local stakeholders, strengthens policy frameworks to address ethical concerns, and balances sustainability with technological progress. By incorporating energy justice principles, the island can establish an equitable renewable energy system that integrates innovation with the well-being of both its residents and the environment.

Recommendations

To ensure a fair and sustainable transition to renewable energy in Siargao Island, the following suggestions are proposed:

1. Community-Driven Renewable Energy Model

    - Examine how effectively energy cooperatives promote local ownership and equitable distribution of benefits.
    - Evaluate the feasibility of small-scale renewable energy initiatives, such as micro-hydropower and solar power systems, in remote communities.
    - Investigate participatory decision-making models that integrate local perspectives into energy development plans.

2. Financial Accessibility and Social Equity

    - Investigate how flexible financing options, such as pay-as-you-go solar initiatives and microloans, affect energy affordability for low-income families.
    - Assess government funding initiatives and financial assistance frameworks to evaluate their success in facilitating the adoption of renewable energy.
    - Examine how Renewable Energy Communities (RECs) contribute to promoting energy savings and efficiency within households.

3. Environmental Impact and Sustainability

    - Conduct thorough research on the environmental impacts of renewable energy initiatives, focusing on biodiversity and changes in land use.

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- Explore effective methods for incorporating robust regulatory frameworks to mitigate environmental threats such as deforestation and habitat disruption.
- Assess the effectiveness of environmental governance frameworks that include sustainability objectives and accountability systems.

4. Governance and Stakeholder Engagement

- Investigate collaborative governance frameworks that improve engagement among policymakers, community leaders, environmental organizations, and private investors.
- Examine approaches to enhance transparency and inclusiveness in decision-making processes to ensure equitable benefits for the community.
- Assess institutional structures for renewable energy management to identify deficiencies and opportunities for improved stakeholder collaboration.

5. Policy Innovations for Renewable Energy Development

- Investigate policy structures that effectively combine the growth of renewable energy with goals related to social justice and economic development.
- Investigate policy changes that address bureaucratic inefficiencies, facilitating decentralized energy alternatives such as microgrids and off-grid solar power systems.
- Analyze insights from prior electrification initiatives in the Philippines to guide policies that promote equitable access to renewable energy.

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