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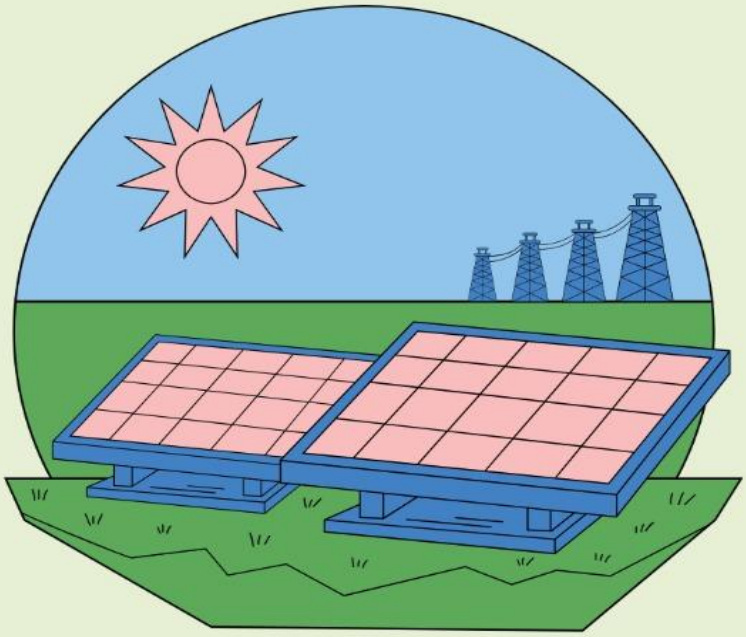
Just Energy Transition in Sindh: Socio-Economic Evidence from Umerkot and Policy Recommendations for Renewable Energy Development



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This report has been produced by The Citizenry to advance and mainstream the Just Energy Transition framework in Sindh.

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About The Citizenry

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About The Contributors

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Foreword

Pakistan stands at a critical point in its transition toward a cleaner, more sustainable, and climate-resilient energy future. As the country expands its renewable energy portfolio, it is equally important to ensure that this transition is fair, inclusive, and responsive to the needs of the communities living in areas where these projects are developed. A Just Energy Transition (JET) is not only about replacing conventional energy sources with renewable alternatives; it is also about safeguarding livelihoods, promoting social equity, protecting vulnerable groups, and ensuring that no one is left behind.

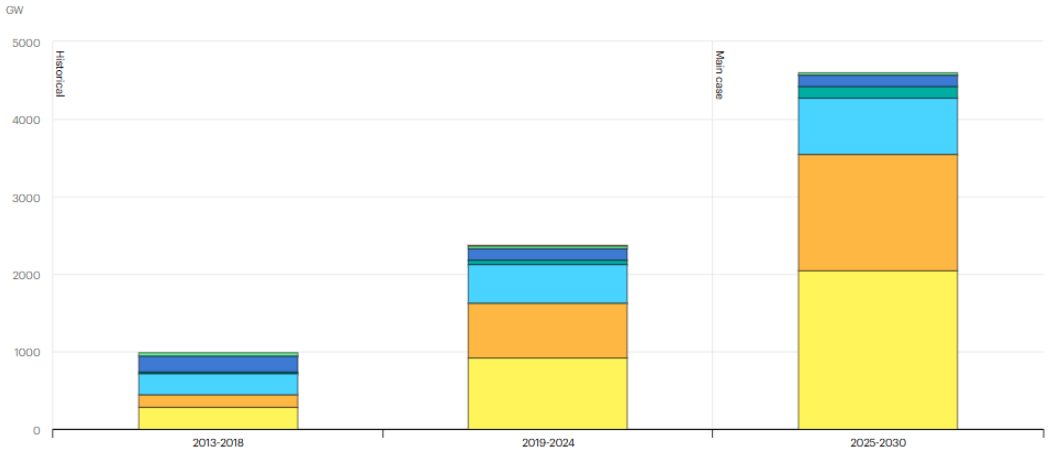
This report has been prepared to provide a comprehensive understanding of the socio-economic conditions, community priorities, and local perspectives in the proposed project areas. Through extensive field consultations and household surveys, it captures the voices of local communities and highlights the opportunities and challenges associated with renewable energy development from a community perspective. The findings presented in this report are intended to support evidence-based planning and informed decision-making by government institutions, project developers, development partners, and other stakeholders. They also underscore the importance of meaningful community engagement, transparent communication, equitable benefit-sharing, and the protection of local rights throughout the project lifecycle.

Particular attention has been given to understanding livelihoods, access to essential services, energy availability, healthcare accessibility, community participation, and the concerns and expectations of local residents. These insights provide an important foundation for designing interventions that not only advance clean energy objectives but also contribute to sustainable local development and improved quality of life. The preparation of this report reflects the shared commitment of all stakeholders to ensuring that renewable energy investments deliver lasting social, economic, and environmental benefits. By integrating community voices into planning and implementation, this report contributes to strengthening transparency, accountability, and public trust—key elements of a successful and equitable energy transition.

It is hoped that this report will serve as a valuable resource for policymakers, practitioners, researchers, development partners, and project implementers working to promote a Just Energy Transition in Pakistan. More importantly, it reinforces the principle that sustainable development is achieved not only through technological advancement but through meaningful participation, social inclusion, and respect for the rights and aspirations of the communities at the heart of the transition.

Introduction

The global energy system is undergoing a profound transformation as countries seek to reconcile growing energy demand with the urgent need to address climate change. Over the past decade, renewable energy (RE) has emerged as a central pillar of this transition, driven by technological advancements, declining costs, and increasing policy commitments toward decarbonization[1]. According to the International Energy Agency, renewable sources are expected to account for the majority of new power generation capacity worldwide, reflecting a structural shift away from fossil fuel dependence.



Renewable electricity capacity growth by technology segment, main case, 2013-2030 [2]

This transition is not only an environmental imperative but also a socio-economic necessity, particularly for developing countries that face intertwined challenges of energy access, economic development, and climate vulnerability. In countries like Pakistan, the need for renewable energy is especially acute. The national energy sector has historically been characterized by persistent supply shortages, high generation costs, and a heavy reliance on imported fossil fuels. These structural challenges have contributed to recurring power outages, financial strain on public institutions, and limited industrial productivity. At the same time, Pakistan is among the countries most vulnerable to climate change impacts, including extreme weather events, water scarcity, and agricultural disruption, as highlighted by the World Bank.[3] Renewable energy thus offers a strategic pathway to simultaneously address energy insecurity and environmental degradation while supporting long-term sustainable development[4].

[1] United Nations.
[2] IEA (2025)
[3] Schmitt, et. al, 2020
[4] UNDP, 2026

However, while the expansion of renewable energy is often framed as inherently beneficial, growing evidence suggests that energy transitions are not automatically equitable. Large-scale infrastructure projects, including solar and wind developments, can generate uneven socio-economic outcomes depending on how they are planned and implemented. Issues such as land acquisition, displacement, unequal access to benefits, and limited community participation have emerged as significant concerns in many parts of the world. In this context, the transition to renewable energy must be understood not only as a technological or economic shift but also as a social and political process with far-reaching implications for equity and justice.

It is within this broader context that the concept of a Just Energy Transition (JET) has gained prominence. The idea of a just transition originated in labor and environmental movements, particularly in response to concerns that environmental policies could disproportionately impact workers and vulnerable communities. Over time, the concept has evolved into a comprehensive framework that seeks to ensure that the transition to low-carbon energy systems is inclusive, equitable, and socially responsible. The International Labour Organization defines a just transition as one that promotes decent work, social inclusion, and poverty eradication while advancing environmental sustainability (ILO, 2015). This definition underscores the need to integrate social and economic considerations into climate and energy policies, rather than treating them as separate or secondary concerns.

The relevance of Just Energy Transition is particularly pronounced in developing country contexts, where existing socio-economic inequalities and governance challenges can shape the outcomes of energy transitions. In regions with limited infrastructure, weak institutional capacity, and high levels of poverty, renewable energy projects have the potential to either alleviate or exacerbate existing disparities. For example, while such projects can create employment opportunities and improve energy access, they can also lead to land conflicts, exclusion of marginalized groups, and unequal distribution of economic benefits if not carefully managed. As a result, there is a growing recognition that achieving a sustainable energy transition requires not only technological innovation but also a commitment to fairness and inclusivity.

This study is situated within this broader discourse on Just Energy Transition and seeks to examine how these principles are understood and applied in the context of renewable energy development in Sindh. By combining socio-economic data with expert insights, the research aims to provide a nuanced understanding of the opportunities and challenges associated with implementing a just transition in Pakistan.

JET Framework

For the purpose of this study, we adopted a Just Transition and Safeguards Framework (2024)**,** which is a policy-oriented framework developed to guide governments, companies and other stakeholders in designing and evaluating JET strategies designed by the Environment Defense

Fund. The framework provides practical safeguards, principles and measurable indicators to ensure that the shift from fossil fuels to cleaner energy systems is not only environmentally effective but also socially equitable. Its purpose is to help countries balance decarbonisation goals with socioeconomic development, workers' rights, community welfare and environmental protection.

A JET, as per the report, is the shift from fossil fuels to renewable energy sources in a way that ensures fairness and equity, particularly for communities most affected by climate change and those traditionally dependent on carbon-intensive industries. It aims to reduce fossil fuel dependence in a phased manner while addressing socioeconomic justice, protecting livelihoods, and involving all stakeholders in shaping climate solutions (Environmental Defense Fund, 2024)

The Just Energy Transition framework is commonly operationalized through three core principles: distributive justice, procedural justice, and restorative justice outlined in the Environment Defense Fund framework and many others. These principles provide a structured approach to evaluating the social dimensions of energy transitions and ensuring that outcomes are aligned with broader development goals[5].

Figure 1: Energy Transition Framework

Distributive justice focuses on the equitable allocation of the benefits and burdens associated with energy systems. In the context of renewable energy, this includes questions about who gains from new investments and who bears the associated costs. Benefits may include employment opportunities, improved infrastructure, and access to electricity, while costs may involve land acquisition, environmental impacts, and disruption of traditional livelihoods. The International Renewable Energy Agency emphasizes that without deliberate policy mechanisms, the benefits of renewable energy projects tend to accrue disproportionately to investors and urban populations, leaving rural and marginalized communities with limited gains (IRENA, 2022). Ensuring distributive justice therefore requires targeted interventions such as local employment policies, community benefit-sharing arrangements, and equitable compensation frameworks.

[5] UNDP, 2025

Procedural justice, on the other hand, relates to the fairness and inclusiveness of decision-making processes. It emphasizes the importance of transparency, accountability, and meaningful participation of all stakeholders, particularly those directly affected by energy projects. Effective procedural justice ensures that communities have access to information, opportunities to voice their concerns, and the ability to influence decisions that impact their lives. In many developing contexts, however, consultation processes are often limited to formal compliance with regulatory requirements, resulting in tokenistic engagement rather than genuine participation. Strengthening procedural justice requires institutional reforms that prioritize inclusive governance, capacity building, and the empowerment of marginalized groups, including women and indigenous populations.

Restorative justice addresses the need to repair harm and mitigate negative impacts associated with energy transitions. This principle recognizes that development projects, including renewable energy initiatives, can result in social, economic, and environmental disruptions that must be addressed through deliberate and sustained efforts. Restorative justice encompasses a range of measures, including compensation for land and resource loss, livelihood restoration programs, resettlement support, and long-term investments in community development. The United Nations Development Programme highlights that addressing historical and ongoing inequalities is essential for building trust and ensuring the legitimacy of energy transition policies (UNDP, 2021). Without such measures, communities may resist or disengage from projects, undermining their long-term viability.

Together, these three principles provide a comprehensive framework for assessing the social dimensions of energy transitions and guiding policy design. They highlight the interconnected nature of economic, social, and environmental considerations and underscore the need for integrated approaches that go beyond narrow technical or financial metrics. In the context of Pakistan, and particularly in regions such as Sindh where large-scale renewable energy projects are being developed, the application of these principles is critical to ensuring that the transition contributes to inclusive and sustainable development.

Global Experiences of Just Energy Transition (JET)

The concept of a Just Energy Transition has gained significant global traction as countries increasingly recognize that decarbonization must be accompanied by social and economic inclusion. While the transition to renewable energy is a shared global goal, the pathways and outcomes vary considerably across contexts depending on governance structures, institutional capacity, and socio-economic conditions. Among the most widely discussed and institutionally developed examples is South Africa, which has emerged as a leading case in operationalizing JET principles within a developing country context.

South Africa is often considered the world's first major Just Energy Transition (JET) test case because of its heavy dependence on coal and the social risks associated with decarbonisation. For decades, coal has dominated South Africa's electricity system, supplying around 86% of the country's power while also sustaining local economies and employment, particularly in the Mpumalanga province (Nogrady 2023, n.p.). At the centre of this system is Eskom, South Africa's state-owned electricity company, which generates about 95% of the country's electricity and owns most of its coal-fired power plants. Eskom has historically been the backbone of South Africa's industrial economy, but ageing infrastructure, debt, corruption, and repeated electricity shortages (load shedding) made the coal-based model increasingly unsustainable.

A major turning point in South Africa's transition was the closure of the Komati Power Station, one of the country's oldest coal plants. Located in Mpumalanga, Komati began operating in 1961 and was once South Africa's largest power station. After more than sixty years of operation, it was officially decommissioned in October 2022 as part of Eskom's decarbonisation strategy. However, Komati did not simply shut down; it became the symbolic pilot for South Africa's "repowering and repurposing" model. The site is now being converted into a renewable energy hub comprising 150 MW of solar power, 70 MW of wind energy, and 150 MW of battery storage, representing a shift from coal generation to clean energy infrastructure[6].

This transition formally accelerated at COP26 in Glasgow (2021) when South Africa signed the world's first Just Energy Transition Partnership (JETP) with France, Germany, the UK, the US, and the European Union. The partnership pledged US$8.5 billion in grants and concessional loans to support South Africa's transition away from coal while protecting workers and communities (Nogrady 2023, n.p.). The JETP provided the political and financial foundation for South Africa's Just Energy Transition Investment Plan (JET IP) 2023–2027, which established a structured roadmap for the transition.

The JET IP is built around three major sectors: electricity, new energy vehicles, and green hydrogen. In the electricity sector, the framework prioritises coal plant decommissioning, grid modernisation, and renewable energy expansion. More importantly, it incorporates social justice mechanisms such as worker retraining, local economic diversification, and community consultation to reduce the negative impacts of coal closures. The entire project focuses not only on the constructing renewable energy plants, but also on reskilling, retraining, and redeployment of coal workers.

This reflects broader JET principles of procedural, distributive, recognitional, and restorative justice. Yet the transition has not been without criticism. Analysts argue that most JETP financing is debt-based rather than grant-based, raising concerns about adding financial burdens to an already indebted state. The closure of Komati exposed major gaps between policy ambition and ground realities. While the plant was presented as a flagship example of a "just" transition, many workers

[6] https://www.wired.com

and surrounding communities reported uncertainty over future livelihoods, delays in retraining programmes, and inadequate consultation. Critics argue that although the repurposing of Komati into a renewable hub is symbolically important, the social transition has been far slower than the energy transition itself.[7]

The Komati case remains globally significant because it demonstrates that energy transition is not simply about replacing one energy source with another; it is about restructuring entire local economies. For countries like Pakistan, particularly Sindh with its growing dependence on Thar coal, South Africa offers an important lesson: if transition planning begins early and integrates social safeguards, coal-dependent regions can avoid deeper economic disruption later. In this sense, South Africa's JET provides one of the most developed practical frameworks for linking climate action with social justice.

India offers another important perspective on Just Energy Transition, particularly in the context of large-scale renewable energy expansion. As one of the world's fastest-growing energy markets, India has made significant progress in scaling up solar and wind energy. However, the social dimensions of this transition have been more uneven. While national policies emphasize clean energy growth, issues related to land acquisition, displacement, and community participation have raised concerns about distributive and procedural justice. In recent years, there has been increasing attention to these issues, with initiatives aimed at improving community engagement and integrating livelihood considerations into renewable energy planning. Nevertheless, the scale and diversity of India's socio-economic landscape present ongoing challenges in achieving a uniformly just transition[8].

Bangladesh, on the other hand, provides a more localized and community-driven model of renewable energy development, particularly through its success in off-grid solar systems. Programs such as Solar Home Systems have significantly expanded energy access in rural areas, demonstrating how renewable energy can directly contribute to poverty reduction and social development[9]. While Bangladesh's experience is often cited as a success in distributive justice, particularly in terms of expanding energy access, challenges remain in scaling these models and ensuring long-term sustainability. Procedural and restorative justice dimensions are still evolving, particularly in the context of larger infrastructure projects and climate adaptation strategies.

These global examples highlight that while the principles of Just Energy Transition are widely recognized, their implementation is highly context-specific. South Africa's experience demonstrates the importance of institutional frameworks and international support, while India and Bangladesh illustrate the complexities of balancing rapid energy expansion with social equity.

[7] https://www.ft.com/
[8] https://unfccc.int/
[9] World Bank Group (2021)

Together, these cases provide valuable lessons for countries like Pakistan, where renewable energy development is accelerating but justice considerations are still emerging.

Sindh Profile for Renewable Energy and Just Energy Transition

Sindh occupies a central position in Pakistan's renewable energy landscape due to its unique geographic and climatic advantages. The province is endowed with high solar irradiation levels and significant wind energy potential, particularly in the Gharo–Jhampir wind corridor, which has been identified as one of the most promising wind energy zones in South Asia[10]. In recent years, Sindh has become a focal point for renewable energy investments, including utility-scale solar parks, wind farms, and emerging initiatives such as floating solar projects.

According to assessments supported by the World Bank, Sindh has been identified as a priority region for scaling up solar energy development due to its vast land availability and favorable environmental conditions (World Bank, 2020). These developments align with Pakistan's broader policy commitments to increase the share of renewable energy in its national energy mix. As a result, districts such as Umerkot and Jhampir are increasingly being targeted for large-scale energy projects.

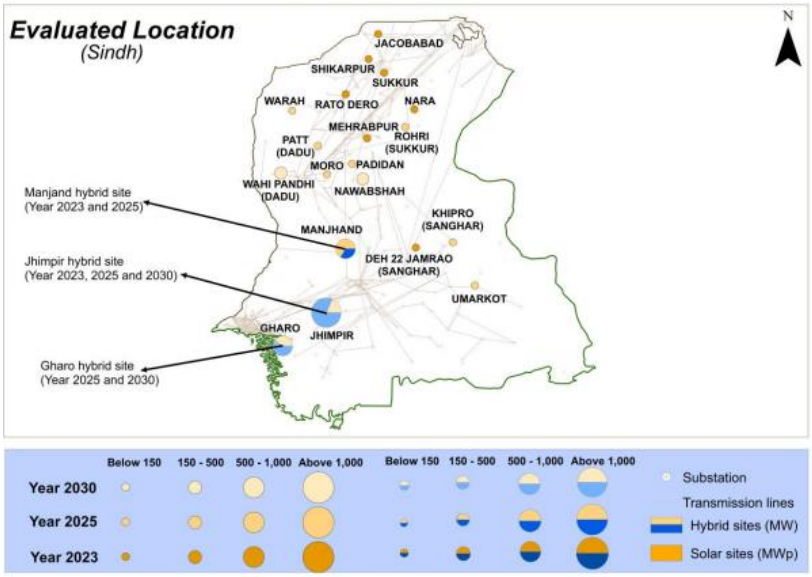


Figure 2: ES-1: GIS map of identified sites in Sindh (dark: 2023, medium: 2025, light: 2030); ratio of blue and orange in hybrid site circles shows wind and solar share (Source: World Bank Report)

[10] World Bank Report, 2021

The socio-economic profile of these regions presents a complex and challenging context for implementing a Just Energy Transition. Despite their strategic importance for energy development, these areas are characterized by high levels of poverty, limited infrastructure, and restricted access to basic services. As evidenced by the socio-economic survey conducted in Umerkot, a significant proportion of households lack access to electricity, rely on informal housing structures, and face severe constraints in accessing clean water and healthcare services. Livelihoods are predominantly informal and precarious, with a majority of households dependent on daily wage labor or livestock.

This disconnect between resource potential and human development underscores the importance of integrating JET principles into renewable energy planning in Sindh. From a distributive justice perspective, there is a critical need to ensure that local communities benefit directly from energy projects, not only through improved energy access but also through employment opportunities and infrastructure development. Procedural justice is equally important, as meaningful community participation can help address local concerns, build trust, and improve project outcomes. The findings from the field indicate that while awareness and consultation levels may be relatively high, the depth and inclusivity of these processes require significant strengthening[11].

Restorative justice is particularly relevant in the Sindh context, where historical neglect and underdevelopment have created structural inequalities. Renewable energy projects provide an opportunity to address these disparities by integrating social development objectives into project design. This includes investments in healthcare, education, water supply, and livelihood enhancement, which can contribute to long-term community resilience.

In this sense, Sindh represents both an opportunity and a test case for Just Energy Transition in Pakistan. The province's renewable energy potential positions it at the forefront of the country's energy future, but the success of this transition will depend on the extent to which it is aligned with principles of equity, inclusion, and social justice. This study is focused on the socioeconomic analysis and formulating recommendations for JET by selecting the district of Umerkot located in the southeastern part of Sindh province of Pakistan. The city of Umerkot is the capital of the district. Which district? Sindhi is the native language of approximately 95.1% of the residents according to the 2023 Pakistani census. According to latest census estimate, the population of district is 1,158,284 (1.15 million). Umerkot is the only non-Muslim majority district in Pakistan, with adherents of Hinduism representing 54.7% of the total population as per 2023 Pakistani census.

[11] Khan, Yousafzai & Hassan, 2026

Legal and Policy Framework for a JET: International and Pakistan Context

The realization of a Just Energy Transition (JET) in Sindh is not only a matter of policy intent but also of regulatory alignment and institutional enforcement. Both international frameworks and national/provincial policies provide guidance—albeit uneven—on how energy transitions can be implemented in a manner that is socially inclusive and equitable. However, the findings of this study suggest that while relevant legal instruments exist, their integration into renewable energy planning remains limited, and their potential to operationalize JET principles is not fully realized.

At the international level, institutions such as the World Bank have developed comprehensive safeguards to address social and environmental risks associated with large-scale infrastructure projects. A key reference in this regard is the World Bank's Environmental and Social Framework (ESF), particularly standards related to land acquisition, involuntary resettlement, stakeholder engagement, and community health and safety. The principles outlined in these frameworks emphasize a mitigation hierarchy: the need to avoid or minimize displacement, ensure fair compensation, and restore livelihoods where impacts are unavoidable[12].

The World Bank policy states that when people are forced to move because of a project (like a construction or development project), it can cause serious problems for them. These problems could include long-term poverty, hardship and environmental harm unless careful planning is done to prevent or reduce these effects. The bank's policy on this issue has three main goals:

1. Avoiding resettlement whenever possible: If there's a way to design the project so people don't have to be displaced, that should be done. Moving people should be the last resort. 2. Making resettlement a positive experience: Where it is not feasible to avoid resettlement, resettlement activities should be conceived and executed as sustainable development programmes, providing sufficient investment resources to enable the persons displaced by the project to get a share from the project's benefits. The displaced persons should be meaningfully consulted and should have opportunities to participate in the planning and implementation of the resettlement programme.

3. Helping people improve their lives: Displaced people should get help for improving their living conditions. At the very least, they should be able to restore their standard of living to what it was before they had been displaced or even better.These provisions align closely with the restorative and procedural dimensions of JET, as they require meaningful consultation, transparency, and long-term support for affected populations. However, these safeguards are typically applied to projects financed by international institutions and are not consistently embedded within domestic regulatory systems, limiting their broader applicability.

[12] World Bank Document, 2015

Within Pakistan, several policy instruments provide a foundation for integrating JET principles, although they are not explicitly framed in these terms. The Power Generation Policy 2015 represents a key national framework guiding energy sector development. While its primary focus is on promoting investment and expanding generation capacity, it includes provisions related to environmental compliance and social impact mitigation. However, the policy largely prioritizes efficiency and investment facilitation over equity considerations, and does not explicitly address benefit-sharing or community inclusion[13].

It's section 12(xi) emphasises that project sponsors should make deliberate efforts to support **social, health, and educational development** in the project area as part of their **Corporate Social Responsibility (CSR)** and community welfare programmes. This provision ensures that energy projects contribute to local development beyond power generation by investing in community wellbeing. Section 12(xiv) prioritises the inclusion of **local skilled and semi-skilled labour** by giving preference to local manpower in employment on a merit basis. It also requires the provision of internships aimed at training and building the capacities of local individuals, with the objective of creating a skilled workforce within the project area.

At the regulatory level, the NEPRA Social Investment Guidelines 2021 define "local community" means any community of people living or having rights or interests in a distinct geographical area that is directly or indirectly impacted by the operations of a licensee. It also defines) "stakeholders" means those groups and individuals who can affect, or are affected by the operations and activities of the licensee collectively or individually. They ask RE power producers to annually prepare and implement a social investment plan, with financials. Set measurable targets and identify performance measures; hold stakeholder Community Engagement sessions to prepare a social development plan and align their social investment plans and reporting format with the UN Sustainable Development Goals,2030 (SDGs).

These guidelines encourage power producers to hire skilled and semi-skilled employees from local communities/project areas Employment of Pakistanis both in operations as well as in management staff. Paid Internship and Apprenticeship Programs for local communities. Skill development programs for local communities and ensure gender diversity. The power producer is encouraged to safeguard the legitimate interests and rights of the local community relating to land, assets, natural resources, Resettlement and Rehabilitation of displaced communities Disaster management and emergency relief Education Healthcare The welfare of marginalized groups and rural areas, Accessibility to clean drinking water and sanitation Women empowerment Skills development and vocational training, Accessibility to affordable clean energy Rural infrastructure developmental projects, Livelihood interventions Creation of local employment and retention of the workforce Art, Cultural Heritage and Sports

[13] The Power Generation Policy 2015

The power producer is encouraged to improve **water and waste management**, implement **emission control measures**, reduce the use of **harmful substances**, and adopt **clean technologies** to minimize environmental impacts. The framework also emphasises **underground contamination**, and ensuring the **safety of local communities** affected by industrial operations. In addition, it calls for efforts to mitigate **land degradation**, preserve **threatened and indigenous species**, and support broader **environmental conservation and protection initiatives**.

The compliance framework requires licensees to honour the commitments and pledges they have already made to local, provincial, and federal governments, regulatory authorities, and international financiers or investors, while also submitting regular compliance reports to the relevant authority. In addition, licensees are expected to establish clear benchmarks and measurable targets aligned with National Electric Power Regulatory Authority (NEPRA)'s key performance indicators (KPIs) to ensure accountability and monitor progress over time.

Beyond compliance, the framework also encourages licensees to integrate their corporate social responsibility (CSR) initiatives under NEPRA's **Power with Prosperity (PwP)** programme, either by independently implementing CSR projects with regulatory endorsement or by forming bilateral partnerships with national and international NGOs, donors, and social development organisations. This mechanism is designed to align energy sector investments with broader social and developmental objectives, ensuring that energy projects contribute to community welfare alongside regulatory compliance

While the National Electric Power Regulatory Authority Social Investment Guidelines (2021) acknowledge the importance of linking energy projects with community welfare and environmental protection, they remain non-binding guidelines rather than enforceable regulations. The repeated use of the term "encourage" throughout the document places social investment largely at the discretion of power producers, creating a significant governance gap within Sindh's broader just energy transition framework.

This weakens accountability and limits the ability of affected communities to claim social protections as a right. Nevertheless, the guidelines align with principles of distributive and restorative justice by promoting local development, livelihood support, and environmental conservation. However, their practical effectiveness depends heavily on the existence of stronger enforcement mechanisms and the extent to which these provisions are embedded into project approval, compliance, and monitoring systems.

However, these guidelines support distributive and restorative justice by linking energy investments with local development outcomes [14] . Teir effectiveness depends heavily on enforcement mechanisms and the extent to which they are integrated into project approval and

[14] NEPRA Social Investment Guidelines 2021

monitoring processes. At the provincial level, Sindh has developed several policies that are directly relevant to JET, particularly in the context of land acquisition and resettlement. The Sindh Solar Energy Project (SSEP) Resettlement Action Plan (RAP) provides a detailed framework for managing land acquisition impacts, including compensation, livelihood restoration, and stakeholder engagement. This aligns closely with international best practices and reflects an effort to incorporate safeguards similar to those of the World Bank. The RAP emphasizes the importance of minimizing displacement, ensuring fair compensation, and supporting affected communities through transitional processes[15].

Complementing this, the Sindh Resettlement and Rehabilitation (R&R) Policy provides broader guidance on managing displacement and resettlement across development projects. It recognizes the need to restore livelihoods and improve living standards of affected populations, thereby aligning with restorative justice principles. However, implementation challenges persist, particularly in ensuring that compensation is timely, adequate, and accessible to vulnerable groups[16].

The Land Grant Policy in Sindh plays a critical role in shaping how land is allocated for development projects, including renewable energy initiatives. While it facilitates access to land for investors, it also raises important questions about equity and land rights, especially in contexts where local communities lack formal ownership documentation. The Land Grant Policy, 2015 policy primarily frames renewable energy development through a land-allocation lens, but several sections indirectly address social aspects of the transition. In particular, section 13(g), 13(h), and 13(i) are the strongest social provisions.

These require project developers (grantees) to contribute to the improvement of local livelihoods, prioritise employment for semi-skilled and unskilled local workers, submit annual reports on jobs provided to local communities, and arrange technical training and capacity-building for local candidates to enable their participation in the renewable energy sector. These provisions reflect an early recognition that renewable energy projects should generate local socioeconomic benefits rather than function solely as infrastructure investments.

Regarding land acquisition and leasing mechanisms, the policy gives out a formalised process mainly in the section 3 to 12. These sections define land eligibility, establish that government land can be leased for renewable energy projects for up to 30 years (renewable for another 30), and specify market-based lease rates. The process requires applications through the Energy Department, technical scrutiny, district-level verification, and review by a multi-departmental scrutiny committee before final government approval. This shows that land allocation for

[15] https://ssep.gos.pk/
[16] Sindh Resettlement & Rehabilitation Policy 2023.

renewable energy in Sindh is highly centralised and state-controlled, with pricing and approvals tied to administrative review rather than community consent mechanisms.

The Land Grant Policy includes provisions for local jobs and training, it largely lacks explicit safeguards on community consultation, displacement, land rights conflicts, or compensation mechanisms, which are central pillars of a "just" transition framework. As highlighted in the study findings, informal land tenure remains widespread in project areas, increasing the risk of displacement without adequate protection. This underscores the need to align land policies with JET principles by strengthening tenure security and ensuring transparent, inclusive decision-making processes[17].

Overall, while Pakistan and Sindh possess a range of legal and policy instruments that can support certain dimensions of a JET, these frameworks remain fragmented and are not explicitly integrated into a coherent transition strategy. Existing policies address isolated aspects such as land allocation, local employment, environmental safeguards, and social investment, but they lack a unified framework that systematically links decarbonisation with justice principles. International safeguard mechanisms, particularly those promoted by the World Bank, provide an important benchmark for social and environmental protection.

However, their application remains largely project-specific and often contingent upon the priorities of local political actors or bureaucratic discretion. Moreover, the absence of robust and independent monitoring mechanisms, including limited oversight by the World Bank itself, weakens accountability and raises concerns about whether these safeguards are implemented meaningfully or merely remain procedural requirements. This fragmentation ultimately undermines the possibility of a truly just and equitable energy transition in Sindh. National and provincial policies offer entry points for embedding justice considerations, yet gaps in enforcement, coordination, and accountability limit their effectiveness.

To move toward a genuinely just transition, it is essential to harmonize these frameworks into a unified policy approach that explicitly incorporates distributive, procedural, and restorative justice. This would involve strengthening regulatory enforcement, enhancing institutional coordination, and ensuring that social safeguards are not treated as peripheral requirements but as central components of energy governance. In doing so, Sindh can not only align with international best practices but also address the structural inequalities identified in this study, thereby ensuring that renewable energy development contributes to inclusive and sustainable outcomes.

[1717] Land Grant Policy for Sindh

Methodology

This study adopts a mixed-method approach combining primary data collection through a socio-economic survey, field observations and experts interviews. A structured survey was conducted across 12 villages in Umerkot district, Sindh, covering a total of 204 respondents to capture household-level data on demographics, livelihoods, access to basic services, and perceptions of renewable energy projects. The sampling focused on communities located in proximity to planned or existing renewable energy initiatives to ensure contextual relevance. In addition to the survey, field observations were carried out during site visits to document living conditions, infrastructure gaps, and community dynamics, providing qualitative depth and validation to the quantitative findings. This combined approach enabled a comprehensive assessment of socio-economic conditions and facilitated analysis through the lens of Just Energy Transition principles. The interviews were conducted from two experts Mr. Mehfooz A. Qazi, Former Director of Alternative Energy, Sindh Energy Department and Dr Khalid Waleed official from Sustainable Development Policy Institute

Socio-Economic Realities in Umerkot

The socio-economic assessment, supported by survey data (n=204) and extensive field observations across multiple villages in Umerkot, presents a deeply concerning picture of structural deprivation, exclusion, and inequality. The sample selected for data collection is presented in Table 1 whereas Table 2 presents the demographic characteristics of the studies population. The data has been collected from 12 villages of the selected region. The population of each village was different therefore; more respondents were selected from the highly populated villages whereas the villages with lesser population has relatively low representation in the sample size. The socioeconomic conditions are not only based on the data collected through the questionaries but it has been analyzed in alignment with the field observations carried out during the visits to the selected areas. The researcher attempted to have a balance representation of male and female however, due to cultural and social sensitivity, the presentation of male respondents is higher from that of female. Alongside cultural and social restrictions, many women also refused to participate in the study because they are highly dependent upon the male house members regarding questions being asked and they excused for not having the information to be shared in the survey.

Table 1

Survey sample Selection

Survey Sample – n=204 District/Tehsil: Umerkot		
Village	**Frequency**	**Percentage**
Somarabad	14	6.9
Parchi Station	75	36.8
Parchi Halapota	50	24.5
Parchi Ji Veri Halapota	18	8.8
Parchi Ramdia Paro	11	5.4
Parchi Station Rahmon Paro	2	1.0
Parchi Station Zamri Paro	2	1.0
Parchi Zamri Paro	6	2.9
Kohli Darro	17	8.3
Kohli Darro Somra Paro	6	2.9
Kohli Darro New Chhore	2	1.0
New Chhore Somra Paro	1	0.5
Total	**204**	**100.0**

Table 2

Demographics Characteristics

Gender	Male	169
	Female	35
Age Group	18-25	11
	26-35	41
	36-45	79
	46-60	51
	60+	**22**
Education Level	No formal education	126
	Primary	60
	Secondary	10
	Intermediate	8
Religion	Muslim	81
	Hindu	123
	Christian	0
Members of household	2-5	134
	6-9	62
	10-13	8
	14-17	0

The purpose of the survey was to obtain a clear picture about the current socio-economic landscape of the area under study. Therefore, they were asked questions about their sources of income, standard of living and the basic necessities and facilities available on their areas. Table 3 presents the results obtained from these questions:

Table 3

Socio Economic Indicators

Essential Service / Indicator	Current Status
Electricity access	Largely absent; majority households without grid connectivity
Alternative energy (solar)	Limited and self-financed; small-scale usage only
Drinking water	Fully dependent on tanker supply; no piped infrastructure
Water quality	Often unsafe and inconsistent
Housing	Predominantly katcha (informal and vulnerable structures)
Livelihoods	Dominated by daily wage labor and livestock
Income levels	Extremely low; majority below subsistence threshold
Education	Limited access; schools non-functional or poorly resourced
Healthcare	Highly inadequate; facilities distant or non-operational
Transport access	Limited; long distances to basic services
Land ownership	Mostly informal; lack of legal documentation
Women's participation	Minimal in decision-making processes
Community consultation	Reported to be strong
Government services	Weak and inconsistent access and availability
Infrastructure	Poor to non-existent

The findings reveal that despite the presence of ongoing and planned development initiatives, including renewable energy projects, the lived realities of local communities remain largely unchanged. The analysis below integrates quantitative survey data with qualitative field testimonies to provide a comprehensive understanding of ground conditions. A defining feature of the study area is extreme energy poverty. Survey data indicates that 78.9% of households have no access to electricity, while only a small fraction rely on minimal, privately purchased solar systems. Nearly all respondents reported receiving no electricity on a daily basis. Field observations strongly reinforce these findings. In villages such as Parchi Ji Veri, residents described living in complete darkness at night, with no access to grid electricity since independence. As one resident explained, "this may be one of the only villages in Pakistan where even the most basic facility electricity has still not reached". Even where small solar panels exist, they are limited to charging mobile phones or powering a single light, reflecting both affordability constraints and lack of institutional support.

Closely linked to energy deprivation is the severe water crisis. The survey reveals that 100% of households depend on water tankers as their primary source of drinking water. Field observations highlight the scale of hardship associated with this reality. Residents, particularly women, travel between 12 to 30 kilometers daily to fetch water, often multiple times a day. In one account, an elderly woman described carrying water over long distances despite her age, stating that even pregnant women are forced to undertake the same burden. The water itself is often contaminated and unsafe for consumption, contributing to widespread health issues. Observations confirm that existing water infrastructure, such as storage tanks, is either non-functional or inadequately managed, with water supply being irregular and externally controlled.

A well with limited water availability showing water scarcity in the area (Field Visit)

The housing and living conditions further reflect entrenched poverty. The survey indicates that 94.1% of households reside in katcha structures, often lacking basic protection from extreme weather conditions. Field visits revealed that many families live under open skies or in fragile mud houses, with no access to cooling systems despite extreme heat. The absence of basic amenities such as fans, lighting, and sanitation exacerbates vulnerability, particularly for women, children, and the elderly.

Condition of houses and roads in villages (Field Visit)

Livelihood patterns reveal a high degree of economic precarity and insecurity. A majority of respondents (56.7%) depend on daily wage labor, while others rely on livestock or informal activities. Income levels are extremely low, with over 93% of households earning less than PKR 25,000 per month. Field testimonies provide a more human dimension to these statistics. Residents reported earning as little as PKR 100–200 per day, often insufficient to meet even basic needs. The absence of secondary income sources further limits resilience, while lack of local employment opportunities forces some individuals to migrate to urban centers under precarious conditions.

The education system in the region is effectively collapsed. Although schools exist on paper, field observations reveal that many are non-functional, consisting of single-room structures without teachers, furniture, or students. In some villages, schools have remained closed for years, depriving entire generations of access to basic education. One resident noted that this is now the "fifth generation" in the village without meaningful educational access. The survey data, which shows that over 61.8% of respondents have no formal education, reflects this systemic failure.

Similarly, healthcare access is critically inadequate. Survey findings indicate that nearly 90% of respondents lack access to nearby health facilities, and all respondents reported that emergency care is located more than 10 kilometers away. Field observations reveal that even where infrastructure exists, such as dispensaries, they are often non-functional due to administrative and political issues. In one case, a fully constructed health facility remained closed for years due to local political interference. As a result, communities are forced to travel long distances, often carrying patients on foot, to access even basic medical care.

A critical dimension emerging from both survey and field data is the issue of land insecurity and fear of displacement. While many households possess land, ownership is often informal and lacks

legal documentation. Residents expressed strong concerns that their land could be acquired for development projects without fair compensation or consultation. The cost and complexity of formal land registration further exclude low-income households from securing their rights. This creates a persistent sense of vulnerability, particularly in areas targeted for large-scale infrastructure and energy projects.

Focus Group interviews and capacity building workshop with the residents during field visits

The findings also highlight significant gaps in procedural justice and community inclusion. Survey responses suggest very low levels of awareness (3%) and reported low consultation (5%), and, the field observations paint a more complex picture. Consultations are often perceived as superficial, with limited transparency and minimal impact on decision-making. Communities reported that they are rarely informed about the nature, purpose, or implications of development projects. As one resident stated, “they keep us far away from every major project, and when it is implemented, we have no role in it”.

The issue of political control and unequal resource distribution emerged as a recurring theme. Access to benefits such as solar panels, water supply, and employment opportunities is often mediated by local power structures. Residents reported that resources are disproportionately allocated to influential individuals, while marginalized groups remain excluded. In some cases, even basic services such as water distribution are controlled externally, limiting community autonomy.

Despite these challenges, community expectations from renewable energy projects remain high. Survey responses indicate that residents associate these projects not only with electricity but also with improvements in water access, healthcare, housing, and overall living conditions. However,

past experiences with development initiatives have led to growing distrust. Many residents expressed skepticism about promises of employment and compensation, citing repeated instances where such commitments were not fulfilled.

Overall, the socio-economic findings reveal a stark disconnect between development planning and ground realities. While Umerkot is increasingly positioned as a site for renewable energy expansion, the communities living in these areas continue to face severe deprivation and exclusion. The evidence underscores the urgent need to integrate distributive, procedural, and restorative justice into energy and development policies. Without such integration, renewable energy projects risk reinforcing existing inequalities rather than addressing them.

Experts Opinion about JET challenges in Sindh

The expert interviews conducted with Dr Khalid Waleed official from Sustainable Development Policy Institute and Mr. Mehfooz A. Qazi, Former Director of Alternative Energy, Sindh Energy Department provide critical insights into the emerging discourse on JET in Pakistan, particularly in Sindh. Both experts emphasized that JET cannot be understood merely as a shift from fossil fuels to renewable energy, but rather as a broader socio-economic transformation that must integrate environmental sustainability with social and economic justice. Dr Khalid Waleed highlighted that while renewable energy projects contribute positively to environmental goals, a truly just transition requires that communities are not excluded or harmed in the process. He stressed that in Pakistan, energy governance is highly centralized, with limited participation of local communities in decision-making, particularly in large-scale projects such as those developed under government-to-government arrangements. He further noted that in areas like Jhimpir, renewable energy projects have been implemented with limited attention to local socio-economic realities, creating a gap between infrastructure development and community well-being.

A central concern raised in both interviews is land governance, which is identified as the most significant barrier to achieving a just transition in Sindh. Dr Khalid Waleed pointed out that land ownership complexities, particularly in rural Sindh, where formal documentation is often absent, make fair compensation and resettlement highly challenging. He argued that without proper recognition of customary or informal land rights, communities risk exclusion from compensation frameworks. Mr. Mehfooz A. Qazi further elaborated on this issue by explaining the existing Sindh Land Grant Policy (2015), under which renewable energy projects are allocated land on a 30-year lease basis through coordination between the Energy Department, Board of Revenue, and district administration. While this policy has enabled the development of multiple wind and solar projects, Mr. Mehfooz A. Qazi noted that it largely relies on government-owned or administratively cleared land, often overlooking the lived realities of local communities who may not hold formal land titles but have generational occupancy and livelihood dependence on the land.

Both experts also highlighted significant gaps in resettlement, compensation, and livelihood restoration mechanisms. Dr Khalid Waleed emphasized that monetary compensation alone is insufficient, as many communities depend on land-based livelihoods such as agriculture, fishing, and grazing. He argued that without livelihood restoration or equivalent value replacement, displacement can lead to long-term economic insecurity despite environmental gains from renewable projects. Mr. Mehfooz A. Qazi added that while World Bank safeguard policies (OP 4.12) and Sindh's emerging Resettlement and Rehabilitation frameworks provide a formal structure for compensation and relocation, implementation remains inconsistent and, in some cases, still in draft or evolving stages. This creates uncertainty in how justice is operationalized on the ground, particularly for vulnerable and undocumented populations.

Another key issue identified is the absence of mandatory Corporate Social Responsibility (CSR) frameworks in renewable energy projects. Mr. Mehfooz A. Qazi explained that unlike the oil and gas sector, where CSR obligations are embedded in agreements and monitored through district-level mechanisms, renewable energy projects in Sindh rely largely on voluntary CSR practices without standardized enforcement or verification. This results in uneven community benefits and raises concerns about accountability. Dr Khalid Waleed further emphasized the importance of integrating community ownership models and decentralized energy systems to ensure that local populations directly benefit from energy generation rather than remaining passive recipients of external development

Overall, both experts converge on the view that while Pakistan's renewable energy expansion is environmentally promising, it falls short of the normative standards of a Just Energy Transition. They collectively argue for stronger land governance, mandatory CSR mechanisms, meaningful community participation in decision-making, and robust livelihood restoration frameworks. Without these reforms, renewable energy development risks reproducing existing inequalities rather than addressing them, thereby limiting the transformative potential of JET in Sindh and Pakistan.

Policy Framework for Advancing a Just Energy Transition in Sindh

The findings of this study, drawing on both household survey data and expert interviews at national and international levels, point to a fundamental misalignment between renewable energy expansion and socio-economic justice in Sindh. While the province is increasingly positioned as a strategic hub for solar and wind energy, the communities hosting these projects continue to experience severe deprivation, limited participation, and negligible long-term benefits. Addressing this gap requires a shift from a purely infrastructure-driven approach to a justice-centered policy framework that embeds distributive, procedural, and restorative principles into all stages of renewable energy planning and implementation.

A central priority is the institutionalization of equitable benefit-sharing mechanisms to address distributive justice concerns. The evidence clearly demonstrates that communities in project areas remain energy-poor despite proximity to large-scale energy investments. Policy frameworks must therefore mandate that a defined proportion of project benefits directly accrue to local populations. This can be operationalized through legally binding provisions requiring developers to ensure local electricity access, either through mini-grid integration or dedicated community energy allocations. In addition, employment generation must move beyond symbolic commitments. Policies should require enforceable local hiring quotas, coupled with skills development programs tailored to renewable energy technologies. Expert insights further emphasize that without such mechanisms, benefits will continue to be captured by external actors, reinforcing existing inequalities. Financial instruments such as community development funds or local equity participation models—adapted from international experiences—can further strengthen distributive outcomes by linking project revenues to local development priorities.

At the same time, the study highlights critical deficiencies in procedural justice, particularly in relation to community participation and transparency. While consultation processes are formally conducted, they are often limited in depth and inclusivity. To address this, regulatory frameworks governing Environmental and Social Impact Assessments (ESIAs) must be strengthened to ensure that consultations are not merely procedural requirements but meaningful platforms for engagement. This requires the development of standardized protocols that guarantee early-stage involvement of communities, accessible information dissemination in local languages, and independent monitoring of consultation quality. Particular attention must be given to the inclusion of marginalized groups, especially women, who are currently excluded from decision-making processes.

Gender-sensitive consultation mechanisms, including separate forums for women and youth, should be institutionalized as mandatory components of project approval processes. Furthermore, grievance redress systems must be made transparent, accessible, and time-bound, ensuring that community concerns are addressed effectively and without fear of reprisal. The absence of restorative justice mechanisms represents one of the most significant gaps identified in this study. Renewable energy projects in Sindh are being developed in regions that have historically experienced chronic underinvestment and socio-economic marginalization. As such, these projects must be designed not only to avoid harm but to actively contribute to repairing structural inequalities.

This requires a shift toward integrated development planning, where renewable energy investments are linked with improvements in basic services such as water supply, healthcare, education, and infrastructure. Policy frameworks should mandate that project developers allocate a portion of their investment toward community development initiatives, guided by locally identified priorities. For instance, the acute water crisis documented in the study suggests that water infrastructure should be a central component of any development intervention in the region.

Similarly, investments in healthcare and education facilities can generate long-term social benefits that extend beyond the lifespan of individual projects.

Land governance emerges as another critical area requiring urgent policy attention. The findings reveal widespread insecurity due to informal land ownership and lack of legal documentation, which increases the risk of displacement without adequate compensation. To address this, land acquisition processes must recognize informal or customary land ownership and ensure transparency, fairness, and legal protection for affected communities. This includes simplifying land registration procedures, providing legal assistance to low-income households, and ensuring that compensation frameworks reflect not only market value but also livelihood impacts and social costs. Experts further emphasize the need for independent oversight mechanisms to prevent elite capture and ensure accountability in land transactions.

Conclusion

The study also underscores the importance of institutional coordination and governance reform. Renewable energy development in Pakistan currently operates within a fragmented policy environment, with limited integration between energy, environment, and social development sectors. Achieving a Just Energy Transition requires a coordinated approach that aligns national energy policies with provincial development priorities and local needs. This can be facilitated through the establishment of a dedicated JET framework at the national or provincial level, which clearly defines roles, responsibilities, and accountability mechanisms across institutions. Lessons from international experiences, particularly South Africa, highlight the value of integrated planning and multi-stakeholder coordination in achieving equitable outcomes.

Finally, the success of a Just Energy Transition in Sindh depends on the establishment of robust monitoring and accountability systems. Current project evaluation mechanisms are largely focused on technical and financial performance, with limited attention to social outcomes. To address this gap, policy frameworks must incorporate measurable indicators related to distributive, procedural, and restorative justice. These indicators should be monitored throughout the project lifecycle, with regular public reporting to ensure transparency. Community-based monitoring approaches can further enhance accountability by empowering local stakeholders to track project impacts and raise concerns.

In conclusion, the transition to renewable energy in Sindh presents a critical opportunity to align climate action with social justice. However, realizing this potential requires a fundamental reorientation of policy and practice. By embedding distributive, procedural, and restorative justice into the core of energy governance, Pakistan can move beyond a narrow focus on energy generation and toward a more inclusive and sustainable development pathway. The evidence from this study makes it clear that without such an approach, renewable energy expansion risks perpetuating the very inequalities it seeks to address. Conversely, with the right policy

interventions, it has the potential to become a powerful driver of equitable growth and community resilience.

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