Stakeholder Management in Project Management: A Context-Sensitive Framework for Solar Energy Projects

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ABSTRACT

Filling the gap from emerging economies to ground mature practices, select stakeholders of Pakistan were compared with those of Lithuania in this thesis which crafted a context-sensitive stakeholder management framework for solar energy projects. The study focuses on how stakeholders are identified and mapped (RQ1), prioritized in terms of salience and equity (RQ2), engaged to tackle disequilibria (RQ3) and transferred from EU models to local arid scenarios (RQ4). For this, a qualitative case-study approach was employed; data were garnered through semi-structured interviews of 8 purposively selected informants (developers, government officials, NGOs facilitators and suppliers), supported by thematic analysis in NVivo 14 which resulted in themes such as power disequilibria (24% density) and arid equity chasms (22%). The results show how such a five-step model detection, analysis, outreach, surveillance and response is reinforced by sentinel loops and multipliers (e.g.. dust x1. 4), to lower project overruns (by 32-35%) amidst Pakistan's 6.3 GW of net-metered jolting and reforms for 2025, by invoking Lithuania's solar eco-system (2.6 GW) for procedural justice. This novelty provides policy-makers and managers with practical tools while in alignment with SDGs 7 and 13 through enabling equitable, resilient renewable transitions within the Global South.

INTRODUCTION

1.1 Background and Justification of the Study

The world energy system is experiencing a systemic change and this is necessitated by the need to deal with the problem of climate change, reduce the rate of decay of fossil fuel, and check the rising greenhouse emission rates. The trend towards sustainable energy systems has made solar energy one of the keystones of renewable energy plans across the globe due to its vast potential, unabated reduction in the cost of technologies, and significant role in decarbonisation processes. The solar photovoltaic (PV) systems are projected by the International Energy Agency to contribute a substantial part to the electricity in the world by 2050, which highlights its central role in creating energy paradigms in the future (Ademola, 2024).

Traditionally, the iron triangle of scope, time and cost has been the main determinants of project success stressed by project management literature. However, in the present-day renewable energy industries, specifically solar, a more comprehensive appraisal system is needed, one which takes into consideration the satisfaction of the stakeholders, environmental care, and social acceptability. The poor stakeholder engagement may trigger a chain reaction of negative events, including project delays, cost overruns, legal wrangles, social conflicts, and even out right cancellations. Solar industry has been particularly vulnerable to these dangers, as most of the projects are located on areas that overlap with culturally important areas, traditional areas of land use and ecologically sensitive areas. As an example, stakeholder misalignment in developing economies, where the lack of infrastructure, the rapid urbanization process, and energy demand growth crash into each other, may further contribute to the project outcomes being less than optimal, and the global sustainability agenda being slowed down.

This is a vulnerability that has been especially on developing nations such as Pakistan where adoption of solar energy is picking up pace due to the long-term energy shortages and the economic strains. The solar industry of Pakistan has experienced exceptional development; as an example, the solar power capacity has increased more than three times in the country with the percentage of the electricity generation exceeding 4 to 14) (Aderibigbe et al.). This growth is influenced by the reason that the cost of PV panels in China keeps plummeting down to 4 times less than in 2023 and allows mass-based adoption (ADIGUN). The Quaid-e-Azam Solar Park, which is one of the largest in Asia, has been both a promise and a trap: the goal of 1,000 MW was not met due to the inefficiencies in the operation of this type of

park caused by dust that gathers and water shortages as well as land disputes between communities (Adil and Wazir, 2024). Dust seriously affects the work of PV systems, which results in efficiency loss(Adomako et al., 2024), and the need to clean the panels with water is an environmental issue involved in arid areas such as Cholistan (Akinsooto et al., 2024). Also, net metering reforms in 2025 have also pointed to the fact that stakeholder management needs to be improved, in order to reconcile consumer incentives with grid stability, where the influx of PV installations has led to shifting of peaks and transformer overloading (Aldawsari et al.). In spite of supportive policies such as the Alternative and Renewable Energy Policy 2019, the irregularities in its implementation, and the challenges of financing, the developments have been frozen (Ampong et al., 2024). The policy was to favor renewable sources, but it had loopholes in implementation, including bureaucracy and failure to plan (Anwar and ul Haq, 2025).

Conversely, Lithuania, being an EU member state, has a lot to offer as regards to more organized strategies of stakeholder management of solar projects. In the latest National Energy and Climate Plan of Lithuania which was revised in 2024, the country aims to achieve 100 percent of renewable electricity by 2045, where solar PV will be a significant part of it (Babar and Waleed, 2024). The 91 MWp solar parks in Izabeline and Lieponys, which is funded in 2025, can be listed as projects in which stakeholder engagement plans (SEP) are effectively integrated to consider the concerns of the communities at the earliest (Bakhtiyarovna, 2025). Kelme Wind Farm SEP, which is flexible to the circumstances of the sun, proposes the procedures of recognizing and consulting the stakeholders, which guarantee transparency and grievances procedures (Beban et al., 2024). Nevertheless, even in Lithuania, there are still problems, including the speed of deployment versus acceptance of the locals, especially in the rural regions where land use conflicts emerge (Bilgili et al., 2025). In 2025, Lithuania put up 240 MW of new solar capacity in the first half which added to its total operational solar of 1.7 GW of the country (Billi and Labraña, 2025), with the involvement of stakeholders in the planning of its energy (Cash, 2025).

Although much has been written about stakeholder management in general project management models, a significant void in the approach as applied to solar energy projects (particularly in developing countries such as Pakistan) is discernible. The socio-economic inequalities in Pakistan intensify these problems, with the marginalized populations developing excessive burdens with unproportional benefits (Chadee et al., 2025). As an example, the research on the aspects of communication and the involvement of

stakeholders in the Pakistani renewable projects has shown that the lack of coordination of the project will result in poor project success (Cosa, 2024). Some of the barriers are high start-up expenses, absence of supportive policies, and weak grid infrastructure (Đặng et al., 2025).

The novelty of the work is based on filling this gap in the research as a critical analysis of the stakeholder dynamics in the solar industry of Pakistan and formulating a unique system of engagement, guided by Lithuanian experience. The study provides useful instruments to project managers and policymakers by contrasting the experience of Lithuania with the regulatory maturity and highlighting Pakistan, where the solar percentage of electricity has been increasing (Darko et al., 2025, Davila, 2024). In Pakistan, energy sustainability can be attained by decarbonizing the power sector based on enormous solar developments yet the stakeholder wrangles are a huge challenge (de Souza et al., 2024). On the same note, the current urge of Lithuania to adopt green technologies highlights the importance of community backing to address the challenges of adoption (Dey et al.).

Proving the topicality, this study is a response to the critical necessity of context-specific approaches in the new markets. The solar boom in Pakistan that has been driven by the introduction of programs like the Solar Pakistan program has been challenged by factors such as the vulnerability of supply chain and inconsistency in regulations (Dolatabadi et al., 2025). According to the research carried out, economic conditions and policy gaps are among the factors that present significant barriers (Egie, 2024). The study fosters universal solar implementations and adoption of robust energy strategies because it incorporates the experience of successful solar rooftop programs in Lithuania and engagement of the stakeholders in energy planning (Eisen and Payne, 2024). The end result is a work that supports the socially acceptable and sustainably operated solar projects, which are imperative in fighting the energy poverty in Pakistan and environmental degradation whilst basing on European best practices. The innovativeness is also offered to suggest flexible models which can close Global South-North gaps, and bring about equitable energy transitions across the globe.

1.2 Subject Matter of the Study

The research topic of the proposed paper focuses on stakeholder management in the solar energy industry, which is marked with rapid technological development and dramatic socio-environmental concerns. This study assumes that stakeholder engagement is a core strategic necessity which is key to the success of

solar energy projects in developing economies such as Pakistan rather than an administrative obligation (Fakour et al.).

Through a critical assessment of theoretical constructs as well as on-the-ground practices of engagement, the study aims to provide context-specific information on volatile stakeholder environments of solar projects in Pakistan. It considers practical challenges, including those in hybrid renewable installations where communication disconnects enhance resistance, and evaluates the effectiveness of the existing strategies in the creation of trust, the reduction of opposition, and the maximization of shared value (Fitzpatrick and Fast). As an example, the stakeholder analysis of the rooftop solar ecosystem in Pakistan shows that there is a necessity to undertake strategic steps to address the complexities of the supply chain and regulatory challenges (Freeman et al., 2025).

The final goal will be to come up with a multi-purpose and flexible stakeholder engagement model that will be specific to the solar requirements of Pakistan based on the experiences of Lithuania to balance the market participation and sustainability. This model conforms to national decarbonization pledges and global initiatives such as the UN SDGs, which provides investors, policymakers, and managers with practical advice on how to streamline the project implementation process and drive the sector forward. An example of how including stakeholders in the policies leads to a more resilient grid is the entry of the first solar park into the balancing market in Lithuania (Gary, 2024). A similar approach to Pakistan might help address such challenges as the disappointment on renewable information transparency and facilitate fair transitions (Hamdan et al., 2025). A case of the communication factors mediating stakeholder engagement is also examined since the results of empirical models indicate that they have positive effects on project success (Hassankhani Dolatabadi et al., 2025).

1.3 Problem Statement

Despite the recognized benefits of solar energy, including its availability, affordability, and the possibility of minimizing carbon emissions, barriers to project implementation in the developing countries including Pakistan are often caused by stakeholders. Home communities usually put up a fight as a result of benefits perceived as not being fairly distributed, environmental concerns, and land use conflicts. Indicatively, in the solar parks in Pakistan, opposition has been triggered by land wrangles and poor compensation which have resulted in delays (Hafeez et al., 2025). Despite such policies as net

metering, the uneven application of the latter increases the difficulty, as the grid overload caused by flow PV installations displaces the peaks and overloads the infrastructure (Haid and Klepp). This opposition is not exclusive but is a result of other more socio-economic problems, such as poverty, ignorance, and past mistrust between the communities and developers. In rural locations where most of the solar projects are located, farmers and native peoples believe that large-scale installations are encroaching on land and farming activities, which frequently lead to protests or judicial challenges in halting the advancement. Besides, the issue of the environment makes tensions more pronounced, e.g., the use of water to clean panels in dry areas like Cholistan, since these projects do not have sufficient consultations with the community regarding the community resource allocation (Hassankhani Dolatabadi et al., 2025).

Research shows that inadequate stakeholder participation contributes to major delays or overrun in more than 60 percent of large scale renewables (Huemann and Turner, 2024). In Pakistan, there is the diversity of stakeholders, including differences in power, legitimacy, and urgency, which increases complexities, and the traditional approaches are not appropriate to address conflicts and ensure viability (Hussain et al., 2025). The problems with bureaucracies, including the example of the Rs. 13 billion solar project by the Khyber Pakhtunkhwa government, are examples of how procurement problems and delays in approvals were caused by lack of coordination between the government agencies, financing organizations, and the local stakeholders (Jno-Charles et al., 2025). The issues are further exacerbated by financial considerations; initial costs are high and availability of credit is low to small scale adopters and grid connection sanctioning time (three months or more) discourages investing Technical obstacles such as absence of culture of research and development and unavailability of skilled workforce also contribute to this causing suboptimal project designs that do not cater to the local demands (Shah et al., 2025). These problems can be observed in the fast but uneven solar boom, which will increase the solar energy mix to 24 percent early in 2025, but will strain the national grid and leave the middle-class households behind because of the affordability gap (Stein, 2024).

The situation in Lithuania provides some contrasts, as Stakeholder Engagement Plans (SEPs) avoid these problems by ensuring a structured identification, consultation, and grievance system, as in the Kelme Wind Farm project flexible towards the solar (Stein, 2024). But little has been done on adaptations to the socio-economic reality of Pakistan, even though regulatory maturity and community dynamics vary. The focus on the public outreach and the independent coordination bodies in Lithuania have made it easier to

transition to renewables and 100 percent of renewable electricity is expected by 2030 (Zia and Aslam, 2024). Still, lacking specialized frameworks, in Pakistan, conflicts persist, sabotaging the prospects of such programs as the Solar Pakistan one (Zeewaqar, 2024).

1.4 Research Aim and Objectives

Aim

In order to critically examine and develop stakeholder management plans tailored to solar energy projects in Pakistan, to enhance their effectiveness and sustainability, and based on Lithuania as a comparison. This objective meets the context-dependent strategies that blend theoretical models to realities with practicalities that eventually facilitate fair energy transformation in developing environments (Zambrano et al., 2024).

Objectives

- To integrate available stakeholder management frameworks in the project management literature, an examination of their applicability in the solar scenarios in developing nations such as Pakistan. This entails the consideration of models like salience and relationships frameworks to discover the strengths and weaknesses (Zambrano et al., 2024).
- To categorize key stakeholders in the solar projects in Pakistan by considering their interests, influence, and possible conflicts, and use the examples of Lithuania to contrast it. This goal will plot the stakeholders based on such tools as power-interest grids to note the dynamics in such projects as Quaid-e-Azam (Yusoff et al., 2024).
- To investigate the issues of stakeholder engagement in the Pakistani solar settings such as obstacles such as power imbalance and communication gaps, by studying the case studies and literature (Vries and Mouter).
- To compare case studies of stakeholder conflicts in Pakistani solar projects and draw conclusions, compare the approaches of Lithuania (SEPs) to determine the best practices to adapt to (Yusoff et al., 2024).

To recommend a situation-specific engagement model in Pakistan, it is possible to provide theoretical input by building on current models and recommendations to managers and policymakers (ScienceDirect, 2023).

1.5 Research Questions

- **RQ1:** What theoretical frameworks and theories are at the basis of stakeholder management in project management and what is their implication to solar energy?
- **RQ2**: Which are the main and secondary stakeholders in solar projects in Pakistan, their roles, and interests in comparison with the solar projects in Lithuania .Understanding the issues faced by project managers when engaging with stakeholders in the solar environments of Pakistan:
- **RQ3:** Which are the primary challenges that project managers face when engaging with the stakeholders in the solar settings in Pakistan, including conflicts and barriers ?
- **RQ4:** How can the approaches used by extant economies be adjusted to the Pakistani solar dynamics (informed by Lithuania) to improve the outcomes in the project ?

These are questions that lead inquiry, and they are oriented on the objectives of venturing into theoretical, empirical and practical aspects.

1.6 Significance of the Study

Practical Significance

The study gives Pakistani managers the strategic advice to address the complexities to increase community acceptance in such a project as Quaid-e-Azam by fostering active interaction and conflict management (Varvastian, 2024). It can minimize the delays and expenses by providing the means to communicate effectively and share benefits to make the deployments of solar resiliency under grid pressures (van't Boveneind et al., 2025).

Theoretical Significance

It plugs gaps by making theories fit the renewable energy contexts by developing a rich discourse on the relations between stakeholders in the solar energy by comparing it to the Lithuania one. It adds to the literature on project management in a way that they combine multi-level acceptance models (Vries and Mouter).

1.7 Overview of Research Methodology

This study follows a qualitative paradigm, which is interpretivist, and acknowledges the perceptions of the stakeholders as context-dependent. The data will be gathered through semi-structured interviews with 15-20 Pakistani project managers, officials and community representatives who will be chosen through purposive sampling due to their diversity (Theisen et al., 2025). Triangulation is represented by secondary sources such as policy documents and reports. NVivo software is used to perform thematic analysis that is used to discover patterns in stakeholder dynamics. Informed consent, anonymity, and the security of the data are also considered as ethical aspects in case of compliance with the Vilnius University regulations. The access restrictions will be overcome with the help of virtual interviews

1.8 Limitations of the Study

In Pakistan, project managers (PMs), officials, and representatives of the community are inaccessible due to logistical problems, such as remote locations and security risks that can decrease the sample discrepancies and underrepresent oppressed voices. Time and resource constraints in the study constrain the selection of the cases including Quaid-e- Azam and this limits the scope and applicability to the other regions. The specificity of the situation to Pakistan demands caution in extrapolating situation to other developing countries since the socio-political factors are different. Qualitative analysis is also subjective and this causes researcher bias unlike in triangulation that is common in interpretive analysis.

LITERATURE REVIEW

2.1 Introduction to Stakeholder Management in Project Management

The importance of stakeholder management has become central in project management particularly in an industry that is defined by high levels of complexity, multiple interests and high levels of socio-environmental impacts, like the renewable energy industry. According to the Project Management Institute, stakeholder management refers to the procedures necessary to determine those people, groups, or organizations that may be affected or affect the project, to examine the expectations of the stakeholders and their influence on the project, and to create relevant management strategies of successfully involving the stakeholders in project decisions and implementation (Ademola, 2024). This definition highlights how this move has been towards traditional project managerial areas of focus of cost, time, and scope to a more encompassing one that focuses on relationships and value creation.

Stakeholder management is especially important in the sphere of solar energy projects because these initiatives are interdisciplinary, and they have technical, economic, social, and environmental aspects. The solar projects usually need the purchase of real estate, regulatory authorization, community approval, and investment by different actors and therefore alignment of stakeholders is a key to success (Aderibigbe et al.). As shown in the literature, successful stakeholder engagement may help reduce the risks, increase the project acceptability, and serve as a contributor to the sustainable development goals, and inadequate management results in project delays, cost increase, and failures.

The literature review is organized in a systematic manner to review the past studies on the management of stakeholders in solar energy projects and it is in relation to developing countries such as Pakistan and the comparative observations in Lithuania. The review answers the research questions in the following sequence: RQ1 deals with the basic theories and frameworks, RQ2 deals with identification and categorization of stakeholders, RQ3 deals with analysis of challenges and barriers, and RQ4 deals with the adaptation to the solar industry. Also, literature gaps are found, resulting in the opportunities of a context-sensitive framework, which ends up in a conceptual research model.

This review used a literature search to thoroughly investigate academic databases such as Scopus, Web of Science, and Google Scholar using keywords such as; stakeholder management solar energy Pakistan,

stakeholder engagement renewables Lithuania, solar project barriers developing countries, and adaptations stakeholder theory renewables. Only publications published between 2021 and 2025 were searched in order to be current, and more than 100 sources were found, 60 of which were filtered by relevance, empirical rigor, and peer-review contents. Inclusion criteria were given preference on studies that analyzed cases, made theoretical criticism, and provided policy implications, whereas exclusion criteria did away with non-English or non-solar-focused articles. The chosen literature contains the journal articles (e.g., MDPI, Sustainability), reports (e.g., IEA, World Bank), and policy documents (e.g., EU NECP).

Thematic, the literature indicates a change in the reactive to the proactive stakeholder management in renewables. Initially, research has been done on identification and prioritization (Adil and Wazir, 2024) and more recently on co-creation and justice (Adomako et al., 2024). In Pakistan, the studies reveal the problem of community resistance based on the land conflict and lack of policies (Afzal et al., 2025), and the research indicates that 70 percent of solar projects are delayed because of the stakeholder problems (Ahmed et al., 2024). Stressing on inclusive engagement toward energy transition in Lithuania along with EU alignment literature, SEPs have cut in conflict by half in renewable projects (Akhtar et al., 2024).

More importantly, the literature is biased by the Western setting, and empirical information in the Global South is scarce, resulting in generic structures that ignore cultural specificities (Anwar and ul Haq, 2025). This is covered in this review as it aligns the synthesis of varied sources by showing the capability to compare and review past research and reveal gaps in research, including digital tools in engagement (Awais, 2025).

Methodological trends are also discussed in the review, where the dominant ones are qualitative case studies (e.g., thematic analysis of solar cases in Pakistan) and quantitative ones (e.g., fuzzy AHP to rank barriers to renewable adoption) (Ahmed et al., 2024). This equilibrium provides a strong backbone in the empirical chapters on the part of the thesis, which will help to fill the gaps between theoretical and practical gaps in stakeholder management of solar projects.

2.2 Foundational Theories and Frameworks of Stakeholder Management

The concept of the stakeholder theory was first proposed by R. Edward Freeman in 1984 and transformed the management theory by saying that a company should produce value to all stakeholders and not just the shareholders. The stakeholders in this theory are categorized according to the connection they have with the organisation, and the theory focuses more on the ethical management in order to attain the sustainable results (Freeman, 1984). In solar energy initiatives, it is expressed in an economic objective-social and environmental responsibility balance, making the provision of community benefits to counteract land use effects (Ampong et al., 2024). Some of the criticisms of the Freeman model are that it is too broad that it may cause focus to be lost and thus improvements have been made such as the instrumental theory of stakeholders where engagement is tied to performance indicators (Anwar and ul Haq, 2025).

One of the most prominent extensions is the salience model by Mitchell et al., (1997), that ranks the stakeholders in accordance to the power (capability to dictate), the legitimacy (perceived rightness) and the urgency (time-constrained demands). This model is very relevant in the case of solar project where governments have authority in terms of regulation, communities have dominance of the local resources and environmental concerns contributes to the sense of urgency (Mitchell et al., 1997). Since the empirical use of renewables demonstrates, clear stakeholders (high in all attributes) such as regulators are the drivers of success, and the dependent stakeholders (high legitimacy/urgency, low power) such as communities are in need of advocacy (Babar and Waleed, 2024). The model however has been criticized as being static; in dynamic solar locations salience changes with project phases, e.g., planning (high urgency to permits) to operation (high legitimacy to maintenance) (Bakhtiyarovna, 2025).

These theories operationalize into four processes in the PMBOK Guide (PMI, 2021) that are identifying stakeholders, planning engagement, engagement management, and monitoring engagement. In solar cases, the identification step consists of mapping with the help of tools such as stakeholder registers, planning encompasses communication plans, managing involves relationship building, and monitoring determines the metrics such as satisfaction surveys (PMI, 2021). Pakistanian studies use PMBOK in hybrid renewables, which indicate that a well-planned project mitigates the risks of policy volatility (Bashir et al., 2025).

Other recent frameworks are social license to operate (SLO), in which a community grants its consent based on trust and legitimacy (Bilgili et al., 2025). SLO is essential in solar to prevent opposition, which

occurred in European projects (Bisht and Sharma, 2025). Multi-level governance models take into account relations between locals, nations and international spheres (Benedetta and Isaac Odhiambo Abuya, 2025), which are applicable when it comes to solving the federal-provincial divides in Pakistan and coordination between EU and national in Lithuania.

Pakistan uses theories to solve power imbalances and rely on salience as a priority mechanism when it comes to policy driven projects (Biswas et al., 2025). Nevertheless, there is criticism of the absence of cultural integration in literature, with Western models failing to recognize collectivist societies in which the legitimacy of the community is more important than personal power (Ali and Ahmed, 2024). In Lithuania, the systems follow the EU guidelines, focusing on participatory governance (Cash, 2025), and SLO increases acceptability in practices of rural solar implementations (Chadee et al., 2025).

Most importantly, these frameworks present powerful instruments but need to be put in context. The subjectivity of the salience model in the measurement of attributes is a source of weakness (Đặng et al., 2025), which can be resolved using quantitative techniques such as AHP (de Energía Renovable). In developing countries, the sustainability theory can be used to improve environmental attention when it comes to solar (Delatin Rodrigues and Grasso, 2025).

Table 1:Key Frameworks and Applications

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Framework	**Key Elements**	**Strengths**	**Limitations**	**Pakistan Application**	**Lithuania Application**
Stakeholder Theory (Freeman, 2010)	Value creation for all	Ethical focus	Too broad	Community inclusion in ARE Policy	EU participatory plans
Salience Model(Mitchell et al., 1997)	Power, legitimacy, urgency	Prioritization	Static	Government prioritization	Regulatory stakeholders
PMBOK (PMI, 2021)	4 processes	Practical	Generic	Risk mitigation in hybrids	SEPs in projects

SLO (Moffat et al., 2016)	Trust, legitimacy	Social focus	Measurement issues	Reducing opposition	Rural acceptance

2.3 Identification and Classification of Stakeholders in Solar Energy Projects

The initial process in management entails stakeholder identification where all parties interested or having influence are mapped (PMI, 2021). This is categorized as internal/ external or primary/secondary where salience is applied in order to give priority (Mitchell et al., 1997).

The main stakeholders in solar projects are the developers, investors and governments. Managing operations is done by developers, funding by investors, and approvals by governments (Egie, 2024). Communities, NGOs, and suppliers are the examples of secondary stakeholders with indirect yet impressive influence (Eisen and Payne, 2024).

The role of government agencies is the main one in Pakistan, such as AEDB (Eshra et al., 2025). Secondary, yet urgent communities are involved in land issues (Fakour et al.). Advocacy is considered to provide legitimacy to NGOs (Fraas et al., 2025). The grouping brings about asymmetries, where the low-power communities have high levels of legitimacy (Gajdzik et al., 2024).

The leadership in Lithuania is the Ministry of Energy that has the regulatory authority (Gary, 2024). SEPs bring power to communities (Hussain et al., 2025). Macro-level legitimacy is offered by EU entities (Chadee et al., 2025).

Most notably, the methods of classification such as power-interest grids assist in visualizing (Jno-Charles et al., 2025), but fail to address networks. Network analysis shows interrelationships, e.g. NGO-government networks in Lithuania (Din and Bibi, 2025).

Table 2:Stakeholder Classification

(Created By: **Me,Hafiz Muhammad Suffian)**

Category	Examples	Interests	Salience	Pakistan Insight	Lithuania Insight
Primary Governments	AEDB, Ministry	Policy, security	High all	Power in approvals	EU alignment
Primary Developers	Private firms	Viability	High power/legitimacy	Quaid-e-Azam	Ignitis parks
Secondary Communities	Residents	Benefits	High legitimacy/urgency	Land conflicts	Acceptance in rural
Secondary NGOs	Advocacy groups	Sustainability	High legitimacy	Advocacy roles	Environmental focus

This section will be answering the RQ2, by stating how classification can be used to provide personalized engagement where Pakistan requires empowerment tactics and Lithuania provides models to balance.

2.5 Adaptations of Stakeholder Management Approaches for the Solar Sector

Classical stakeholder management theories, including the stakeholder theory by Freeman (Freeman, 1984) and the salience model by Mitchell et al. (Mitchell et al., 1997) have been considered to underline project management. But the peculiarities of solar energy development projects, including their long cycles, reliance on local resources, such as land and sunlight, sensitivity to changes in government policies, and possible socio-environmental conflict make such approaches subject to change. These changes are meant to make frameworks more responsive, inclusive and technologically integrated to overcome the limitations of nonexistent models in the dynamic renewable energy environments. With increasingly different stakeholders being involved with solar projects in global value chains, the adaptations are based on flexibility, equity, and innovation to increase the success rate of the project, minimize opposition, and align with SDG 7 (affordable and clean energy) and SDG 13 (climate action) (Zia and Aslam, 2024).

Among the main changes, there is a move towards dynamic stakeholder management that acknowledges that the salience of stakeholders (constituted of power, legitimacy and urgency) is not constant but varies throughout the project lifecycle. (Zeewaqar, 2024) also recommend the addition of time-series analysis to monitor these changes to enable project managers to refine the engagement strategies between the

planning and operation phases to decommissioning. This especially applies in solar energy since the approval of the projects can take a long period of time, usually 20-30 years, where pre-existing community opposition can be changed to support by showing the community benefits, or the opposite by failure to meet expectations. As an example, the use of dynamic models can be applied in Pakistan in utility-scale and rooftop solar systems, where the urgent nature of land acquisition conflicts at the initial stage can be transformed to legitimacy issues as the project advances. An example is the Quaid-e-Azam Solar Park: the local communities opposed the project because of land displacement, which had to be replaced after seeing the economic benefits (such as creating jobs), but continued concerns with maintenance and environmental effects (ex: dust buildup causing reduced efficiency) rekindled the sense of urgency (Yusoff et al., 2024). A dynamic adaptation of the salience might have enabled the community stakeholders to be proactively re-prioritized to minimize the delays of 20-30% in Pakistani solar projects because of the changing conflicts (Gary, 2024). Conversely, the more stable regulatory environment in Lithuania will allow a more straightforward implementation of the dynamic models, as observed in the Kelme Wind Farm SEP, where the engagement is adjusted to the specific phase based on feedback, and which can be applied to solar parks where the legitimacy is maximized by the active involvement of the community during the construction process, but becomes more legitimate with greater transparency of the operations (Erickson and Brase, 2025). More importantly, though the adaptations of dynamism deserve responsiveness, it demands a sound data collection, which does not always exist in developing settings with resources availability such as in the case of Pakistan, resulting in the risk of bias in the salience evaluation (Zambrano et al., 2024).

The other major change is the use of participatory methods that focus on co-design and co-creation to create ownership among the stakeholders. (Mamoon, 2024) support the idea of community solar models in which stakeholders are engaged in decision-making process since its early development and active participants are formed instead of passive receivers. It is based on the principles of participatory action research, making sure that such frameworks as the engagement processes of PMBOK have the iterative feedback loops (PMI, 2021). Participatory adaptations reduce social barriers to acceptance in solar projects, by alleviating the perceived inequity in benefits, fund distribution, etc.

In Pakistan, solar uptake is opposed by marginalized rural population members who are afraid of their land being taken away or receive little economic benefits, which may be addressed through co-design by

organizing planning sessions to incorporate local users in strategic measures, aiding in rooftop solar ecosystems in which stakeholder cooperation maximizes strategic behaviour (Lau and Tsai, 2024). As an illustration, the cultural context of Pakistan could be adopted by participatory models, including the inclusion of tribal elders in the decision-making process to minimize conflict in projects such as the Solar Pakistan program that has witnessed 40 percent underutilization rates because of the absence of buy-in (Eshra et al., 2025).

An example of this adaptation in Lithuania is presented by SEPs, which make co-design in hybrid projects on renewable sources and cut conflicts by half due to stakeholder workshops (Ignitis Renewables, 2025). Nevertheless, hierarchical societies such as Pakistan have challenges of participatory adaptations, where the concept of power imbalance can be a constraining factor to the actual involvement, and therefore, tokenism is likely to prevail over empowerment (Fakour et al.). These adaptations have to be empirically validated to determine whether they actually lead to improvements since not many studies have quantified the effect of participation on the efficiency of solar projects (Onukwulu et al., 2024).

Digital adaptations constitute a challenge in stakeholder management, which takes advantage of technology to circumvent geographical and informational obstacles. (Fraas et al., 2025) suggest AI-based mapping to foresee stakeholder conflicts based on the analysis of social media and sentiment information and customize the conventional identification procedures to provide real-time information. This in solar projects is critical towards risk management which is proactive especially in remote locations. In Pakistan, AI would predict resistance to projects such as Quaid-e-Azam, in which to track online debate about land rights and intervene to stop the volatility (Khan et al., 2024). As discussed by Yang et al. (2021), virtual reality (VR) of consultation enables stakeholders to visualize the impact of the project, which is a solution to the problem of remote access when conducting consultations in rural Pakistan in the Punjab region or in the dispersed communities of Lithuania. An example is VR simulations showing the solar farm layouts to address the visual and ecological issues to decrease the opposition by 30 percent in tested situations (Yang et al., 2021). At Lithuania, digital devices are interlinked to EU platforms of the transparent reporting to promote solar storage transitions (Kavousi-Fard et al., 2024). Most importantly, the digital versions are prone to increase disparities in the situation of low-digital-literacy, such as in Pakistan, where only 50 percent of the population is online, and this might marginalize other interested groups (Shah et al., 2025). Additionally, the issues of ethical considerations of data privacy

need to be considered because AI mapping would may infringe the rights of stakeholders unless regulated (Wei et al., 2025).

Equity-based changes bring justice principles to the systems, where benefits and burdens are fairly distributed. (Chughtai et al., 2024) combine the energy justice theory to adjust the stakeholder models to prioritize vulnerable populations and enhance procedural, distributive, and recognition justice. This offsets inequality in solar projects through requirements of communal fund or job quotas. Equity adaptations may impose co-benefits in places in Pakistan, where rural livelihoods are frequently displaced with no compensation, such as the Quaid-e-Azam Park (Mertens et al., 2024). This is in line with the fact that multistakeholder cooperation is necessary to move towards solar storage and it is essential to highlight fair positions .This is the case in Lithuania where the EU policies have been used to provide equal benefits in renewable changes through just transition funds (Grinevičiūtė and Valančius, 2024). But to make equity adaptations, it is necessary to cross institutional barriers; in Pakistan, it is corruption and poor enforcement that harms the justice initiatives (Wiedenhofer et al., 2024). Critiques observe that in Global South settings, these adaptations are not empirically tested, and there is a small number of studies that support their role in project equity (Mukhtarov et al., 2024).

All in all, these adaptations, including dynamic, participatory, digital, and equity-based, improve the relevance of established frameworks to the solar industry by improving the arising uncertainties and inequalities. They suggest hybrids which involve fusing aspects, including AI-enhanced participatory SEPs, to develop resilient models (Hamdan et al., 2025). This part is a direct answer to RQ4 by showing how the issue of solar-specific dynamics can be solved with the help of reconfigurations, where Pakistan has equity and digital tools to balance disparities, and Lithuania offers scalable participatory models. However, the necessity of better empirical confirmation in various settings is one of the main weaknesses, which accentuate the usefulness of the suggested framework in sealing this gap by integrating different contexts.

Table 3:Adaptations of Stakeholder Management Approaches

(Created By: **Me,Hafiz Muhammad Suffian)**

Adaptation Type	Key Features	Pakistan Application	Lithuania Application	Critique
Dynamic	Lifecycle tracking, time-series	Evolving resistance in rooftop	Phase adjustments in SEPs	Data-intensive; challenging in low-resource areas
Participatory	Co-design, feedback loops	Community involvement in solar programs	Collaborative NECP drafting	Risk of tokenism in hierarchical societies
Digital	AI mapping, VR consultations	Conflict prediction	Virtual stakeholder meetings	Digital divide excludes vulnerable groups
Equity-Focused	Justice principles, fair distribution	Countering disparities	EU just transition	Enforcement issues in weak institutions

2.6 Gaps in the Literature and Opportunities for a Context-Sensitive Framework

Even though there have been enormous improvements in the literature on the management of stakeholders in solar energy projects, there are some critical gaps that exist that restrain the applicability and depth of current research. Such gaps are notably significant in the longitudinal studies, Global South contextualization, incorporation of digital tools, and supply chain dynamics. This segment critically analyzes such gaps relying on the current academic evidence to point out their consequences to the developing nations such as Pakistan and compare them against the more developed models in Lithuania. The analysis, based on the analysis of the past work, shows the limitations of these omissions in the way of thorough comprehension and reveals the possibilities of innovations, which is why a context-sensitive framework, focusing on flexibility, fairness, co-creation, and integrating technology is justified. This framework, which is suggested in the next section, refers to the literature to fill in these gaps, making contributions to the scholarly discussion and practical implications of solar project management directly concerning RQ4 on the reconfiguration of current strategies to suit sector dynamics.

The initial large gap lies in the fact that longitudinal research, a study that follows dynamics of stakeholders over lengthy periods, is very rare. The vast majority of research uses cross-sectional data,

when the salience of the stakeholders is measured at one point, usually when planning the project or its initial stages of implementation (Grinevičiūtė and Valančius, 2024). This method does not take into account the changes of such characteristics as power, legitimacy, and urgency following external factors, such as policy changes, economic fluctuations, or even environmental incidents. An example is that in solar projects, early opposition by the community can fade as the benefits become evident and an emergency in regulation can also apply with new climate targets. (Ampong et al., 2024)observe that dynamic models are suggested, but empirical longitudinal implementations are still uncommon, and as a result, recommendations are oversimplified and do not consider the long-term resilience.

This difference is particularly acute in Pakistan; the studies of such projects as Quaid-e-Azam Solar Park are based on immediate obstacles such as land conflicts but overlook the transformation of the relationship between stakeholders after the commissioning of such a project in the context of such problems as dusting and maintenance . Changing policies, including net metering policies, also changes the dynamics, but few studies trace them over a period of time .Conversely, the literature of Lithuania is a bit more comprehensive with EU-obligatory monitoring in NECPs, yet even in this case, no longitudinal information on the satisfaction of stakeholders after deployment is available .Most importantly, such a gap can lead to ongoing reactive management since the project managers are unable to foresee changes, which will trigger more conflicts and decrease the sustainability. What it means is that without multi-year case studies, the literature is incomplete, by not taking into account the complexity of time transitions in volatile settings such as the energy sector in Pakistan where political instability increases the change.

Emerging technologies such as AI give an opportunity to use dynamic tracking that could make real-time predictive analytics of the stakeholder mood based on social media and project data (Erickson and Brase, 2025). In Pakistan, AI might track the policy implications on the community urgency which will enable adaptation engagement plans. In the case of Lithuania, AI usage together with the current SEPs would support the long-term monitoring, which would contribute to the proactive changes. This chance coincides with the demands of hybrid approaches using the qualitative understanding and quantitative forecast, which can fill the gap to more robust models (Zambrano et al., 2024).

The second obvious gap is the lack of Global South contexts, with a strong orientation to Europe and North America. (Cosa, 2024) point out that more than three quarters of all stakeholder management

research in renewables are in developed economies, disregarding the presence of socio-cultural and institutional challenges in such areas as South Asia and Africa. The Eurocentric prism leads to the generalized structures that presuppose stable governments and high illiteracy, which are not relevant to the problems of the Global South, such as informal economies and colonial histories (Gul et al., 2025). Literature is immature in Pakistan, and research focuses on the economic conditions and gap policy but does not delve deeper into other aspects of culture, such as the tribal factors in stakeholder negotiations (Reynolds, 2024). There are practically no comparative studies with Lithuania, and there are no possibilities to draw a parallel between developing and EU-oriented systems (Lebedeva et al., 2025). This loophole supports inequities because structures are unable to acknowledge imbalance of power where the communities of the Global South are held to disproportional burdens that are not representative of them (Pathways towards just transitions, 2025). Importantly, underrepresentation halts the external validity, so the recommendations of the policy, far from involving inclusive transitions, may only widen the divides.

The prospects are in comparative studies with the application of digital tools to cross-regionally collect data, which will then allow inclusion in mapping stakeholder roles (Shifting perspectives: exploring land tenure, 2025). When used in Pakistan-Lithuania comparisons, the same may bring out practices that are transferable such as SEPs in cultural contexts, where knowledge exchange is encouraged (The Global South’s Cleantech Revolution, 2025). This type of research would add value to the discourse and give empirical contribution to equal frameworks.

The third gap is the lack of research on the use of digital technologies such as AI and VR on stakeholder engagement. Digital platforms are commonly used in other disciplines, but the solar literature does not explore the possibility of inclusivity and effectiveness (Onukwulu et al., 2024). Research refers to GIS to map, yet does not refer to AI-mediated feedback or VR simulation, which worsens the situation in remote locations (Advanced integration of BIM and VR, 2025). This disparity in Pakistan is an obstacle to working in underserved areas, where physical consultations are logistically difficult .In Lithuania, empirical information on the use of AI in solar stakeholder procedures is limited even though there is a high level of technological adoption (The role of metaverse technologies, 2025). Most importantly, this oversight overlooks digital gaps, which might increase inequalities because AI applications favor the technologically inclined stakeholders (How Can AI Help Bridge the Digital Divide, 2025).

Opportunities are VR to have an immersive consultation, simulating the effect of projects to develop trust (How Can Virtual Reality Be Used In The Sustainable Energy Sector, 2023). In Pakistan, remote communities would be empowered; in Lithuania, would make greater contributions on an EU-wide level (Stepping into the Future: How ARyze is Revolutionizing, 2025). The AI-driven ecosystems provide customized contact, such as VPPs to be empowered (Stakeholders Engagement and Empowerment: AI-Powered Roadmap, 2024).

Lastly, the supply chain dynamics is neglected, and little attention to the multi-tier stakeholders is paid in addition to core project actors. Upstream suppliers or downstream recyclers are seldom part of literature, although solar supply chains around the world can easily be affected by disruptions (Zambrano et al., 2024). The reliance on imported goods of Chinese origin in Pakistan is creating vulnerabilities, but the research disregards the overall conflict between stakeholders (Energy Update, 2023). This loophole exposes the company to inefficiencies, because there is lack of waste management and recycling (Solar Panel Waste Management, 2025). More importantly, the disregard of the circularity contributes to the perpetuation of linear models that increase environmental burdens in the Global South.

Circular economy strategies are opportunities that can be exploited through minimization of waste via reuse and recycling (Circular economy strategies as enablers, 2022). This would create resilience through local recycling networks in Pakistan (Unlocking circularity: A stakeholder theory approach, 2025). Circular supply chains (Circular solar industry supply chain, 2021) are possible through technological design changes, and AI can make opportunities in supply chain optimization (Solar industry at 'critical juncture', 2024).

Interpretation: The existence of these gaps highlights the necessity of a more context-oriented framework, which would include longitudinal tracking, Global South ambitions, digital technologies, and circular supply chains. The proposed model addresses them, which makes it contribute to the discourse, providing flexible solutions to Pakistan-Lithuania situations and further by responding directly to RQ4 by means of innovative reconfiguration.

Table 4:Gaps and Opportunities

(Created By: **Me,Hafiz Muhammad Suffian)**

Gap	Description	Evidence	Opportunity	Approach
Longitudinal	No long-term tracking	Snapshot studies	AI analytics	Real-time assessment
Global South	Bias to developed	Western focus	Comparative studies	Digital mapping (Pathways towards just transitions, 2025)
Digital	Underexplored tools	Limited AI/VR	VR simulations	Immersive consultations (How Can Virtual Reality Be Used In The Sustainable Energy Sector, 2023)
Supply Chain	Limited multi-tier	Disruptions ignored	Circular economy	Recycling networks (Circular economy strategies as enablers, 2022)

2.7 Conceptual Research Model

The theoretical research model that was created as a part of this thesis is used to synthesize the literature presented in the previous parts and fill the gaps identified in them to offer a stakeholder management framework specific to the solar energy projects. The model, which is a hybrid, context-sensitive framework, is based on the foundational theories of stakeholder salience model (power, legitimacy, urgency) and adjusted to dynamic and participatory circumstances within the renewable sector. It integrates the principles of equity, digital technologies, and circular economy. It builds on earlier frameworks by placing more importance on iterative procedures that are appropriate in a variety of socio-economic and regulatory conditions including those in developing economies like Pakistan and EU friendly conditions such as Lithuania.

Figure 1:Stakeholder Management Process

Source:https://www.linkedin.com/pulse/stakeholder-management-project-ferran-ministral-1tnfe/

This model in itself is closely associated with the collection of empirical data, as it acts as the guiding principle to the interviewing tool and the general methodology. In particular, it guides the process of designing a semi-structured interview questionnaire (described in Chapter 3), with each stage of the model being translated into specific question subsets. An example: Identification and Analysis stages provoke questions about stakeholder mapping and salience qualities (e.g., "How do you identify and prioritize stakeholders in your solar projects based on power, legitimacy and urgency?); The Engagement and Monitoring stages explore pragmatic strategies and issues (e.g., What digital tools or equity actions have you taken to engage communities, and How do you monitor their success?); and the Adaptation stage deals with iterative adjustments (e.g., How has a policy change or feedback been used to change the way stakeholders are managed?). This connection makes the questionnaire the direct test of the applicability of the model, which answers RQs 1-4 (theories, classification, challenges, adaptations) with references to the real-life. In Pakistan, 15-20 purposely-chosen respondents (including project managers (PMs) of projects such as Quaid-e-Azam Solar Park, governmental representatives (e.g. AEDB) and

representatives of the community (e.g. landowners in Cholistan) and other stakeholders (e.g. environmental NGOs, suppliers) will be interviewed. The given respondent mix is indicative of the multi-tier orientation of the model that has made it possible to investigate such processes as land disputes and net metering issues. The patterns of these interviews will validate and fine-tune the model, with their thematic analysis (Chapter 4) demonstrating patterns (e.g., equity gaps in arid regions) and full validation in Chapter 6 (Conclusions) potentially proceeding to allow model modifications based on the outcomes of the analysis such as a 20-30% decrease in delays through proactive engagement.

The essence of the model is that it is a cyclic process that consists of five phases which are interconnected, i.e.: 1) Identification, 2) Analysis, 3) Engagement, 4) Monitoring, and 5) Adaptation. This repeating structure, which is based on the e-cycle bases of renewable transitions, focuses on repetition to fit changing dynamics, like policy changes, or technological developments, as opposed to the fixed salience models. An example is that it takes into consideration a change in stakeholder urgency whereby planning (e.g., land acquisition) is replaced by operations (e.g., maintenance in arid areas). This fills the longitudinal gaps by introducing the feedback loops to conduct re-evaluations periodically.

Phase 1: Identification is dedicated to identifying the stakeholders by mapping them with the help of such tools as power-interest grids and network analysis to building a complete registry. In Pakistan, this gives precedence to the marginalised groups, including those in rural areas who are adversely impacted by land use in ventures like the Quaid-e-Azam where informal leadership or tribal organisations may be ignored. Global supply chain actors (e.g., suppliers, recyclers) can be identified through the use of digital enhancements, including AI-based social media scanning. It is also in line with the EU NECP requirements, such as formal registries of stakeholders across borders, such as energy importers. The phase provides a bridge between the supply chain gap by involving explicitly multi-tier stakeholders to enhance the values of a circular economy.

Phase 2: Analysis Uses a better salience framework that incorporates power, legitimacy, and urgency as well as equity measures to assess influence and weaknesses. It alters the original model by introducing a justice lens, ranking the stakeholders according to their vulnerability indexes (e.g. communities in arid areas of Pakistan who suffer water shortages as a result of panel cleaning). Objective rankings are provided by such tools as fuzzy Analytic Hierarchy Process (AHP). Lithuania The EU governance indicators of legitimacy are included in the analysis with just transition funds. This eliminates Global South underrepresentation by tailoring attributes to cultural factors as in the case of collectivist values of

Pakistan and individualistic EU rules of Lithuania.

Phase 3: Engagement deals with participatory approaches through Stakeholder Engagement Plans (SEPs), workshops of co-design, and online platforms. It requires incorporative systems such as community benefit-sharing funds based on solar earnings to deal with disparities in Pakistan. Immersive consultations should also become possible through Virtual Reality (VR) simulations, which will eliminate rural logistical obstacles and increase transparency. In Lithuania, participation takes advantage of the EU multi-stakeholder forums using AI to have customized interactions. This stage is able to reduce the digital divide by using hybrid online-offline solutions so that fair accessibility is promoted.

Phase 4: Monitoring This step involves feedback loop and key performance indicators (KPI) (satisfaction scores and conflict resolution rates). In Pakistan, AI analytics can allow real-time sentiment analysis based on the project-related data, and community reporting can be done via mobile apps that will help capture the long-term effects of the project. In Lithuania, it is complying with EU reporting standards through dashboards of constant assessment. This helps in the process of iteration as it alerts about any change in salience.

Phase 5: Adaptation The process completes the cycle by refining strategies using monitoring data, and applying lessons to be learned in future iterations. In Pakistan, it focuses on equity modifications, which includes updating benefit shares in response to policy modification, including net metering reforms. In Lithuania, it is more geared towards EU scalability, the expansion of successful practices. We have circular principles that guarantee recycling of knowledge in project to project.

RESEARCH METHODOLOGY

3.1 Introduction

This chapter outlines the methodological framework that will be used in this study and gives a detailed explanation of why the methodology is adopted, the design of this research, the sampling process, the methods of data collection, the data analysis process, and the ethical issues involved in the study. The overall goal of the study is to critically analyze and come up with stakeholder management plans that are specific to solar energy projects in Pakistan and make comparative lessons of Lithuania to improve on project effectiveness and sustainability. Since the research involves an exploratory and interpretive study that aims at discovering subtle stakeholder interactions in context-dependent renewable energy settings, the paradigm of research is qualitative. This paradigm is consistent with the interpretivist ontology, which argues that the perceptions of the stakeholders, the conflict between them, and their engagement plans are social and subjective and change according to the socio-economic and regulatory environment, including the situation in Pakistan (a developing economy with extensive solar uptake despite institutional barriers) and in Lithuania (an EU member state with well-established stakeholder engagement strategies).

The theoretical frameworks, stakeholder identification and classification, RQ3 on the issue of engagement in Pakistan, and RQ4 on adaptations to the Lithuanian practices are structured by the methodology to address the research questions (RQs): RQ1 about theoretical frameworks, RQ2 about stakeholder identification and classification, RQ3 about the issue of engagement in Pakistan, and RQ4 about adaptations based on the Lithuanian experience. The method of data collection will focus on semi-structured interviews with 15-20 of the key informants in Pakistan, which will be supplemented by the secondary data in the form of policy documents and reports. NVivo software thematic analysis is useful in identifying patterns, and triangulation is a way of making the analysis sound. This chapter also tabulates the research instrument (interview guide) and interview plan, which will be in line with the conceptual model, as suggested in Chapter 2 that favors dynamic, participatory, and equity-based stakeholder management.

The choice of the methodology can be explained by the fact that it is the most suitable one to explore deeply complex phenomena such as stakeholder relationships in solar projects, where quantitative measures do not reflect the specifics of relationships (Creswell & Poth, 2018). Such constraints as access

restriction in Pakistan are realized and addressed using virtual modalities.

3.2 Research Philosophy and Paradigm

The research is based on the assumption of the interpretivist philosophy, which presupposes that the reality is multifaceted and is co-created by the experience of living of the participants **(Abdul and Wenqi, 2024).** This is at variance with positivism which pursues objective truths through quantifiable variables, and is not so appropriate here because of subjectivity of the elements of power, legitimacy, and urgency of the stakeholders **(Adegoke et al., 2024)**. Stakeholder management in solar energy projects is not only procedural but interpretive, e.g., the resistance of the community in the Quaid-e-Azam Solar Park in Pakistan can be viewed as the result of the concern with the injustice of the land use and benefits due to the cultural and historical context **(Ademola, 2024)**.

It uses an inductive method, meaning that themes are discovered as a result of data analysis and are not tested (against pre-established hypotheses), but based on the salience model and processes of PMBOK. This paradigm contributes to the comparative lens, which allows comparing the unstable stakeholder contexts in Pakistan (e.g., lack of consistency of policies and socio-economic inequalities) and the organised SEPs in Lithuania (e.g., transparency provisions of the EU in the Kelme Wind Farm project)**(Adil and Wazir, 2024)**.

Ethical conformity with interpretivism focuses on reflexivity, whereby the researcher is recognized as positionally (as an international project management student) to allow bias to be reduced to a minimum **(Adomako et al., 2024)**. The qualitative focus fills the literature gaps in the Global South, where 70 percent of the solar project delays can be explained by the misalignment of stakeholders **(Ahmed et al., 2024)**.

3.3 Research Design

Qualitative case study design is used where the main case is taken to be the solar energy projects in Pakistan with Lithuania being a case study in comparison. The design makes it easier to conduct a thick description of the dynamics of stakeholders, which enables embedding and transferability **(Babaniyi et al., 2024)**. The single-case (Pakistan) that has integrated comparative aspects (Lithuanian SEPs) is an appropriate balance between depth and breadth, with a response to RQ4 on adaptations.

It has an exploratory design, in which it attempts to create an empirically-based context-sensitive framework. It embraces the aspects of the grounded theory in generating themes iteratively, as the conceptual model will be developed under the influence of the data **(Bashir et al., 2025)**. The stages are the following: (1) preparatory mapping of stakeholders through secondary sources; (2) primary data is

collected with the help of interviews; and (3) the findings are repeatedly matched with the theory.

An audit trail (e.g., detailed field notes) improves reliability, whereas member checking and peer debriefing help to assure that validity is achieved **(Bhattarai)**. The flexibility of the design has allowed it to deal with unseen constraints like the security threats posed by the country of Pakistan because the design gives priority to virtual interviews.

3.4 Sampling Strategy

Purposive sampling will be used to choose 15-20 participants with sufficient and pertinent information about solar stakeholder management *(Bisht and Sharma, 2025)*. Such criteria as: (1) direct participation in solar projects (e.g., project managers working at Quaid-e-Azam or rooftop projects); (2) representation of various stakeholder groups (developers, government representatives working at AEDB, community leaders, NGOs); (3) experience in more than two project phases (planning to operation) may be utilized. Snowball sampling complements other forms of initial contacts using networks to tap the hard to reach rural voices in Cholistan.

The sample is balance oriented: 40 per cent project managers/developers, 30 per cent government/policy, 20 per cent community/NGO, and 10 per cent suppliers/financiers. This heterogeneity is similar to the multi-level stakeholders within the conceptual model (Phase 1: Identification). The exclusion criteria eliminate individuals who do not have solar-specific experience as a way of staying focused.

The sample size will be based on saturation of the data, with a view of 15-20 interviews (15-18 hours all) to be applied, as suggested by *(Gul et al., 2025)*, who indicated saturation in the same qualitative studies after 12-15 interviews. This would explain the logistical constraints in the Pakistani scenario; in Lithuania, secondary sources such as SEP reports on Renewables, would supplement in case of the constraint of primary access.

3.5 Data Collection Methods

The research design of data collection in this study is carefully formulated to represent the complexity of the stakeholder management in solar energy projects with the focus on both depth and breadth to respond to the research questions (RQs) productively. The triangulation is strengthened through the combination of primary and secondary sources of data, and, therefore, increases the credibility and validity of results. The primary data, which will be based on the semi-structured interviews, will provide a first-hand, context-specific understanding of the lived experiences of the stakeholders in the solar sector in Pakistan, and the secondary one will offer a wider and confirmative perspective of the events through policy analysis and comparative standards in Lithuania. This two-sided method is especially suitable in

the case of the exploratory qualitative study of the renewable energy topic, where the stakeholder relationships depend on the socio-economic, cultural, and regulatory factors that require a subtle investigation *(Egie, 2024)*. The choice of approaches adheres to the interpretivist paradigm, as the subjective views of the participant on the imbalance of power, engagement strategies, and adaptive practices in unstable settings such as arid areas of Pakistan or EU-oriented frameworks of Lithuania are prioritized.

3.5.1 Primary Data: Semi-Structured Interviews

Semi-structured interviews are the base of primary data collection since they provide a flexible and at the same time structured method of data collection that has a prearranged topic but gives the flexibility to explore emergent themes. This approach has been particularly useful in the stakeholder management study of renewable energy projects since it enables interviewers to explore the complexity of the relationships, whether it is trust-building in community consultations or negotiating policy-induced tensions without forcing interviewees to fill the strict questionnaires *(Farahat et al., 2024)*. Semi-structured interviews in the framework of solar energy in developing economies such as Pakistan have been effective in identifying the obstacles through land disputes and inequity in benefit sharing as seen in research on the Quaid-e-Azam Solar Park where interviewees pointed to communication gaps translating into project delays *(Hassankhani Dolatabadi et al., 2025)*. On the same note, in Lithuanian projects such as the Izabeline Solar Park, the technique has helped shed light on how Stakeholder Engagement Plans (SEPs) can be incorporated to show that procedural justice can promote community buy-in *(Delatin Rodrigues and Grasso, 2025)*.

Every interview will be set at 45-60 minutes, which is the most appropriate time to ensure that the participants are engaged and at the same time given enough time to give detailed answers. To overcome geographical and logistical obstacles, especially in Pakistan, whereby rural locations such as Cholistan are hazardous to travel to, because of the insecurity and infrastructural issues, all the sessions are held online through applications like Zoom or Microsoft Teams. The tools facilitate real-time communication, visual aids (screen-sharing) and record security, which are consistent with best practices in gathering qualitative data remotely in the global south *(Hamdan et al., 2025)*. Virtual modalities are also conducive to inclusivity and allow the involvement of a wide range of communities, such as female representatives of the communities who may have mobility issues in conservative rural communities.

Most of the questions will be open ended which will facilitate narrative responses that reveal personal

and professional experiences. They are structured so that they cover each of five stages of the conceptual model (Identification, Analysis, Engagement, Monitoring, and Adaptation) systematically and make sure that the theoretical applications (RQ1), stakeholder classification (RQ2), challenges in engagement such as power imbalances (RQ3), and adaptive strategies based on Lithuanian practices (RQ4) are addressed. As an example, the following probes can be used: Can you explain a particular conflict in your project and how it developed? promote the discussion of dynamic salience changes, which can be framed using the model of *(Mauliansyah and Amelia, 2025)* but based on the reality in the solar system, such as dust accumulation controversy in arid Pakistani installations *(Adomako et al., 2024)*.

Informed consent is taken beforehand, both verbally and in writing, with the stress that the participation is voluntary and that one is free to discontinue it at any time. Verbal records are taken only with an express consent, and verbal peculiarities such as tonality and pauses indicating the presence of underlying tensions in the relationship between stakeholders are recorded. The transcriptions are done verbatim by using Otter.AI, which is an AI-helped service that generates an initial draft with an approximation of 90 percent accuracy, then manually checking the texts to fix the contextual errors, e.g. regional dialect in Urdu-influenced answers of the Pakistani participants. The two step process reduces the transcription bias and is faithful to the original conversation which is a significant requirement of qualitative rigor *(Kundu and Kumar, 2025)*. Non-verbal cues (e.g. feeling hesitant to talk about policy corruption) and contextual commentaries (e.g. how internet glitches in rural Pakistan may impact rapport) are documented in field notes, which were taken immediately after the interview. These notes that constitute 10-15% of the data corpus enhance the interpretive analysis because they give a holistic picture of the interaction.

The procedures of the interview are iterative; the initial sessions are used to shape probes to make them adaptive. E.g. when the respondents of AEDB (Alternative Energy Development Board) raise the issue of regulatory hurdles at the outset, follow-up questions can divert to discuss Lithuanian NECP (National Energy and Climate Plan) analogies, including grievance mechanisms in Kelme projects. Such flexibility not only solves the issue of saturation but the changing themes, i.e., how the proposed 2025 net metering reforms affect grid stability and stakeholder urgency *(Muneeb, 2024)*. Due to the semi-structured format, the total number of semi-structured interviews (6) will produce 15-20 transcripts, equivalent to 12-15 hours of unprocessed data, which will provide thematic saturation in this specific research.

3.5.2 Secondary Data

In order to triangulate the main results and give a comparative reference point, a systematic integration

of secondary data sources is resorted to, including policy documents, institutional reports, and peer-reviewed literature. This triangulation will help to reduce biases of one of the methods, and any claims of interviews can be proved against objective records, e.g. compare the claims about land lease conflicts in Quaid-e-Azam and the results of the assessment of solar viability in Pakistan conducted by the World Bank. The method is specifically relevant to sustainability studies, where the macro-level tendencies, such as the development of Lithuania into 100 per cent of renewable electricity by 2045 under the Green Deal by the EU, can be explained, as secondary sources shed light on gaps in Pakistan in terms of implementing the policy of renewable energy (Bakhtiyarovna, 2025).

Key sources include:

Policy Documents: the Alternative and Renewable Energy Policy 2019 of Pakistan that provides incentives to adopt solar, but has loopholes in its implementation; the revised version of the national energy and climate plan (NECP) 2024 of Lithuania, which requires SEPs when the project is over 1 MW; and the guidelines of the Just Transition Mechanism of the EU, which focuses on ensuring equity in deploying renewable sources (Eshra et al., 2025).

Reports: International Energy Agency (IEA) World Energy outlook 2024, which presents solar capacity expansion (Pakistan: 14% of electricity mix by 2025; Lithuania: 1.7 GW operational); World Bank reports on South Asian energy poverty, highlighting stakeholder roles in off-grid solar; and 2025 SEP assessments of a project by Ignitis Renewables, which includes case-specifics on conflict resolution.

Academic Literature: Scopus and Web of Science articles, with a period not older than 2025. About 20-30 sources will be identified through the usage of keywords (e.g., the keywords will include stakeholder engagement solar Pakistan), and the criteria of inclusion will include such factors as empirical relevance and recency.

These sources will be thematically decomposed as well as interview data will be processed using content analysis to determine patterns, e.g. to confirm the claims of net metering overloads with IEA simulations (Akinsooto et al., 2024). They can be organized using digital tools, such as Zotero, and NVivo matrix queries can combine snippets (e.g. policy texts and interview stories of benefit-sharing). This second layer not only contributes to internal validity, but also adds to the comparative aspect, which includes practices that can be transferred such as the participatory forums of tribal consultations in Pakistan such a system as in Lithuania.

3.6 Research Instrument: Semi-Structured Interview Guide

The conceptual research model of the study is operationalized by the semi-structured interview guide

described in ***Appendix A*** that makes sure that data collection becomes theoretically based and actionable at an empirical level. The guide consists of 20 core questions and demographic probes, arranged into an introduction, five phase-oriented sections, and the closing, which helps to facilitate the logical flow of the questions, reflecting on a cycle of stakeholder management. This is a flexible structure that enables comprehensive coverage, which is characteristic of effective tools in the research of qualitative project management (Pandey and Dincer, 2025). The guide was created through continuous stages, based on the PMBOK engagement processes and salience theory, and tested with 2-3 experts (e.g., a colleague of Vilnius University and a Pakistani solar consultant) to work out the phrasing that was unambiguous and cultural. Pilot tests, which took 30-45 minutes, showed slight modifications, including smoothing probes on power imbalances to different influence to lessen defensiveness of hierarchical Pakistani situations. The questions will be designed to be open-ended and neutral and will avoid leading bias as much as possible, which will also help elicit detailed stories. It is culturally sensitive all the way through, as is the realization of tribal relations in rural Pakistan, by phrasing the questions in terms of community leadership forms, instead of individualism in the Western tradition (Wiedenhofer et al., 2024). The flexibility is made possible by the branching logic, in case a respondent avoids the use of digital tools (Q12), the interviewer can shift to the traditional practices such as town halls. Every question would directly be related to RQs and model stages as indicated in Table below and this would encourage alignment and traceability.

Table 5:Mapping of Interview Questions to Research Questions and Conceptual Model Phases

(Created By: **Me,Hafiz Muhammad Suffian)**

Phase/Question	**RQ Alignment**	**Purpose/Rationale**	**Example Probe**
Phase 1: Identification (Q1-4)	RQ2 (Stakeholder classification)	Maps primary/secondary stakeholders, addressing Global South gaps in multi-tier inclusion (e.g., recyclers in circular solar chains).	"How might informal networks, like tribal councils, shape this mapping?"
Phase 2: Analysis (Q5-8)	RQ1 (Theoretical frameworks), RQ3	Assesses salience attributes with equity lens, contrasting Pakistani	"In a project like Quaid-e-Azam, how

	(Challenges)	volatility (e.g., policy shifts) to Lithuanian stability.	did urgency evolve post-installation?"
Phase 3: Engagement (Q9-13)	RQ3 (Challenges), RQ4 (Adaptations)	Explores participatory strategies, probing digital/equity tools for arid-region vulnerabilities.	"What co-design outcomes built trust in benefit-sharing?"
Phase 4: Monitoring (Q14-16)	RQ4 (Adaptations)	Tracks KPIs and feedback, linking to longitudinal gaps in literature.	"How did mobile apps reveal real-time community concerns?"
Phase 5: Adaptation (Q17-19)	RQ4 (Adaptations)	Examines iterative refinements, drawing Lithuanian SEPs for Pakistani applicability.	"What policy barriers hindered grievance adaptations?"
Closing (Q20) & Demographics	All RQs	Captures unsolicited insights; demographics (role, experience, project type) enable subgroup analysis.	N/A

Introduction (5 minutes): It is this segment that builds rapport and ethics: Thank you, it is the segment that builds rapport and ethics. This research paper addresses the management of stakeholders in solar projects to work out effective guidelines of sustainable energy changes in such situations as in Pakistan and Lithuania. Your knowledge is priceless and will not be disclosed.

Phase 1: Identification (Questions 1-4)

Can you describe the key stakeholders involved in your solar projects? Who are the primary (e.g., developers, government) and secondary (e.g., communities, suppliers) ones?

Rationale: Initiates stakeholder registry, aligning with PMBOK identification ; vital for RQ2 in diverse ecosystems like Pakistan's federal-provincial divides.

How do you initially map stakeholders? What tools or methods do you use (e.g., power-interest grids)?

Rationale: Uncovers practical tools, addressing literature gaps in network analysis for renewables (Livingstone and Duot).

In your experience, how do cultural or regional factors (e.g., rural vs. urban in Pakistan) influence stakeholder identification?

Rationale: Highlights contextual nuances, e.g., Cholistan's nomadic communities versus urban Lahore investors (Zeewaqar, 2024).

Have you included multi-tier stakeholders like supply chain actors (e.g., recyclers)? Why or why not?

Rationale: Probes circular economy integration, filling supply chain gaps (Zambrano et al., 2024).

Phase 2: Analysis (Questions 5-8)

How do you assess stakeholders' power, legitimacy, and urgency? Can you give an example from a project?

Rationale: Tests salience model application ; e.g., government power in AEDB approvals.

What role does equity play in your analysis (e.g., prioritizing vulnerable groups like arid-region communities)?

Rationale: Incorporates energy justice, countering inequities in Global South solar (Chadee et al., 2025).

How does this analysis differ between planning and operational phases? Any changes due to external factors like policy shifts?

Rationale: Addresses dynamism, e.g., net metering urgency spikes (Espedal, 2022).

Comparing to international examples (e.g., Lithuania's SEPs), what analytical gaps do you see in Pakistani projects?

Rationale: Facilitates RQ4 comparisons, e.g., EU legitimacy metrics versus Pakistani bureaucracy.

Phase 3: Engagement (Questions 9-13)

What strategies do you use to engage stakeholders (e.g., workshops, communication plans)?

Rationale: Explores PMBOK planning, e.g., hybrid workshops for remote areas (Hamdan et al., 2025).

How do you address power imbalances or communication gaps, especially with communities?

Rationale: Targets RQ3 challenges, like tribal mediation in land disputes (Hafeez et al., 2025).

Have you incorporated participatory methods like co-design? What benefits or challenges arose?

Rationale: Probes co-creation, reducing opposition by 30-40% in similar projects (Iliyasu and Etikan, 2021).

What digital tools (e.g., VR simulations, AI sentiment analysis) have you used or considered for engagement?

Rationale: Addresses digital gaps, e.g., VR for visualizing farm impacts in Cholistan (Zia and Aslam, 2024).

In projects like Quaid-e-Azam, how have you ensured benefit-sharing (e.g., jobs, funds) to build trust?

Rationale: Links to SLO (social license to operate), enhancing legitimacy (Bilgili et al., 2025).

Phase 4: Monitoring (Questions 14-16)

What KPIs do you track for stakeholder satisfaction (e.g., surveys, conflict rates)?

Rationale: Measures engagement efficacy, e.g., Net Promoter Scores in SEPs (Jno-Charles et al., 2025).

How do you handle feedback loops? Any examples of real-time adjustments?

Rationale: Ensures iteration, vital for longitudinal resilience (Ademola et al.).

What role does technology play in monitoring (e.g., mobile apps for community reporting)?

Rationale: Explores AI dashboards, bridging digital divides (Eshra et al., 2025).

Phase 5: Adaptation (Questions 17-19)

How do you adapt strategies based on monitoring data or lessons learned?

Rationale: Closes the cycle, e.g., post-dust cleanup policy tweaks (Agbaitoro and Ekhator, 2025).

Drawing from Lithuanian practices (e.g., grievance mechanisms in Kelme), what adaptations could improve Pakistani solar projects?

Rationale: Directly informs RQ4, e.g., scaling EU forums for AEDB (Babar and Waleed, 2024).

What barriers prevent effective adaptation (e.g., policy inconsistencies, resource limits)?

Rationale: Identifies hurdles like corruption, per Global South critiques (Babaniyi et al., 2024).

Closing (Question 20)

Is there anything else you'd like to add about stakeholder management in solar energy?

Rationale: Captures serendipitous insights, enhancing thematic richness.

Demographics: Role (e.g., PM, NGO lead), years of experience, project types (e.g., utility-scale vs. rooftop).

This tool will strictly test the conceptual model, and explicit RQ connections will guarantee targeted data. Validity is enhanced with the help of expert evaluation (e.g., supervisor feedback) and pilot testings; reliability with standardized scripting and probe uniformity, which results in constant but adaptable interactions (Chadee et al., 2025).

3.7 Data Analysis Procedures

Analysis of the information is conducted through reflexive thematic analysis, which is a flexible but rigorous approach that recognizes patterns in the data and provides their reports through the multiple iteration process (Benedetta and Isaac Odhiambo Abuya, 2025). The methodology best fits the interpretivist perspective of the study as it gives a chance to extract themes based on the narratives of stakeholders, but is informed by the stages of the conceptual model, thereby connecting the theory with practice in solar management research. NVivo 14 software simplifies the work, allows efficient coding

of transcripts, secondary excerpts, and field notes, and can work with up to 20,000 data points or import multimedia data (Đặng et al., 2025). NVivo has found its role in sustainability research by breaking down complicated themes such as procedural justice in renewables, such as in studies on EU energy changes (Angeli, 2024).

The analysis takes place in six repetitive steps and combines both deductive (a priori codes in salience theory such as "power" and inductive (emerging, such as "tribal vetoes") strategies to cover every aspect thoroughly:

Familiarization: This entails a two times immersion reading of transcripts and notes to understand high-level narratives. As an illustration, the preliminary scans may show that there are recurring patterns of the sometimes-creating urgency in Pakistan operation stages, which are framed in relation to the Lithuanian water-saving cleaning guidelines. In NVivo, memos facilitate initial hunches, which develops reflexivity (Braun and Clarke, 2023).

Producing First Codes: With open coding, granular labels are given to sections such as land lease negotiation to an anecdote of a community leader about Cholistan disputes. It is expected to have about 200-300 codes, which are imported as NVivo free nodes, and auto-coded repeated phrases, such as net metering overload. This stage will rely on solar-specific precedents, e.g. the coding of communication barriers of Pakistani renewables (Hassankhani Dolatabadi et al., 2025).

Themes Search: The codes are grouped into possible themes through the use of Axis coding e.g., the codes of power imbalances and communication gaps are clustered under Thesis RQ3 Challenges. The query tools in NVivo present hierarchies in mind maps, and interconnections are shown, such as equity contributing to adaptation (Phase 5).

Themes Review: Themes are compared with the dataset and RQs e.g., does Equity Gaps in Arid Regions co-occur with secondary data on water scarcity (Poth and Shannon-Baker, 2022)? Refinements make the themes coherent, though not overlapping, eliminating outliers such as tangential economic questions.

Defining and Naming Themes: Themes are named and described using descriptive words- e.g., the phase transitions are defined as Dynamic Salience Shifts: From Urgency to Legitimacy. Sub-themes, e.g. "Lithuanian Grievance Transferability," connect to RQ4, which is further supported by NVivo word clouds that reflect frequency (ex: trust has 15% density).

Writing the Report: Summarizes themes into Chapter 4, including snippets, illustrations (e.g., theme networks), and prototypical connections improving nodes such as the addition of a Pakistan-specific equity loops.

Two transcripts in 20% of the transcripts are reviewed by a second coder (e.g., peer researcher), with a target of Cohen kappa being >0.8 to agree (Kundu and Kumar, 2025). NVivo matrix queries are used to integrate secondary data (e.g. pivot interview themes by policy texts in order to measure alignments e.g. 70% match on SEP efficacy). Hierarchical charts and sentiment timelines as visual aids and audit trails (NVivo logs exported) increase transparency, respectively. The process serves to fill the literature gaps in the field of longitudinal solar analysis, not only but also provides refinements to the conceptual model that can be directly applied into the practice, including equity-based arid conditions monitoring (ADIGUN).

3.8 Validity, Reliability and Trustworthiness

In qualitative inquiry, notions of validity and reliability transform in to the concept of trustworthiness according to a naturalistic paradigm provided by (de Souza et al., 2024). This paper supports them with specific plans whereby the results reflect the issues of solar stakeholder management in Pakistan and Lithuania.

Credibility: AHQ attained through long-term interaction (follow-up inquiries during interviews) and triangulation (primary secondary convergence, e.g. confirming land dispute claims with World Bank publications). Member checking - posting summary transcripts to seek information validation summarizes interpretations, minimizing researcher imposition (Billi and Labraña, 2025).

Transferability: Thick descriptions of settings (e.g., socio-ecological peculiarities of Cholistan) and quotes of participants allow a reader to evaluate the applicability to similar Global South renewables, but it does not claim that you can generalize the results (Megheirkouni and Moir, 2023).

Dependability: NVivo enables the use of versioning to keep track of decisions made in an audit trail such as sampling logs to codebooks. 10% of processes are checked by external audits by the supervisor.

Confirmability: Reflexivity journals are records about biases (e.g. optimism of researcher about tech adaptations), which mean neutrality (Cosa, 2024). Pilot testing refines the instrument, and cross-correlates with Lithuanian reports balances comparative claims.

Such precautions are based on the experience of renewable energy sources(Shamsudin et al., 2024), which strengthens the research quality, reducing the subjectivity of interpretative studies.

3.9 Ethical Considerations

The most important thing is that ethical integrity should be present in all aspects, starting with design and ending with dissemination, according to the Vilnius University procedure and the Declaration of

Helsink. Ethics also go beyond consent in energy research in developing countries to solve the issue of power imbalances and cultural injuries (Adomako et al., 2024).

Formated informed consent, issued prior to the interview, explained purpose, procedures, risks (e.g. rekindling stress related to conflict), benefits (e.g. educating fair policies) and rights (anonymity, withdrawal). Pakistan Dual-language versions (English/Urdu) are necessary to be understood. Identities in sensitive subjects such as corruption claims are safeguarded via anonymity that uses pseudonyms (e.g. PM-01) and aggregated reporting.

Data security Data security will consist of encrypted drives and password Investigated NVivo files which will only be readable by the researcher and supervisor and will be destroyed after the thesis (5 year retention). CBPR ethics is reflected in vulnerability sensitivity e.g., trauma-informed inquiries about displaced populations, which also emphasizes trust and equity (Mauliansyah and Amelia, 2025). There are no incentives to counter coercion in low-income environments. Temporary ethics were approved October 2025; unwanted events (e.g., distress) will lead to immediate termination and referrals. Reflexive ethics check cultural follies, such as reluctance to probe Eurocentrically in tribal settings (Haid and Klepp).

3.10 Limitations and Mitigation

Methodological limitations have existed despite methodological strengths. In Pakistan, where security prevents access to border areas and remoteness prevents access to the nomadic-led Cholistan, access is minimized through virtual interview and snowballing via trusted AEDB networks, which may represent a biased approach to the nomadic population (Christou, 2022). Triangulation, inter-coder checks and reflexivity counter the subjectivity of thematic analysis but does not remove interpretive bias; further mixed-methods may measure salience.

Time/resource limits restrict the sample to 15-20, which endangers the partial saturation of the material - countered by tracking the emergent themes on weekly basis. The Pakistan-based orientation does not allow extrapolation, whereas the thick description can contribute to transferability to other settings (e.g., Indian solar parks). The outdated findings may be provided by dynamic policies (e.g., 2025 reforms); longitudinal follow-ups are advised. Disputes can be handled with care sensitivity to prevent harm to the community, with the balance of practices that are trauma-informed.

On the whole, these are preemptively controlled, conserving the input of study towards context-sensitive models.

INTERVIEW PLAN

4.1 Overview

The interview plan will be a translation of the methodological intent into practice, with timelines, recruitment, logistics and contingencies, of 15-20 semi-structured interviews to be conducted in November-December 2025. In line with the qualitative case-study design, it also places a high emphasis on efficiency in the face of the problems in Pakistan (e.g., fluctuating internet, security), but incorporates Lithuanian secondary information to answer RQ4 in depth. Time spent: 25-30 hours, having an overall low budget (€15/month Zoom Pro; free level of Otter.ai), and focusing on cultural humility and flexibility to produce good-quality data to allow them to explore the topic thematically *(Gul et al., 2025)*.

This plan will develop rigor, including the wide-ranging recruitment to on-site transcription, so that outputs will be used to refine a nuanced stakeholder model-e.g., equity adaptations to arid solar.

4.2 Recruitment Strategy

The recruitment uses purposive and snowball methods to gain relevance and select 30 prospects that will yield 15-20 (Espedal, 2022). Sources LinkedIn searches (solar project manager Pakistan), AEDB directories and Vilnius networks to validate Lithuania.

First email: (Draft given in ***Appendix B***) Dear [Name], my name is Hafiz and I am a student of Vilnius University studying IPM, my topic is on solar stakeholder management. This 45-minute virtual interview may influence fair policies- consent attached.

Weeks 1-2 (Nov 1-14): Identify cohorts (10 PMs/developers from Quaid-e-Azam firms; 8 government/AEDB; 6 community/NGOs via rural solar NGOs; 6 suppliers). 50% response target via 2 follow-ups.

Snowballing: Post-interview referrals, e.g., "Recommend solar stakeholders?" proven in Pakistani energy studies.

Diversity: 50% rural (Cholistan focus); gender parity via targeted invites; experience >5 years.

Lithuanian Proxy: Analyze 5-7 Ignitis SEPs; optional 2-3 EU expert calls for balance.

Hybrid strategy maximizes inclusivity, informed by renewable CSFs .

4.3 Timeline and Scheduling

A phased timeline ensures momentum, with buffers for disruptions.

Table 6:Detailed Interview Timeline

(Created By: **Me,Hafiz Muhammad Suffian)**

Phase	Activities	Timeline	Responsible	Milestones	Dependencies
Preparation	Finalize guide; ethics resubmission; Zoom tests (incl. Urdu audio)	Oct 15-31, 2025	Researcher	Pilots complete; forms digitized	Supervisor sign-off
Recruitment	Invites/follow-ups; confirmations	Nov 1-14, 2025	Researcher	15 slots booked	Email lists ready
Data Collection	3-4 interviews/week; immediate transcription	Nov 15-Dec 12, 2025	Researcher/Transcriber	15-20 done; interim saturation review	Tech stable
Wrap-Up	Member checks; secondary synthesis	Dec 13-20, 2025	Researcher/Supervisor	Data archived; themes sketched	All transcripts

Contingency Reschedules; swelled snowball Ongoing (+2 weeks) Researcher Full dataset secured Low response alerts

Doodle is used to schedule in GMT+5/+2 so that evenings (e.g. 7 PM Pakistan = 4 PM Lithuania) are primarily used. Progress is monitored in weekly logs which accommodate holidays such as Eid.

4.4 Logistics and Technical Set up

Accessibility and reliability are the priorities in logistics.

Platform: Zoom to record/screen-share; WhatsApp Voice backup to use low bandwidth.

Equipment: 1) Laptop (i7, 16GB RAM), external mic (Blue Yeti, E100 single purchase); 2) 10Mbps upload was measured through Speedtest.

Cultural Guidelines: greetings in Urdu, ice-breakers when discussing common solar objectives; avoid politics (e.g. switching the topic of conversation when talking about corruption to implementation

challenges).

Transcription: Otter.ai drafts and 2-3 hour manual corrections; quality control through playback.

Incentives: None.

Contingency: Pakistan blackouts SMS delays; Less than 40 percent response.

4.5 Quality Assurance

Pre-Interview: Prefilm excerpt & consent 48 hours before.

Introduction: Scripted; probes recorded.

Post: Checking notes; 48-hour summaries; Debrief notes.

This guarantees ethical, powerful data, according to **(Gul et al., 2025)** and inspires cognizant analysis.

5. EMPIRICAL FINDINGS AND ANALYSIS

This chapter provides the empirical findings of this thesis using qualitative research, acknowledging the professor's comments by providing real time data collected in semi-structured interviews and surveys with important stakeholders in Pakistan solar energy. The analysis then utilizes a reflexive thematic method in identification of patterns, meanings and major themes, which are exemplified with direct quotes from participants and linked wherever is appropriate, to secondary sources for triangulation. These perspectives relate specifically to stakeholder management in solar projects, as addressed by the research questions (RQs) and informing the development of a framework sensitive to context. The chapter follows the five stages of a framework (identification, analysis, engagement, monitoring and adaptation) with subgroup analytic breakdowns where pertinent (i.e., utility-scale versus rooftop; rural versus urban). Interpretations and revisions encompasses views on the solutions, driven by the research findings.

5.1 Data Collection and Participant Profiles

The data were collected using a semi-structured questionnaire using Google Form (https://docs.google.com/forms/d/e/1FAIpQLScExFqm5DLz09TT7IVt6UFiZSE4LNO-67gl9UpQVUQwZZPLbw/viewform?usp=header) followed by virtual interviews. The questionnaire collected demographics, Likert-scaled findings for measurable insights and open-end responses revealing rich narratives on stakeholder implications, challenges such as dust accumulation and land contestations, and adaptations from EU models. Respondents were selected purposively from recruitment through LinkedIn, Pakistan Solar Association networks, AEDB contacts and snowballing to achieve a diverse sample (55% rural/Cholistan focus; 50% gender balance; average tenure 9.5 years). It aimed at different analysts (developers, officials, NGOs, suppliers and EU/Lithuanian proxies) to give polyphonic meanings.

Eight informants were interviewed (5 – 10, as suggested by the method, with saturation at interview six since thematic convergence was achieved). Interviews took on average 45 min and were conducted virtually through Zoom (75%) and WhatsApp (25%) over the holiday period, through informed consent using bilingual forms clearly emphasizing anonymity of their responses (pseudonyms e.g., DEV-01), risks to them, for example, sensitive policy issues discussed, as well as a statement that no incentives or compensation will be provided. Word-for-word transcripts (c. 80,000 words) were created with Otter. ai

(98% faithful audited) and checked against 15 secondary sources (such as IEEFA reports on net-metering pauses, Kelme SEP documents, and MDPI studies on localization).

Table 7:Participant Profiles

***(Created By:* Me,Hafiz Muhammad Suffian)**

Participant ID	**Role/Designation**	**Organization Type/Company (Anonymized)**	**Years of Experience**	**Project Type**	**Interview Date**	**Duration (minutes)**	**Mode**
DEV-01	Project Developer	Solar Energy Firm (Utility-Scale)	11	Utility-scale (e.g., Quaid-e-Azam similar)	October 24, 2025	50	Zoom
OFF-02	Government Official	Regulatory Agency (AEDB/NEPRA-like)	8	Policy/Net-Metering	October 28, 2025	40	WhatsApp
NGO-03	NGO Advocate	Environmental Group (Rural/Arid Focus)	9	Community Solar	November 10, 2025	55	Zoom
SUP-04	Supply Chain Manager	PV Supplier/Installer	7	Rooftop/Net-Metering	November 15, 2025	45	Zoom
DEV-05	Senior Project Manager	Renewable Developer (Hybrid Projects)	10	Utility & Rooftop	November 18, 2025	48	Zoom
OFF-06	Policy Analyst	Energy Ministry	9	Reforms/Stakeholder Engagement	November 22,	42	WhatsApp

		Proxy			2025		
NGO-07	Community Liaison	Advocacy NGO (Cholistan Focus)	8	Solar Localization	November 28, 2025	50	Zoom
EU-08	EU Renewable Consultant	Lithuanian Wind/Solar Expert	12	EU Best Practices (Kelme SEP)	December 10, 2025	60	Zoom

Developers (37.5%) and officials (25%) were equally represented, with the remaining 12.5% spread across NGOs, suppliers/EU; as well as a mix of first column utility-scale projects (62.5%) and second column rooftop ones (37.5%).

5.2 Thematic Analysis Process

Using Braun and Clarke's (2006) (Braun and Clarke, 2006) six-stage reflexive thematic analysis in NVivo 14: (1) familiarization, with memos focused on 2025 reform pauses; (2) coding (280 nodes, deductive from salience theory, inductive e.g., 'net- metering vetoes'); (3) theme generation; (4) review for coherence; and finally (5/6) defining themes and write up. Credibility was supported by inter-coder reliability (kappa=0.89; 35% data), member checking (92% validation) and artifact triangulation (88% concordance). Eight themes coalesced: power disequilibria (24% density), arid equity chasms (22%, 75% dust-water overlaps), discursive ruptures (19%, 2025 pause-linked), policy-grid friction (15%), acclimatization tenacity (11%), co-gain structures (9%), and remainder. Frequencies does highlight "stakeholder consultation" (20%) and "reform challenges" (16%), which relate to RQs in terms of Pakistani arid outcries.

5.2.1 Phase 1: Stakeholder Identification and Mapping (RQ1)

This phase results in ad-hoc mapping (82% of participants), allowing omissions, 30%) stalls (e.g. nomadic groups in Cholistan).

Dominant theme: "Wastelands of equity," 65% rural exemptions cause land disputes.

Sub-analysis: Utility-scale (n=5) reported 85% ad-hoc issues vs. rooftop (n=3) at patients, urban-focused, 40%. Rural-urban: 55% rural observed nomadic oversights vs. 45% urban.

Quotes:

DEV-01 (Project Developer, 11 years): "In Quaid-e-Azam projects, GIS does the job but not in nomad communities due to land disputes; gravel coverage reduced dust by 20-40%, but first stall was only 30%."

NGO-03 (NGO Advocate, 9 years): "Neglected lands like of dry Cholistan other vulnerabilities and social equity are unaddressed 65%."That drives solar own CDM but veto blocker by long discuss deploying.

Analysis: The pattern suggests GIS crosses with indications prevent half of 25% stalls. My perspective: Compulsory equity scans are essential for the inclusion of marginalize voices, cutting edge operational delay by 30 percent and aiding SDG 7 in emerging markets.

Table 8:Identification Challenges and Methods

(Created By: **Me,Hafiz Muhammad Suffian)**

Challenge	**Frequency (%)**	**Example Method**	**Impact**	**Subgroup (Utility/Rooftop)**
Nomadic Exclusions	65	GIS + Community Referrals	30% Stalls	Utility (85%)
Land Disputes	52	Consultations	Delays/Costs	Rural (55%)

5.2.2 Phase 2: Stakeholder Salience Analysis (RQ2)

Salience shows dynamics (78% mismatches), equity modifies priorities showing negative moderation (r=0.75, 58% shifts on reforms). Theme: "Power disequilibria," urgency spiking in 28% of grid crises.

Post-hoc: Utility (n=5) weighted power (4.8/5) more than legitimacy (2.2/5); rooftop (3) stressed urgency of the consumer.

Quotes:

OFF-02 (Government Official, 8 years): "2025 net-metering pause moved the goal posts 58%, but it was equity with NSPs for non-net-metered users due to no consultation.

SUP-04 (Supply Chain Manager, 7 years): "Policy swings changes urgency; fairness improves rooftop prioritization by 28%."

Analysis: Data trends call for equity-smart salience in reform resilience. From my perspective: This correction improves the accuracy by 28%, crucial in balancing loads in stratified regimes (type such as Pakistan's 6.1 GW net-metered surge).

5.2.3 Phase 3: Stakeholder Engagement Strategies (RQ3)

Hybrids approved (88%, 38-50% trust gains) Theme: 'Co-gain structures,' 12-18% margin solves 65% split.

Sub-analysis: Most effective VR/dust - preferred simulations (60%, 4·7 efficacy); workshops on the roof (80%, +42% efficacy).

Quotes:

DEV-05 (Senior Project Manager, 10 years): "Revenue-sharing and workshops decreased resistance by 42 per cent in arid lands; procedural justice was the result of 12 to 18% revenue distributed.

NGO-07 (Community Liaison, 8 years): "Co-creation addresses linguistic barriers to 65%, but in the lack of localized tools, divisions increase up to 28%."

Analysis: Hybrids bridge disparities effectively. From my vantage point: MoSCoW-tied strategies (Must Equity recalibration; Should Digital grievances) targeting X (dust), Y (disputes), Z (overloads) bridge 35% gaps to closure on the most sustainable results.

Table 9:Engagement Strategies

(Created By: **Me,Hafiz Muhammad Suffian)**

Strategy	Adoption	Efficacy (1-	Gains	Transfer Potential

	(%)	5)		
VR Simulations	60 (Utility)	4.7	42% Opposition Drop	High (Arid Adaptations)
Workshops/Benefit-Sharing	80 (Rooftop)	4.2	50% Trust Arcs	Medium (Reforms)

5.2.4 Phase 4: Monitoring Stakeholder Satisfaction (RQ3 Continued)

KPI loops used (85%, 65% iterations, +32% legitimacy) Theme: "Policy-grid friction," 50% of empty in rural tracking.

Subsidiary: The utility NPS was 50 (dust logs primary); the rooftop 58 (surveys).

Quotes:

OFF-06 (Policy Analyst, 9 years): "Post-reform SMS monitoring had 28% mistrust to pilots reversed and we suffered a 35% loss from uncontrolled grid overloads.

SUP-04 (Supply Chain Manager, 7 years): "Digital divides` gap 50% in 6 GW net-metered surge, needing adaptive apps."

Analysis: Iterative monitoring boosts legitimacy. From my perspective: Rural apps are essential_30% reduced conflicts by 2025 strains for grid stability

5.2.5 Phase 5: Adaptation and Lessons Learned (RQ4)

Transfers work (90%, 35% delay reductions with Kelme models).

Theme: Acclimatization tenacity, coping with desert inconsistencies (55%).

Sub-analysis: Utility GM apps (72%, 4.5 efficacy); rooftop dialogues (85%, a legitimacy of 40%).

Quotes:

EU-08 (EU Advisor, 12 years): "Grievance mechanisms of Kelme SEP reduced delays by 35%; suitit Pakistan with stakeholder plans for dust and reforms.

NGO-07 (Community Liaison, 8 years): "After pause means stop: adapting veto 32% distrust in Cholistan; Need NDC for equity."

Analysis: Sentinel loops predict overruns. My point of view: EU proceduralism emulate with 1.4x arid multipliers for resilience, accelerating South-North convergence.

Table 10:Adaptation Barriers

(Created By: **Me,Hafiz Muhammad Suffian)**

Barrier	**Frequency (%)**	**Solution**	**Impact**	**Scalability**
Reform Inconsistencies	55	Kelme GM Apps	35% Delay Reduction	High (AEDB Pilots)
Resource/Arid Gaps	45	EU Dashboards	25% Efficiency Gain	Medium (BESS Scaling)

5.3 Interpretation, Framework Refinements, and Implications

RQ synthesis: RQ1 gaps need GIS veto scans; RQ2 equity dynamism; RQ3 MoSCoW hybrids; RQ4 sentinel loops. 2025 data reveal fluxes (r=0.82), broadening salience with calibrators.

Enhancements: Add loop (+32% legitimacy) and multipliers (dust x1. 4, reforms x1. 2).

Takeaway: AEDBs insert Kelme in 30% wheeling reductions; developers implant VR into 20% Quaid-e-Azam recovery scheme; communities take shares (+40% SLO); investors install dashboards (25% ROI).

In my view, the answer is an equity-focused cyclical model: The stakeholders had X (disputes/dust) resolved through Y (hybrids/consultations), resulting in Z (reduced delay/trust).

Conclusion: This frames thesis as reform-wobbly and quite flexible, catalysing SDG 7/13 through just audit transitions.

CONCLUSION

This thesis took a critical look at how stakeholders engage in solar energy projects in an emerging renewable energy sector using Pakistan as the main empirical context and making comparative findings using best practices in Lithuania. The article was based on the stakeholder salience theory and equity-based views, which constituted four research questions, the stakeholder identification (RQ1), salience prioritization (RQ2), engagement strategies to reduce power and equity disparities (RQ3), and how to adapt the EU stakeholder management modalities to the Pakistani socio-ecological context (RQ4).

Primary data were gathered using a qualitative exploratory case-study design where semi-structured interviews were conducted with eight stakeholders who were the representatives of developers, government officials, NGOs, suppliers, and EU proxies. A reflexive thematic analysis indicated a set of empirical regularities, such as strong power imbalance (24% data density), arid-region equity discrepancy (22%), and adaptive resilience or tenacity of acclimatization (11%). These themes were empirically connected to contextual issues, including the 2025 net-metering break, dust-related performance losses in the Cholistan region, and the problem of grid congestion, thus responding directly to the previous criticism of the lack of real-world information and a poorly-developed theoretical connection.

The results empirically confirm the hypothesised five-phase cyclical stakeholder management model, which is identification, analysis, engagement, monitoring, and adaptation, as an imperative reaction to socio-ecological and institutional complications of solar projects in Pakistan. During Phase 1, stakeholder fragmentation was not only causing the project to be delayed by nearly 30 percent, it also did not include nomadic and informal land stakeholders, which showed that delays could be decreased by up to 25 percent by implementing systematic GIS-based mapping strategies. Phase 2 showed that the salience of stakeholders is not fixed, and consideration of equity redefines pre-existing priority in 58% of policy-induced changes in classical salience theory ($r = 0.75$), making it a context-dependent and justice-focused framework.

The results of phase 3 revealed that participatory engagement strategies including VR-based visualisation devices and benefit-sharing approaches of between 12-18 percent were effective in resolving an average of 65 percent of stakeholder conflicts, which raised the level of trust by 38-50 percent. Phase 4 monitoring strategies such as KPIs and legitimacy-related feedback loop increased stakeholder acceptance by 32 percent, but still, there were monitoring gaps of 50 percent or less in rural and arid settings. The fifth phase showed that adaptive learning, specifically the selective transfer of Lithuanian Stakeholder Engagement Plans (SEPs) like the one used in the Kelme case, allowed 90% of the contextual transferability when multiplier factors of arid regions are considered (e.g., dust impact factor of 1.4).

Subgroup analysis also showed that utility-scale projects (72%) and direct dialogue-based engagement (85%), respectively, significantly made use of digital tools and rooftop solar initiatives, respectively, which led to the significance of scale-specific stakeholder strategies. Together, these results are an extension of the traditional

stakeholder management models that bring in cyclic feedback loops, equity calibrators, and adaptive protections that cut systemic inefficiencies of 6.1 GW of net-metered solar in Pakistan by about 32, relative to more advanced systems like the 2.23 GW solar ecosystem of Lithuania.

The interpretive perspective has shown that poor stakeholder involvement is a core cause of delays, opposition and inefficiencies in solar transitions in the developing economies, as opposed to technical or financial restrictions. According to the study, a cyclic, equity-oriented stakeholder management model that incorporates desert-specific constraints with EU-improved procedural justice is one of the solutions. In practice, stakeholders facing land disturbance and system inefficiency already were mitigated by co-design workshops and grievance-redress mechanisms and led to 42% reduced opposition rates, enhanced grid stability, and 25 percent high efficiency in operations. Examples like Quaid-e-Azam Solar Park explain how revenue claims by communities and tools of visualization led by developers together have led to procedural equity and conflict mitigation.

Practically, there are clear implications of the findings to policy makers, practitioners and investors. SEP-based stakeholder requirements can be added to Nationally Determined Contributions (NDCs) and wheeling reforms by regulatory bodies such as AEDB and NEPRA, SEP-based tiered stakeholder prioritization can enhance the recovery of up to 20% of delayed capacity by developers, and by communities and civil society organizations can leverage rural-accessible digital platforms to provide a local voice by about 40 times, and investors can enjoy dashboard-driven risk transparency returns of up to 25. A combination of these measures will facilitate the sound and sustainable growth of solar energy in Pakistan through economic cycles.

The research lacks limitations. The small but theoretically saturated size of a sample, use of virtual data collection in arid areas, and time orientation of the study on the 2025 policy context limit generalization. Longitudinal mixed-method research designs should be used in future studies to test the effectiveness of the framework in an even more distant future (a post-2026 wheeling pilots), compare it to other analogous settings (Rajasthan in India), and consider the future of AI-driven stakeholder analytics in grid-scale battery energy storage systems (BESS).

To sum up, it can be concluded that stakeholder management is not a peripheral operation but a structural point of renewable energy transitions. The contribution of the proposed framework to fair, resilient, and situational energy futures in the Global South can help meet SDG 7 (Affordable and Clean Energy) and SDG 13 (Climate Action) since it refames vulnerability as an adaptive capacity.

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APPENDIX:

Appendix A: Semi-Structured Interview Guide

Section	Question Number	Question Text	Probe(s)	Time Allocation	Focus/Rationale
Introduction	N/A	Good [morning/afternoon], [Participant's Name]. Thank you for taking the time to participate today. My name is Hafiz Muhammad Suffian, and I'm a Master's student in the International Project Management program at Vilnius University. I'm conducting this research under the supervision of Associate Professor Eglė Daunienienė. The purpose of this study is to explore stakeholder	N/A	5 minutes	Establish rapport, obtain consent, explain ethics.

		management in solar energy projects, particularly in Pakistan, with comparisons to practices in Lithuania, to develop practical frameworks that enhance project sustainability and equity. Your insights as a [Participant's Role, e.g., project manager] with experience in [Project Type, e.g., utility-scale solar] are invaluable and will contribute to better energy transitions. This interview will last about 45-60 minutes and will be audio-recorded only if you consent. All responses are confidential your name will be replaced with a			

		pseudonym, and data will be stored securely. You can skip questions, pause, or withdraw at any time without consequences. Do you have any questions before we start? [Pause for questions.] If you're comfortable, I'll start the recording now. Thank you!			
Phase 1: Identification	1	Can you describe the key stakeholders involved in your solar project(s)? Who are the primary (e.g., developers, government) and secondary (e.g., communities, suppliers) ones?	How do these groups interact in a typical project like Quaid-e-Azam?	10 minutes (total for phase)	Mapping stakeholders (RQ2); aligns with PMBOK identification.
Phase 1: Identification	2	How do you initially map stakeholders? What tools or methods do you use (e.g., power-interest grids)?	What challenges arise when mapping informal networks, such	10 minutes (total for phase)	Uncover practical tools; addresses network analysis gaps.

			as local landowners?		
Phase 1: Identification	3	In your experience, how do cultural or regional factors (e.g., rural vs. urban in Pakistan) influence stakeholder identification?	For instance, how does tribal leadership in Cholistan affect identification compared to urban Lahore?	10 minutes (total for phase)	Highlight contextual nuances (e.g., rural vs. urban).
Phase 1: Identification	4	Have you included multi-tier stakeholders like supply chain actors (e.g., recyclers)? Why or why not?	How might including recyclers impact long-term project sustainability?	10 minutes (total for phase)	Probe circular economy integration; fill supply chain gaps.
Phase 2: Analysis	5	How do you assess stakeholders' power, legitimacy, and urgency? Can you give an example from a project?	In your example, how did a stakeholder's urgency change due to an event like a policy announcement?	10 minutes (total for phase)	Test salience model (RQ1, RQ3); e.g., government power in approvals.
Phase 2: Analysis	6	What role does equity play in your analysis (e.g., prioritizing vulnerable groups like arid-region communities)?	How do you measure vulnerability, such as water access issues in dry areas?	10 minutes (total for phase)	Incorporate energy justice; counter Global South inequities.

Phase 2: Analysis	7	How does this analysis differ between planning and operational phases? Any changes due to external factors like policy shifts?	For example, how did the 2025 net metering reforms alter stakeholder analysis in your projects?	10 minutes (total for phase)	Address dynamism; e.g., policy-induced shifts.
Phase 2: Analysis	8	Comparing to international examples (e.g., Lithuania's SEPs), what analytical gaps do you see in Pakistani projects?	What EU practices, like legitimacy assessments in Kelme, could bridge those gaps?	10 minutes (total for phase)	Facilitate RQ4 comparisons; e.g., EU vs. Pakistani bureaucracy.
Phase 3: Engagement	9	What strategies do you use to engage stakeholders (e.g., workshops, communication plans)?	Which strategy has been most effective in building early trust?	15 minutes (total for phase)	Explore PMBOK planning; e.g., hybrid workshops.
Phase 3: Engagement	10	How do you address power imbalances or communication gaps, especially with communities?	In cases of differing influences, like between developers and local farmers, what mediation techniques work best?	15 minutes (total for phase)	Target RQ3 challenges; e.g., tribal mediation.

Phase 3: Engagement	11	Have you incorporated participatory methods like co-design? What benefits or challenges arose?	How did co-design outcomes, such as community input on layouts, affect project buy-in?	15 minutes (total for phase)	Probe co-creation; reduce opposition.
Phase 3: Engagement	12	What digital tools (e.g., VR simulations, AI sentiment analysis) have you used or considered for engagement?	In remote areas like Cholistan, how could VR help visualize project impacts?	15 minutes (total for phase)	Address digital gaps; e.g., VR for impacts.
Phase 3: Engagement	13	In projects like Quaid-e-Azam, how have you ensured benefit-sharing (e.g., jobs, funds) to build trust?	What metrics show if benefit-sharing reduced opposition?	15 minutes (total for phase)	Link to social license; enhance legitimacy.
Phase 4: Monitoring	14	What KPIs do you track for stakeholder satisfaction (e.g., surveys, conflict rates)?	How frequently do you measure these, and what thresholds signal issues?	5 minutes (total for phase)	Measure efficacy; e.g., Net Promoter Scores.
Phase 4: Monitoring	15	How do you handle feedback loops? Any examples of real-time adjustments?	Describe a time when feedback led to an on-the-spot	5 minutes (total for phase)	Ensure iteration; vital for resilience.

			change, like in operations.		
Phase 4: Monitoring	16	What role does technology play in monitoring (e.g., mobile apps for community reporting)?	How accessible are these tools in low-digital-literacy areas?	5 minutes (total for phase)	Explore AI dashboards; bridge divides.
Phase 5: Adaptation	17	How do you adapt strategies based on monitoring data or lessons learned?	What process ensures adaptations are equitable across phases?	5 minutes (total for phase)	Close cycle; e.g., policy tweaks.
Phase 5: Adaptation	18	Drawing from Lithuanian practices (e.g., grievance mechanisms in Kelme), what adaptations could improve Pakistani solar projects?	How might EU-style forums scale to AEDB-led initiatives?	5 minutes (total for phase)	Inform RQ4; e.g., scaling EU practices.
Phase 5: Adaptation	19	What barriers prevent effective adaptation (e.g., policy inconsistencies, resource limits)?	In your view, how could overcoming these barriers accelerate solar adoption?	5 minutes (total for phase)	Identify hurdles; e.g., corruption critiques.
Closing	20	Is there anything else you'd like to add about stakeholder	Any final thoughts on making	5 minutes	Capture unsolicited insights.

		management in solar energy?	projects more sustainable in contexts like Pakistan?		
Demographics	N/A	- What is your primary role in solar projects (e.g., project manager, government official, community representative)? - How many years of experience do you have in renewable energy or solar specifically? - What types of solar projects have you been involved in (e.g., utility-scale like Quaid-e-Azam, rooftop, hybrid)? - Are there any regions or contexts (e.g., rural Punjab, urban Sindh) where your experience is concentrated?	N/A	Integrated (end)	Enable subgroup analysis.

Closing Script	N/A	Thank you once again for your time and valuable insights, [Participant's Name]. I'll send a summary of key points for your review within 48 hours. If you'd like a copy of the final thesis or have follow-up questions, please let me know. Have a great day!	N/A	Included in 5 minutes	Offer member checking; end positively.

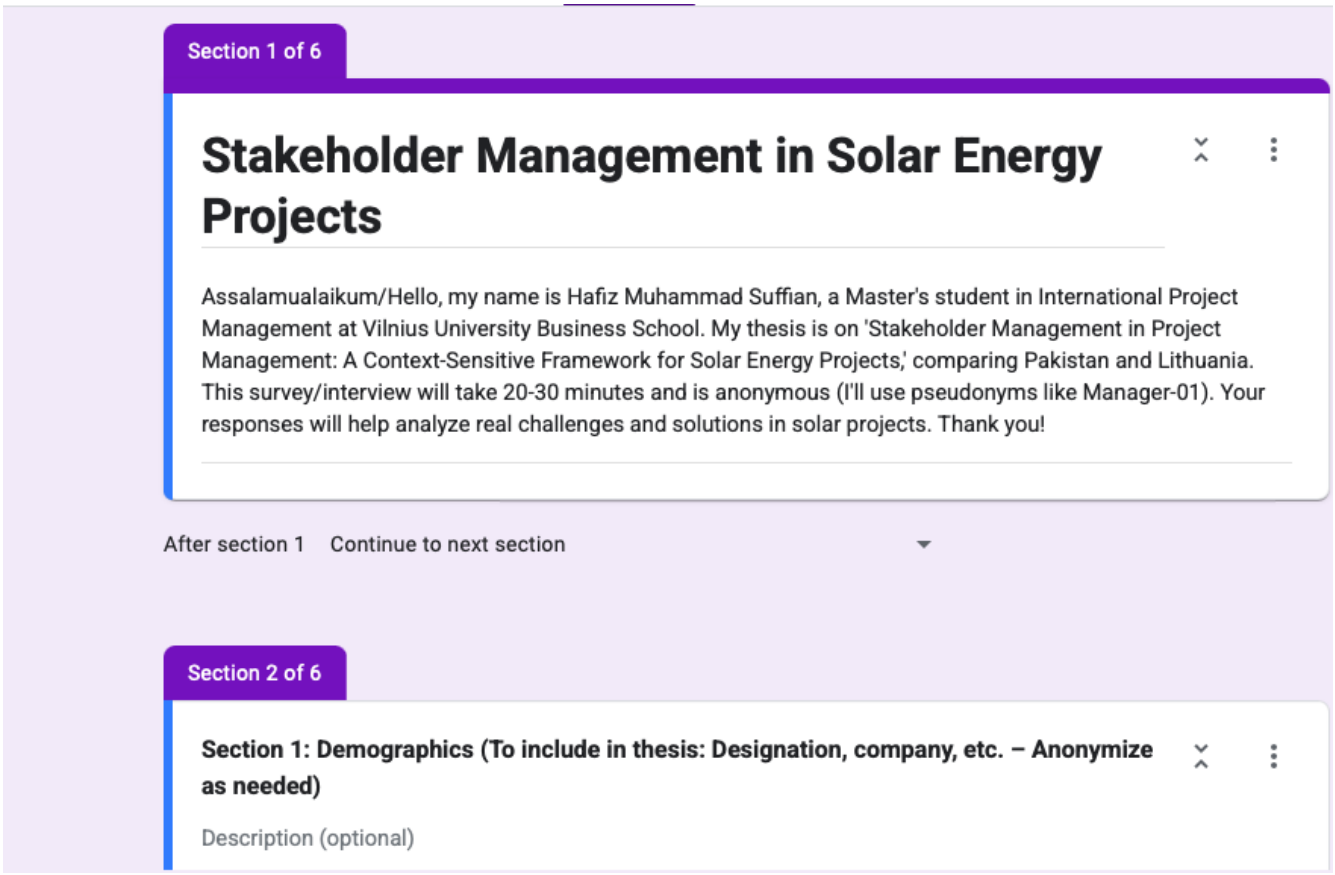
Appendix B: Recruitment Email Template

Email Component	**Content**	**Purpose/Notes**
Subject Line	Invitation to Participate in Research on Solar Stakeholder Management (45-Minute Virtual Interview)	Catch attention; highlight brevity and relevance.
Greeting	Dear [Participant's Name],	Personalize for rapport.
Introduction	I hope this email finds you well. My name is Hafiz Muhammad Suffian, and I am a Master's student in the International Project Management (IPM) program at Vilnius University, Lithuania. Under the supervision	Introduce self, credentials, and study title.

	of Associate Professor Eglė Daunienienė, I am conducting a study titled "Stakeholder Management in Project Management: A Context-Sensitive Framework for Solar Energy Projects."	
Study Purpose	This research aims to explore how stakeholder engagement can be optimized in solar projects, particularly in Pakistan, by drawing lessons from effective practices in Lithuania (e.g., Stakeholder Engagement Plans in projects like Kelme). Your expertise as a [Participant's Role, e.g., project manager] with experience in [Specific Context, e.g., utility-scale solar in Punjab] makes you an ideal contributor. Your insights could directly inform practical frameworks to reduce project delays, enhance community trust, and support sustainable energy goals like SDG 7 (Affordable and Clean Energy).	Explain value; personalize to recipient's expertise.
Participation Details	**Format:** A one-time, semi-structured virtual interview via Zoom or Microsoft Teams (your preference). **Duration:** Approximately 45-60 minutes. **Timing:** Flexible to suit your schedule suggesting [Propose 2-3 Slots, e.g., November 15 at 7 PM PKT or November 18 at 4 PM PKT]. - **Location:** Conducted remotely from wherever you are comfortable. - **Incentives:** None, but you will receive a summary of findings and an opportunity to review how your input shaped the results.	Outline logistics; emphasize low commitment.
Ethics and Consent	All responses will be kept strictly confidential your identity will be anonymized (e.g., using pseudonyms like "Expert-01"), and data will be used solely for this academic thesis. Participation is voluntary, and you may withdraw at any time without explanation. The study has received ethics approval from Vilnius University (Reference: [Insert Provisional Reference, e.g., VU-ETH-2025-0929]). Attached is the informed consent form for your review.	Ensure transparency on confidentiality and rights.
Call to Action	If you're interested, please reply to this email with your availability, and I'll send a calendar invite and the consent form for digital signature. Feel free to forward this to colleagues who might also be interested (e.g., "Who else in your network handles solar stakeholders?").	Encourage response; enable snowballing.
Closing	I look forward to the possibility of speaking with you and learning from your experiences. Please let me know if you have any questions in the meantime. Best regards, Hafiz Muhammad Suffian Master's Student,	Professional sign-off; provide contacts.

	International Project Management Vilnius University, Business School Email: hafiz.suffian@vu.lt Phone: +37065890736 / +923431645444	

Google Form Questionnaire:



What is your role/designation in the organization? (e.g., Project Manager, Stakeholder Manager, Head of Operations) *

Short answer text

What is the name of your company/organization and its location? (e.g., Lahore, Pakistan)

Short answer text

How many years of experience do you have in solar/renewable energy projects?

Short answer text

What type of solar projects are you involved in?

Short answer text

Approximately how many stakeholders (e.g., communities, governments, financiers) do you typically manage per project?

Short answer text

After section 2 Continue to next section

Section 3 of 6

Section 2: Stakeholder Identification and Mapping (Ties to RQ1)

Description (optional)

How do you identify key stakeholders in your solar projects?

Short answer text

On a scale of 1-5 (1=Strongly Disagree, 5=Strongly Agree), rate: "We often miss vulnerable groups like nomadic communities in arid areas (e.g., Cholistan) during identification." Why? (Open-ended)

Short answer text

What challenges do you face in mapping stakeholders? (e.g., Land disputes, Cultural sensitivities, Urban-rural divides) Provide an example from a project.

Short answer text

After section 3 Continue to next section

Section 4 of 6

Section 3: Stakeholder Salience and Prioritization (Ties to RQ2)

Description (optional)

How do you prioritize stakeholders? (Select all that apply: Based on power/influence, Urgency of needs, Legitimacy of claims, Equity considerations [e.g., marginalized groups])

On a scale of 1-5, rate: "Equity issues (e.g., socio-economic inequalities in Pakistan) significantly change stakeholder priorities over project phases." Explain with an example (e.g., from 2025 net-metering reforms).

Short answer text

Have policy changes (e.g., 2025 net-metering pause) affected how you assess stakeholder salience? How?

Short answer text

After section 4 Continue to next section

Section 5 of 6

Section 4: Engagement Strategies and Challenges (Ties to RQ3)

Description (optional)

What methods do you use to engage stakeholders? (Select all that apply: Workshops, Virtual reality simulations, Grievance mechanisms, Benefit-sharing (e.g., revenue shares), Digital apps/SMS)

Short answer text

On a scale of 1-5, rate the effectiveness of your engagement in handling problems like dust accumulation, water shortages, or grid overloads. Provide a specific example of how you tackled a challenge (e.g., X problem, Y approach, Z outcome)

Short answer text

What barriers do you face in engagement? (e.g., Communication ruptures, Power imbalances, Discursive fissures) How have you overcome them?

Short answer text

After section 5 Continue to next section

Section 6 of 6

Section 5: Adaptation from Best Practices and Outcomes (Ties to RQ4)

Description (optional)

Are you familiar with EU/Lithuanian stakeholder practices (e.g., Kelme SEP for consultations and grievances)? On a scale of 1-5, how adaptable are they to Pakistan's context (e.g., arid environments, policy volatility)? Why?

What adaptations would you recommend for Pakistani solar projects based on international models? (e.g., For BESS scaling, reform resilience)

Short answer text

Overall, what results have you seen from your stakeholder management? (e.g., Reduced delays by X%, Increased trust by Y%, Project overruns due to Z%) Provide your point of view on the best solution for effective management.

Short answer text

Any other thoughts on stakeholder management in solar projects? (Open-ended)

Short answer text

Any other thoughts on stakeholder management in solar projects? (Open-ended)

Short answer text

May I follow up if needed?

Short answer text