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Advancing Solar Energy in Albania: The Leadership Role of Private Sector Investments in Renewable Energy Diversification

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ABSTRACT

Albania's energy sector remains predominantly dependent on hydropower, which accounts for the vast majority of the country's electricity generation. While this reliance on renewable sources is commendable, it also exposes the system to growing risks related to seasonal variability and the broader effects of climate change. As national energy priorities shift toward diversification and resilience, solar energy emerges as a strategic alternative—leveraging Albania's high solar irradiation, favorable geography, and rising investor interest. This study explores the role of the private sector in advancing Albania's solar energy transition, focusing on the enabling conditions, investment barriers, and opportunities for scalable deployment. Grounded in qualitative research conducted as part of the project "***Potenciali i Energjisë Diellore në Shqipëri" (Solar Energy Potential in Albania***) carried out by Luarasi University with the support of the Albanian Agency for Scientific Research and Innovation (AKKSHI), the paper draws on focus group discussions with businesses, consultants, and regulatory actors to identify key institutional and financial challenges. It also incorporates comparative insights from neighboring countries—North Macedonia, Greece, and Croatia—to assess relevant policy innovations and market mechanisms. The findings highlight systemic bottlenecks, including fragmented permitting processes, limited access to renewable finance, and the absence of structured incentives. At the same time, the research reveals strong interest and willingness among local investors to lead Albania's solar transformation, provided that regulatory clarity and institutional coordination improve. The paper concludes with actionable recommendations aimed at fostering public-private alignment, de-risking investment, and positioning solar energy as a central pillar of Albania's energy future.

1. Introduction

Albania's energy system is often presented as a regional example in terms of renewable electricity generation. Over 98% of the country's domestic electricity supply is derived from renewable sources, with large-scale hydropower plants dominating the sector. While this reflects a laudable commitment to low-carbon energy, it also presents systemic risks. Hydropower production is highly sensitive to annual precipitation and water availability, both of which are being altered by the intensifying impacts of climate change. As extended droughts and erratic hydrological cycles become more common, Albania finds itself vulnerable to power shortages and increasingly reliant on electricity imports during dry periods. These vulnerabilities undermine national energy security and call into question the long-term resilience of a mono-source energy strategy.

In this context, the diversification of Albania's renewable energy mix emerges not only as a policy goal but also as a structural necessity. A diversified energy portfolio can help mitigate climate-related risks, balance seasonal generation gaps, and enhance the economic competitiveness of the national energy market. It also aligns with the broader strategic imperatives of Albania's European integration path, including commitments under the Energy Community Treaty and the Paris Agreement. Diversification contributes to the broader goals of decarbonization, energy independence, and sustainable economic development. Among the various alternatives to hydropower, solar energy holds particular promise for Albania.

Geographically, Albania is well-positioned to become a leader in solar energy generation. The country benefits from a Mediterranean climate, with solar irradiation levels reaching up to 1,600 kWh/m²/year in several regions—particularly in the south and along the coast, including Fier, Vlorë, and Durrës. According to the findings of the project *Potenciali i Energjisë Diellore në Shqipëri*, carried out by Luarasi University in collaboration with the Albanian Agency for Scientific Research and Innovation (AKKSHI), these conditions support high-efficiency solar energy conversion with consistent yields throughout most of the year. The project utilized NASA's POWER platform and meteorological data from domestic monitoring stations to map solar potential across the country. The data confirmed that Albania possesses significant untapped potential to generate solar power at both utility and distributed scales.

What makes solar particularly compelling is not only its technical feasibility but also its economic and logistical accessibility. Compared to other renewable technologies, photovoltaic systems offer lower maintenance costs, high modularity, and short construction timelines. They can be deployed on rooftops, idle land, or integrated into industrial facilities, allowing for decentralized production and energy self-sufficiency. Additionally, they complement hydropower seasonality: whereas hydro production peaks in spring due to snowmelt, solar irradiance is highest during the summer, when hydro reservoirs often underperform. This complementary dynamic strengthens the case for solar as a key pillar in Albania's energy transition.

This research paper responds to core objectives, including: to explore how the private sector can play a leading role in expanding Albania's solar energy footprint. The study analyzes the barriers and opportunities facing investors in the solar sector, emphasizing how regulatory frameworks, financial incentives, and institutional coordination shape investment outcomes. Using a qualitative approach grounded in stakeholder engagement, particularly focus group discussions with key private sector actors, the research identifies structural bottlenecks—such as permitting procedures, regulatory uncertainty, and insufficient fiscal stimuli—that limit the sector's growth. It also draws insights from comparable countries in the Western Balkans and Southeast Europe that have successfully scaled up solar energy through private investment.

The significance of this study lies in its dual focus: contributing to academic knowledge on renewable energy transitions in emerging economies while offering practical guidance to policymakers, investors, and development partners. It seeks to bridge the gap between policy aspirations and on-the-ground realities by highlighting the perspectives of those most directly involved in the development of Albania's energy infrastructure. The project's participatory methodology ensures that the findings are not only empirically grounded but also responsive to the concerns of real market actors. Ultimately, this work aims to support Albania in charting a strategic and inclusive path toward energy diversification, with solar energy positioned as a central driver of change.

The remainder of this paper is structured as follows. The next section presents a comprehensive literature review that contextualizes renewable energy diversification globally and regionally, and discusses the enabling conditions for private sector participation in energy transitions. Following this, the methodology section outlines the qualitative research design, inclu-

ding the criteria for participant selection and the approach to thematic analysis. The fourth section presents the research findings, beginning with an overview of Albania's solar energy landscape and moving into the identification of regulatory and financial barriers, investor perceptions, and comparative insights from regional case studies. The fifth section articulates strategic and policy recommendations designed to strengthen Albania's regulatory environment, enhance investor confidence, and expand the deployment of solar energy. The paper concludes by summarizing the key contributions of the study and proposing future directions for research, advocacy, and action in support of a more balanced and resilient renewable energy system in Albania.

2. Literature Review

2.1 Overview of Renewable Energy Diversification Globally and Regionally

The diversification of renewable energy sources has become a defining feature of global energy transitions, driven by climate change mitigation commitments, energy security considerations, and the declining costs of renewable technologies. According to the International Renewable Energy Agency (IRENA), the global energy landscape has seen a rapid shift over the last decade, with solar and wind energy accounting for nearly 90% of new electricity capacity additions in 2021 (IRENA, 2022). Diversification is no longer understood merely as a technological choice but as a strategic imperative that reduces exposure to single-source dependencies and enhances the resilience of national energy systems.

Globally, countries with a high dependency on hydropower—such as Norway, Brazil, and Ethiopia—have increasingly incorporated solar and wind energy to mitigate seasonal variability and water stress exacerbated by climate change. These countries demonstrate how over-reliance on hydropower can expose electricity systems to risks during dry periods or in years with below-average precipitation. Integrated planning approaches now prioritize complementarities among renewable resources. In Brazil, for instance, the integration of solar during dry seasons has reduced the strain on hydropower dams, while in Ethiopia, diversification efforts are directly linked to drought resilience (IEA, 2022).

In the regional context of the Western Balkans, energy diversification has become an urgent policy priority due to historical reliance on large-scale hydropower and lignite-based thermal plants. The Energy Community, which includes Albania and other Western Balkan countries, has consistently emphasized diversification as a means to improve energy security, decarbonize national economies, and align with the European Union's Green Agenda for the Western Balkans (Energy Community Secretariat, 2022; European Commission, 2020). Within this policy framework, countries are encouraged to adopt long-term energy strategies that expand the share of solar and wind, improve grid integration, and unlock private sector participation.

Despite shared regional goals, the pace and structure of diversification vary significantly across the region. North Macedonia, for instance, has implemented competitive auctions and feed-in premium schemes to attract investment in solar PV, resulting in over 300 MW of approved solar projects since 2020 (IRENA, 2023). Greece, although an EU member, serves as a regional benchmark due to its successful liberalization of the electricity market and rapid deployment of utility-scale solar farms, supported by a stable auction-based model and EU recovery funds. Meanwhile, Montenegro and Kosovo have initiated solar pipeline development but remain constrained by limited grid capacity and fragmented regulatory frameworks (Energy Community Secretariat, 2023).

In the case of Albania, renewable energy diversification remains in its early stages despite the country's abundant solar and wind potential. The National Energy Strategy 2018–2030 identifies diversification as a national priority, but the institutional and investment frameworks required for implementation are still evolving. The dependence on hydropower for nearly all domestic electricity generation means that Albania is highly exposed to hydrological fluctuations, making solar energy not just an opportunity but a necessity (AKKSHI & Luarasi University, 2024). Compared to its regional peers, Albania lags in solar PV capacity deployment but possesses the foundational conditions—solar irradiation, investor interest, and policy commitments—to accelerate diversification in a relatively short time frame.

In summary, global and regional experiences illustrate that renewable energy diversification is a cornerstone of energy resilience, particularly in hydropower-dependent countries. For Albania and its neighbors in Southeast Europe, integrating solar energy into the

national grid is not only feasible but also strategically aligned with EU climate objectives, regional energy security goals, and long-term socio-economic stability. However, the success of this transition depends on addressing regulatory bottlenecks, incentivizing private capital, and building institutional capacity to manage new energy flows.

2.2 The Private Sector's Role in Renewable Energy Transitions

The role of the private sector in driving renewable energy transitions has gained increasing attention in both academic literature and policy discourse over the past two decades. Private capital, entrepreneurial innovation, and risk-sharing mechanisms are now recognized as indispensable to achieving the scale and speed of clean energy deployment required to meet global climate targets (IEA, 2022; REN21, 2021). The transition from centralized, fossil-fuel-based energy systems to decentralized, renewable-based architectures necessitate not only new technologies but also new governance and financing models — areas in which the private sector plays a catalytic role.

In mature energy markets, the private sector has led in deploying large-scale solar and wind projects through independent power producers (IPPs), corporate power purchase agreements (PPAs), and green bonds. These models have enabled capital-intensive projects to scale without relying solely on public sector financing. Countries such as Germany, the United States, and Chile have demonstrated how clear regulatory frameworks and market liberalization can stimulate private sector leadership in the energy sector (IRENA, 2020). In parallel, small and medium enterprises (SMEs) and energy startups have driven decentralized energy access solutions, especially in developing and emerging markets, by deploying rooftop PV, microgrids, and energy-as-a-service models.

At a policy level, the success of private sector participation hinges on the presence of clear investment signals — including long-term national energy plans, predictable pricing mechanisms, and streamlined permitting procedures. Regulatory stability, grid access guarantees, and financial de-risking instruments are all crucial in unlocking private capital. The International Finance Corporation (IFC) and World Bank have repeatedly highlighted that policy and regulatory risk, not technology or market readiness, is the most significant barrier to private sector participation in renewable energy projects in low- and middle-income countries (IFC, 2021; World Bank, 2020).

In the Western Balkans, efforts to integrate the private sector into energy transition strategies have been uneven. While countries like North Macedonia and Serbia have made progress by launching solar auctions and introducing investor-friendly legal frameworks, others continue to face delays in liberalizing energy markets and introducing competitive procurement mechanisms (Energy Community Secretariat, 2022). Feed-in tariffs, while once effective in early-stage markets, are increasingly being replaced by market-based systems such as contracts-for-difference (CfDs) and auctions that allow the private sector to compete on price and technology performance.

In Albania, private sector involvement in the renewable energy landscape has historically been limited, with the hydropower sector being the only area where private concessions were systematically introduced. The solar energy sector, however, is witnessing growing interest from local and international investors. The Luarasi–AKKSHI project findings indicate that several businesses—especially in energy-intensive industries, construction, and tourism—are willing to invest in solar PV for self-consumption or hybrid generation models (AKKSHI & Luarasi University, 2024). Focus group participants pointed to the need for greater clarity in licensing procedures, predictable returns on investment, and access to fiscal incentives such as VAT exemptions and net metering. The establishment of a stable and transparent regulatory environment was cited as a prerequisite for sustained private sector engagement.

Moreover, the development of public–private partnerships (PPPs) and blended finance schemes is increasingly seen as a pathway to unlock larger investments in solar infrastructure. As noted in the Global Commission on the Economy and Climate (2018), partnerships that combine public risk guarantees with private execution capacity tend to accelerate project development timelines and build investor confidence. In Albania's case, aligning public energy objectives with private sector incentives—such as through competitive auctions or guaranteed feed-in premium contracts—can create a robust pipeline of bankable solar projects.

Ultimately, the private sector's contribution extends beyond financing. Businesses are also key to innovation, job creation, and market transformation. Their capacity to deploy clean technologies, train skilled wor-

kers, and scale commercially viable business models makes them an essential partner in achieving national energy transition goals. For Albania, which is still in the early stages of development, mobilizing private sector leadership is critical to building a diversified and resilient energy future.

2.3 Solar Energy Trends, Benefits, and Challenges in Emerging Economies: The Case of Albania

Solar energy has emerged as a cornerstone of energy transition strategies in many emerging economies, driven by its modularity, falling technology costs, and compatibility with decentralized generation. Countries such as India, Morocco, and Vietnam have demonstrated how targeted policy frameworks, concessional financing, and clear investment signals can catalyze large-scale deployment of solar photovoltaic (PV) systems, even in contexts with limited institutional capacity. These experiences reveal that solar technologies are particularly suited for countries with high solar irradiation, energy import dependence, and rural electrification needs (IRENA, 2023).

In the Albanian context, solar energy is not only a complementary renewable option—it is a strategic necessity. With over 270–280 sunny days per year and solar irradiance levels ranging between 1,400 and 1,600 kWh/m² annually in key regions such as Fier, Vlorë, and Durrës, the technical potential for solar electricity generation is substantial (AKKSHI & Luarasi University, 2024). The project's analysis of meteorological and satellite data from NASA's POWER platform validated these high levels of solar exposure across Albania's southern and coastal zones, where land availability and climatic conditions are optimal for solar PV deployment.

One of the most compelling findings of the project was the high economic and financial viability of solar energy projects in Albania. The cost-benefit analysis conducted by the research team revealed that, in regions with favorable irradiation, solar PV systems can yield a return on investment (ROI) of over 12%, with a payback period of just 2.5 to 3 years for industrial-scale installations (AKKSHI & Luarasi University, 2024). These figures place solar energy among the most attractive investment options in Albania's energy sector, especially when compared to conventional generation sources or fossil fuel-based imports.

The benefits of solar energy in Albania extend beyond economics. Solar PV systems are well-suited to decentralized generation, allowing industries, public institutions, and households to install rooftop systems and reduce their dependence on the national grid. As emphasized in the stakeholder focus groups organized during the project, solar energy is perceived as a low-risk, low-maintenance technology that can help businesses achieve cost savings, meet sustainability goals, and enhance energy security. Moreover, solar projects generate employment opportunities in engineering, construction, maintenance, and energy services—contributing to broader socio-economic development.

However, despite its high potential, the deployment of solar energy in Albania faces several challenges. Chief among them is the fragmented and often bureaucratic regulatory environment. Investors in the focus groups consistently cited delays in obtaining permits, lack of clarity in licensing procedures, and inconsistent application of net-metering regulations as major deterrents to project development. The policy framework, while supportive in principle, lacks enforcement mechanisms and long-term investment predictability.

Another challenge is the limited availability of structured financing instruments. While Albania has introduced certain fiscal incentives—such as VAT exemptions on solar panels and the possibility of feed-in tariffs for specific capacity thresholds—these mechanisms are inconsistently applied and poorly communicated. The absence of competitive solar auctions or clear criteria for accessing government support further discourages new market entrants, particularly SMEs and foreign investors.

Furthermore, grid integration remains a latent challenge. Although Albania's overall grid infrastructure is relatively robust, it was originally designed around large-scale hydropower transmission and lacks the distributed flexibility required to accommodate high penetration of solar PV systems. This is particularly true in rural areas and on the periphery of urban centers, where demand may be high but grid capacity is weak or unreliable.

The Luarasi–AKKSHI project also identified the need for improved public awareness and education regarding solar energy benefits. Many households and small businesses are unfamiliar with the practical and financial aspects of solar PV, including installation procedures, warranty coverage, and long-term maintenance. This information gap, coupled with weak after-sales service networks, limits consumer confidence and demand generation.

Despite these obstacles, Albania remains uniquely positioned to leapfrog into a more diversified and

decentralized energy future, with solar energy at its core. The convergence of high natural potential, rising electricity demand, and international support for clean energy transitions creates a window of opportunity that can be harnessed with appropriate policy reforms and investor engagement. As shown in the experiences of peer countries, strategic coordination between government institutions, private sector actors, and civil society is essential for unlocking the full potential of solar energy.

2.4 Regulatory Frameworks and Investment Environments in Albania

The regulatory framework in Albania for renewable energy has undergone several reforms over the past decade, largely driven by the country's alignment with European Union directives and its obligations under the Energy Community Treaty. However, while the policy environment has demonstrated high-level commitment to sustainable energy, its operationalization remains limited, especially when viewed from the perspective of private investors in the solar energy sector. The gap between policy ambition and implementation capacity has created a fragmented investment environment, characterized by regulatory uncertainty, slow administrative procedures, and a lack of coordinated institutional action (Energy Community Secretariat, 2022).

The Law on Renewable Energy Resources (Law No. 7/2017) provides the legal basis for supporting the development of renewable energy in Albania. It introduces instruments such as Power Purchase Agreements (PPAs), priority access to the transmission grid, and competitive auctions for renewable capacity allocation. However, in practice, many of these mechanisms have not been consistently implemented or adapted to the emerging needs of solar PV investors. The Luarasi–AKKSHI project report notes that delays in secondary legislation, lack of inter-institutional coordination, and unclear guidelines on licensing procedures continue to discourage private sector participation (AKKSHI & Luarasi University, 2024).

One of the key bottlenecks identified by both the literature and investor focus groups is the permitting process. The development of a utility-scale solar plant in Albania may require more than 10 different permits, each issued by separate agencies with overlapping mandates. The absence of a one-stop-shop model or digital permitting portal results in procedural inefficiencies that disproportionately affect small and medium-sized investors who lack the institutional resources to navigate these complexities. Additionally, investors noted a lack of clarity in environmental impact assessment (EIA) thresholds and connection conditions to the national grid, further complicating project planning and execution.

The investment climate is also challenged by the inconsistent application of incentive mechanisms. While Albania has offered some fiscal incentives—such as the exemption of VAT on imported solar panels and net metering schemes for prosumers—these policies are often not uniformly applied or supported by long-term regulatory guarantees. The Luarasi project findings confirm that many businesses perceive current incentives as insufficient and unpredictable, particularly in the absence of feed-in tariffs or feed-in premiums for small-scale projects. Moreover, the country has yet to introduce a coherent auction framework for competitive procurement of solar capacity, limiting price transparency and investor confidence.

Institutional fragmentation also undermines regulatory effectiveness. While the Ministry of Infrastructure and Energy is responsible for setting strategic direction, other entities such as the Energy Regulatory Entity (ERE), National Agency of Natural Resources (AKBN), and the Transmission System Operator (OST) operate with limited inter-agency coordination. As a result, investors often face duplicative requirements or inconsistent interpretations of legal provisions. The lack of technical capacity and digitization within public institutions exacerbates these issues, particularly in rural municipalities where land access, spatial planning, and community engagement processes are not standardized.

At the financial level, Albania lacks dedicated credit lines or de-risking instruments to support renewable energy investors. Commercial banks remain hesitant to finance solar projects due to perceived regulatory risks and limited understanding of the sector. While international development banks (such as EBRD and IFC) have supported pilot projects in the region, these have not yet translated into systemic changes in domestic financing mechanisms. The absence of a national green finance strategy or guarantee such as partial risk guarantees (PRGs) or viability gap funding further limits private sector engagement, especially for capital-intensive projects.

Despite these constraints, the foundational elements of a robust investment environment are present.

Albania has adopted its National Energy Strategy 2018–2030, which explicitly targets diversification and sets goals for increasing the share of non-hydro renewables. The government has also shown growing openness to foreign direct investment in the energy sector, evidenced by the launch of large-scale solar tenders in Karavasta and Spitalla, albeit with complex procurement processes. These developments suggest a growing policy interest in solar energy, but they also underscore the need for systemic reform to translate policy aspirations into tangible investor outcomes.

For Albania to unlock its solar energy potential, regulatory reforms must prioritize simplification, transparency, and investor protection. This includes streamlining permitting, introducing performance-based incentives, strengthening public–private dialogue mechanisms, and building institutional capacity across national and local authorities. Lessons from regional neighbors such as North Macedonia—where auction frameworks, blended finance, and grid access guarantees have successfully accelerated solar deployment—can serve as useful models for institutional adaptation. Without such reforms, Albania risks missing a critical window to position itself as a regional leader in solar energy development.

2.5 Case Studies and Ongoing Initiatives: Public–Private Partnerships in Solar Energy Development in Albania

While Albania's solar energy sector is still in the early stages of development, a number of public–private initiatives have begun to shape a nascent investment landscape. These projects serve as valuable case studies that demonstrate the feasibility of solar development under Albania's evolving regulatory environment, and highlight emerging pathways for private sector engagement in renewable energy diversification.

One of the most notable public–private partnerships in Albania's solar sector is the Karavasta Solar Park, awarded in 2020 through a competitive auction process supported by the European Bank for Reconstruction and Development (EBRD). The 140 MW photovoltaic park is being developed by Voltalia, a French renewable energy company, under a concession agreement with the Albanian government. This project represents the largest utility-scale solar initiative in the Western Balkans to date and is expected to deliver electricity at a record low tariff of €24.89/MWh for half of its capacity, with the remainder sold on the open market (EBRD, 2020). The Karavasta project exemplifies how structured PPPs, anchored in transparent bidding and donor-backed risk mitigation, can attract reputable foreign investors and set benchmarks for cost-effective solar development.

A second flagship initiative is the Spitalla Solar Park, launched shortly after Karavasta. The project is part of Albania's National Renewable Energy Action Plan and continues the government's strategy of attracting private capital through competitive auctions. Although smaller in scale at 100 MW, the Spitalla tender drew interest from major international developers and reaffirmed investor appetite when procurement processes are predictable and competitive. Both Karavasta and Spitalla were made possible through a combination of public land allocation, government guarantees, and EBRD technical assistance—demonstrating the power of blended finance and multilateral coordination in de-risking investments.

In parallel, several smaller-scale PPPs and self-consumption projects are being piloted across the country, particularly in the tourism, agri-food, and construction sectors. For example, solar rooftop installations on hotel chains along the southern Riviera, co-financed through EU IPA funds and local business contributions, are helping to offset seasonal energy demand and reduce grid dependency. Similarly, companies in the construction and heavy materials sectors have initiated solar installations on industrial rooftops as part of broader ESG (environmental, social, governance) strategies and to meet growing energy needs. However, despite these promising developments, public–private partnerships in the Albanian solar sector remain isolated and heavily donor-dependent. The absence of a systemic PPP framework tailored to renewable energy continues to limit scalability. Focus group discussions revealed that while businesses are interested in collaborating with public institutions—especially for land access, grid connections, and regulatory facilitation—there is little clarity on procedures, responsibilities, or risk-sharing mechanisms. Moreover, municipalities, which could serve as key enablers of local solar deployment through public land use and urban planning, often lack the technical and administrative capacity to initiate or manage such partnerships.

To overcome these gaps, Albania could look toward regional models. In North Macedonia, the government's renewable energy PPP framework includes standardi-

zed templates for land leasing, co-investment models, and grid integration guarantees. Greece, through its Renewable Energy Sources Operator (DAPEEP), has institutionalized PPP coordination in solar auctions and balancing markets, ensuring long-term offtake agreements and tariff stability. Albania's alignment with these models would require institutional reform and the introduction of legal provisions specific to energy PPPs under the national Public Procurement Law and the Concessions and PPP Law.

In conclusion, Albania's early experience with solar public–private initiatives offer proof of concept but reveals the need for a more structured, replicable framework. Unlocking the transformative potential of solar energy will depend on scaling these pilot projects into a national strategy that systematically aligns public assets, private capital, and regulatory innovation.

3. Methodology

3.1 Qualitative Research Design

This study adopts a qualitative research design to explore the role of the private sector in Albania's solar energy transition. Given the limited empirical data available on investor behavior and policy effectiveness in the Albanian renewable energy market, a qualitative approach allows for an in-depth understanding of stakeholder perceptions, institutional dynamics, and context-specific barriers to investment. The research is grounded in an interpretive paradigm, aiming to generate insights through direct engagement with key actors in the energy and business sectors. The research was conducted as part of the national project *Potenciali i Energjisë Diellore në Shqipëri*, implemented by Luarasi University and supported by the Albanian Agency for Scientific Research and Innovation (AKKSHI) in 2024.

The focus on qualitative inquiry is justified by the complexity and interdependence of regulatory, financial, and institutional factors shaping solar energy investments in Albania. Rather than testing pre-defined hypotheses, the study seeks to identify patterns of meaning, investor expectations, and institutional challenges from the lived experiences and expert opinions of participants involved in or familiar with solar energy development.

3.2 Focus Group Discussions and Participant Selection

Primary data was collected through focus group discussions (FGDs) with a diverse range of stakeholders operating in or influencing the solar energy sector in Albania. The selection of participants was purposive, based on their expertise, sectoral representation, and potential contribution to understanding the research questions. Participants were selected from three key stakeholder categories:

- Private Sector Investors – including local businesses investing in solar PV for self-consumption, renewable energy companies, and real estate developers integrating solar solutions into building infrastructure.
- Energy Consultants and Technical Experts – including engineers, and consultants advising businesses or public agencies on solar feasibility and implementation.
- Public Sector and Regulatory Authorities – including former representatives from the Energy Regulatory Entity, and advisors from the Ministry of Infrastructure and Energy.

Each focus group session involved 6–10 participants and lasted approximately 90 minutes. Discussions were moderated using a semi-structured guide that covered topics such as regulatory experiences, risk perceptions, financing needs, expectations from government, and proposed policy reforms. Participants were assured anonymity to encourage open and honest feedback.

The diversity of the participants provided a balanced view of challenges and opportunities, while the group format facilitated dynamic exchanges and the surfacing of shared concerns and divergent perspectives. This method also enabled the identification of themes that may not have emerged through surveys or structured interviews alone.

3.3 Data Collection Process

Data collection was conducted over a two-month period, from May to June 2024, across three regions: Tirana, Fier, and Durrës. These regions were selected based on their high solar potential, level of business activity, and proximity to relevant institutional actors. Sessions were held in person at local innovation hubs and university facilities, and were facilitated by researchers from Luarasi University trained in qualitative methods and stakeholder engagement.

Audio recordings were made with participants' consent, and detailed notes were taken by research assistants. Transcriptions were then anonymized and coded using qualitative data analysis software (NVivo), enabling systematic comparison across stakeholder categories and thematic areas.

Secondary data was also reviewed to triangulate findings from the FGDs. This included national energy policy documents, legal frameworks, investment project reports, and publicly available data from the Energy Community and international organizations such as IRENA, EBRD, and the World Bank.

3.4 Analytical Framework

The analysis for this research was conducted using a thematic analysis approach, which is widely recognized in qualitative research for its ability to systematically identify, organize, and interpret patterns of meaning within a dataset. Thematic analysis was chosen due to its flexibility and suitability for studies aiming to understand stakeholder perceptions, institutional dynamics, and context-specific challenges in complex policy environments such as energy transitions.

The analytical framework followed an inductive strategy grounded in the data collected from focus group discussions. This allowed for themes to emerge organically from participants' inputs, rather than being pre-imposed by theoretical models. The process began with the transcription and familiarization stage, during which the research team thoroughly read and re-read the transcripts and accompanying field notes to immerse themselves in the content and to begin identifying recurrent ideas and expressions. This immersion was crucial for developing an initial sensitivity to the data, particularly regarding the nuances of stakeholder experiences with Albania’s solar energy investment landscape.

Following this, the team engaged in open coding of the transcripts. This involved assigning short, descriptive codes to sections of text that captured distinct concepts or issues raised by participants. Codes ranged from specific policy references such as “net metering uncertainty” and “permit delays,” to broader themes such as “trust in institutions” or “perceived investment risk.” These initial codes served as the foundation for building higher-order thematic categories.

Once the coding process was complete, the researchers grouped similar or interrelated codes into overarching themes that reflected the key issues affecting solar energy development from a private sector perspective. Themes such as “regulatory bottlenecks,” “financial accessibility,” “grid integration constraints,” and “public-private alignment” emerged as dominant. These themes were not only representative across multiple focus groups but also demonstrated analytical depth by capturing systemic and structural challenges that transcend individual experiences.

Each theme was then reviewed in the context of its internal coherence and its distinction from other themes. The review process ensured that themes were grounded in rich, supportive data and that they contributed meaningfully to the research objectives. This phase also included verification of thematic consistency across different stakeholder groups—for example, comparing how local investors, consultants, and government representatives described the same regulatory hurdles or financial disincentives. This comparative dimension allowed the analysis to highlight both convergences and divergences in stakeholder perspectives.

The final step involved interpreting the themes in light of Albania’s broader policy and institutional context, including alignment with national energy goals, EU integration processes, and regional renewable energy development trends. The insights gained through this process were not only descriptive but analytical, allowing the study to move from a presentation of stakeholder feedback to a deeper understanding of the structural enablers and constraints within Albania’s energy transition. These interpreted themes form the empirical foundation for the discussion and policy recommendations presented in the subsequent sections of this paper.

This analytical framework, grounded in thematic interpretation, provides a coherent lens through which the complexity of Albania's solar energy investment ecosystem can be understood and addressed. It reflects both the diversity of stakeholder voices and the systemic nature of the issues they confront, thus offering valuable insight for targeted policy interventions and institutional reform.

3.5 Limitations of the Study

While the qualitative design offers rich contextual insights, several limitations should be acknowledged. First, the sample size, though diverse, is not statistically representative of all energy investors or institutions in Albania. The findings thus reflect the views of active or potential stakeholders rather than the full spectrum of market actors.

Second, the focus group format, while dynamic, may have introduced groupthink or power imbalances that influenced participants' willingness to express dissenting views, especially in mixed public-private sessions. Efforts were made to mitigate this through neutral moderation and session segmentation when necessary.

Third, data collection was limited to central and southern Albania, excluding northern regions such as Shkodër and Kukës, which may present different infrastructural or regulatory conditions. Future research could benefit from a broader territorial scope and inclusion of additional sectors such as agriculture and local governance.

Finally, the rapidly evolving nature of Albania's energy regulatory framework means that some findings may become outdated as new policies or tenders are introduced. Nevertheless, the insights remain highly relevant for understanding systemic issues and guiding medium-term reform efforts.

4. Findings and Discussion

4.1 Current State of Solar Energy in Albania

The current landscape of solar energy development in Albania is characterized by both promise and underutilization. While the country enjoys one of the highest solar irradiation levels in Southeast Europe—with more than 270–280 sunny days annually and radiation potential between 1,400 and 1,600 kWh/m²—actual deployment of solar energy technologies remains nascent and concentrated in a handful of regions and sectors. This section draws on the findings of the national research project "Potenciali i Energjisë Diellore në Shqipëri" to provide a status overview of the sector as of 2024, including installed capacity, government-led initiatives, and recent investor activity.

As of mid-2024, Albania's total installed capacity in solar photovoltaic (PV) systems hovers around 35–40 MW, the majority of which consists of small-scale rooftop installations used for self-consumption in the commercial, residential, and tourism sectors. The two landmark utility-scale projects—Karavasta Solar Park (140 MW) and Spitalla Solar Park (100 MW)—remain exceptions and are largely driven by foreign investment under state-backed auction frameworks supported by multilateral development banks such as the EBRD. These projects, especially Karavasta's record-breaking tariff of €24.89/MWh for half of its generated electricity, have set new benchmarks for solar procurement in the region.

In parallel, the government has begun introducing basic support instruments for smaller-scale deployment. These include a limited net metering framework for residential and commercial consumers and VAT exemptions on imported photovoltaic components. Nevertheless, implementation of these policies remains inconsistent and often lacks administrative clarity, especially at the municipal level. Stakeholders engaged through the project's focus group discussions pointed out that the lack of standardized technical procedures and unclear eligibility criteria has prevented many potential adopters from participating effectively.

The project report also included a technical assessment of Albania's solar potential using satellite data sourced from NASA's POWER platform, cross-validated with meteorological data from domestic stations. The analysis confirmed that regions such as Fier, Durrës, Vlorë, and Gjirokastër exhibit the highest technical feasibility for solar deployment. These areas combine strong irradiance levels with relatively flat topography, low land-use conflict, and proximity to existing grid infrastructure. As a result, they offer prime conditions for future commercial and utility-scale investments.

Economically, the study's cost-benefit analysis found that solar PV systems installed in these high-potential

regions can yield a return on investment (ROI) exceeding 12%, with a payback period of 2.5 to 3 years under current conditions. These findings are particularly relevant in light of rising electricity prices, which have driven increased interest from businesses in offsetting operational costs through on-site energy generation. For example, focus group participants from the tourism and construction sectors reported pursuing or planning installations of 30–200 kW rooftop PV systems to reduce energy bills and improve ESG (Environmental, Social, Governance) credentials.

However, despite these technical and financial advantages, the national solar rollout remains far from systematic. As the project team concluded, the existing energy strategy (2018–2030) does acknowledge the importance of renewable diversification, but it does not establish a robust long-term implementation framework for solar energy. Concrete capacity targets for solar, beyond the Karavasta and Spitalla projects, remain ambiguous, and there is no operational auction calendar or national strategy for distributed generation. As such, the momentum generated by high-profile projects has not yet translated into a broader enabling environment for continuous and diversified private sector investment.

The focus group discussions, organized as an integral part of the project, highlighted this implementation gap. Participants expressed frustration with procedural uncertainty, lack of project pipeline visibility, and minimal outreach or guidance from public institutions. At the same time, there was strong consensus across investor, consultant, and public sector groups regarding Albania's untapped potential and the relative simplicity of solar technologies, which require low maintenance and offer predictable outputs.

In conclusion, while Albania possesses exceptional natural conditions and demonstrated economic viability for solar energy, the current state of development is fragmented and policy-dependent. Without a clear and coordinated national roadmap—linking technical assessments with investor confidence and public-private dialogue—Albania risks missing a critical opportunity to position solar energy as a strategic pillar of its renewable future.

4.2 Barriers to Investment

Despite the growing awareness of solar energy's potential in Albania, both the Luarasi–AKKSHI project findings and the testimonies gathered through stakeholder focus groups underscore that the country's solar market remains constrained by a constellation of persistent investment barriers. These constraints cluster around three main dimensions: regulatory complexity and bureaucratic fragmentation, financial limitations and perceived risks, and the absence of robust, transparent incentive mechanisms. These are not abstract limitations—they are concrete, lived challenges, articulated in detail by entrepreneurs, engineers, and sector experts during structured discussions held across multiple regions of the country.

The most immediate and commonly referenced barrier is the complexity and inefficiency of the permitting process. Stakeholders repeatedly described a system in which responsibilities are dispersed across numerous institutions, each operating in silos, often issuing conflicting instructions or imposing procedural delays. Several participants emphasized the absence of a centralized permitting authority or a streamlined digital portal that could unify documentation, reduce waiting periods, and provide real-time updates to applicants. Agim Bregasi, an energy expert, remarked that "not every corner of Albania is suitable for large-scale installations," pointing to the need for spatial planning aligned with energy strategy—but without institutional capacity and clarity, such planning remains elusive.

This regulatory opacity is further compounded by frequent changes in administrative procedures and the lack of transparency in procurement rules. The Karavasta and Spitalla tenders, while hailed as successful international examples, remain isolated cases. As Bregasi pointed out, participation in these projects was gated by price ceilings set by the government (€59.97/MWh), and the absence of clear criteria for broader market access leaves many local investors uncertain about the viability of engaging in similar initiatives.

Equally limiting is the absence of accessible and renewable-specific financial instruments. Focus group participants were nearly unanimous in reporting that commercial banks are hesitant to finance solar projects. The financing model is dominated by self-investment, with very few financial institutions offering tailored products for solar PV. As Altin Toska explained, even for industrial self-consumption systems with short payback periods—typically between 2.5 and 3 years—investors often cannot access affordable loans, and thus are forced to cover full upfront costs. This severely limits market penetration, particularly among SMEs, startups, and rural businesses.

Participants also flagged a disconnect between the financial community and the energy innovation ecosystem. Few banks have internal expertise to evaluate solar project proposals, and there is no central body that links developers, financiers, and technical advisors to co-develop bankable projects. As a result, project development remains a niche activity reserved for well-capitalized firms or foreign developers with extensive institutional support. This weakens the potential for local ownership, innovation, and capacity-building in the sector.

On the policy side, stakeholders agreed that while net metering and VAT exemptions are positive steps, they are inconsistently applied, poorly publicized, and administratively burdensome. Afrim Osmani noted the technical and legal readiness for two-way metering systems, yet implementation remains limited, and many citizens and businesses are unaware of how to apply or benefit. The process for registering as a prosumer, for instance, is riddled with ambiguities, requiring approvals from OSHEE, ERE, and municipal authorities—often without clear guidance or dedicated support.

There is also a lack of long-term regulatory predictability, which erodes investor confidence. As one participant put it, "we can't plan a 25-year investment on one-year policy cycles." Without stable tariff structures, clearly defined incentive mechanisms (such as feed-in premiums or performance-based subsidies), and guaranteed grid access terms, even economically viable projects remain risky. This concern is especially acute for floating solar, agricultural integration models, or other innovative applications, which currently exist in a regulatory vacuum. As Agim Bregasi pointed out, southern Albania could host a wide range of solar solutions that reduce energy losses from transmission (noting the ~16 MW loss from transferring energy from northern hydro plants to southern cities), but there is no active planning to incentivize such distributed models.

Another critical issue is the lack of technical and institutional capacity at the local level, particularly among municipalities and local energy offices. While some urban centers like Tirana and Fier have introduced simplified permitting procedures, others lack trained staff, standardized tools, or clear land-use frameworks. This disproportionately affects rural areas where solar development could have the most decentralized and inclusive impact. Dritan Kapaj added that solar is particularly attractive because it "requires no mechanical parts, minimal maintenance, and is highly modular," yet the administrative system treats small-scale projects as if they were utility-scale installations, resulting in excessive regulatory burden for minimal installations.

Finally, the absence of a structured public-private dialogue platform was identified as a cross-cutting barrier. Several participants remarked that strategic decisions in energy tend to be made without meaningful consultation with investors or developers. This has resulted in a climate of mistrust, where businesses hesitate to initiate projects due to perceived institutional indifference or unpredictability. The call from participants was clear: a dedicated solar or renewables council, jointly governed by the private sector and public institutions, could serve as a platform for co-designing reforms, piloting new models, and improving communication.

In conclusion, the barriers to solar energy investment in Albania are systemic, multifaceted, and deeply rooted in governance challenges. However, they are not insurmountable. The clarity and coherence of the issues raised by stakeholders suggest that the solutions are within reach—requiring coordination, transparency, and institutional will. The following sections will examine how regional best practices can help shape these reforms, and what strategic steps Albania must take to unlock private sector leadership in its solar future.

4.3 Investor Perspectives

The focus group discussions conducted during the project "*Potenciali i Energjisë Diellore në Shqipëri*", offered a unique window into how investors and private sector actors perceive the evolving landscape of solar energy in Albania. These conversations, held with business leaders, energy engineers, consultants, and entrepreneurs, revealed both a strong underlying motivation to invest in solar and a cautious, strategic approach shaped by the realities of the Albanian institutional and market environment.

One of the dominant themes across all discussions was that solar energy is increasingly perceived not only as an environmentally responsible investment, but as an economically sound and operationally strategic decision. Altin Toska, speaking from an industrial producer's perspective, noted that the payback period for solar systems installed for self-consumption is often between 2.5 to 3 years, with manufacturer-backed warranties extending to 25 years, making it "one of the most profitable business models today." This long-term

visibility—paired with immediate cost savings—makes solar attractive for businesses seeking to stabilize operational costs in an unpredictable energy market.

Energy autonomy was another major motivation cited by investors. Multiple participants highlighted the growing need to decouple from volatile electricity markets, especially given the rising seasonal demand in southern Albania during the summer months. As Afrim Osmani noted, solar offers the unique advantage of turning every rooftop or underutilized surface into a productive energy asset, reducing dependency on the national grid. This argument is particularly relevant in a system where hydropower production dominates but cannot meet full-year consumption needs, especially in dry periods.

In addition to economic and operational incentives, investors increasingly view solar energy as a reputational and strategic asset. Several businesses reported that their engagement with European partners, especially in export-oriented industries, now requires ESG compliance, carbon footprint disclosure, and demonstration of green infrastructure. In this regard, solar installations are not just cost-effective—they are a gateway to new markets, funding opportunities, and stakeholder legitimacy. Companies that had adopted solar reported improved eligibility for EU grant schemes, facilitated partnerships with development institutions, and enhanced branding in competitive sectors such as tourism and agri-food.

However, the enthusiasm for solar is tempered by deep concern over institutional reliability and the lack of predictability in the investment environment. Participants described the regulatory system as unclear, overcomplicated, and inconsistently applied. Several reported initiating projects only to later abandon them due to shifting interpretations of the law, delays in grid connection permits, or lack of transparency regarding tariffs and incentives. Even investors with technical capacity and access to capital viewed the Albanian energy bureaucracy as a high-risk component, especially in the absence of contractual guarantees or structured state support.

The issue of financing was another recurring constraint. While most medium to large firms interviewed had chosen to self-finance their installations, this was not perceived as an optimal strategy—it was simply the only viable one. The lack of specialized loan products, low institutional awareness within the banking sector, and perceived sector risk made bank financing rare. Participants advocated for the introduction of green credit lines, guarantee mechanisms, or blended finance models that could reduce upfront burden and open space for innovation. As one participant emphasized, "we're not asking for subsidies—we're asking for rules, predictability, and access to instruments that make sense for a 20-year investment."

Another critical insight from the discussions was the mismatch between local-level opportunity and central-level policy focus. While regions such as Fier, Vlorë, and Sarandë were repeatedly identified as ideal for solar installations due to favorable radiation and terrain, investors found limited municipal support and a lack of targeted incentives. This spatial disconnect creates a bottleneck in areas where solar could not only supplement hydroelectric shortfalls but also reduce transmission losses from north-to-south energy flow—losses estimated by Agim Bregasi at up to 16 MW.

Furthermore, investor perspectives highlighted a need for peer knowledge-sharing and demonstration effects. Many SMEs and independent entrepreneurs expressed hesitation not because they doubted solar's potential, but because they lacked access to real case studies, technical support, and trusted vendor networks. Participants called for the creation of regional solar accelerators or pilot zones—backed by both technical institutions and local governments—where success stories could be documented, monitored, and replicated.

Trust in institutions was a cross-cutting theme—both as a barrier and a prerequisite for engagement. Businesses with positive experiences interacting with proactive local offices or public agencies reported greater willingness to expand their investments. Others, who had encountered delays, unreturned inquiries, or sudden procedural changes, remained skeptical of future engagement. This confirms that beyond financing or tariffs, institutional behavior itself is a core part of the investment equation.

In summary, investor perspectives in Albania reflect a mature and increasingly informed market logic: solar is seen as a reliable, economically sound, and strategic solution—but only when supported by a regulatory framework that is consistent, efficient, and transparent. The private sector is willing to lead Albania's solar transformation, but it cannot do so in a policy vacuum or a climate of institutional uncertainty. Building this bridge between motivation and realization will require stronger state leadership, structured dialogue, and policy mechanisms that align with the risk profiles and innovation capacities of a diverse investor community.

4.4 Regional Comparisons

Albania's efforts to diversify its renewable energy portfolio, particularly through the development of solar energy, can benefit substantially from examining regional experiences across the Western Balkans and Southern Europe. Although the countries in this region differ in their institutional maturity, EU integration status, and market size, they face many of the same challenges as Albania: legacy dependence on hydropower or coal, limited grid flexibility, and the need to unlock private investment. In this regard, countries such as North Macedonia, Greece, and Croatia offer valuable policy and implementation lessons that can inform Albania's strategic choices moving forward.

North Macedonia has emerged as one of the most progressive actors in the region in terms of solar energy development. Over the past five years, it has adopted a transparent and competitive auction system that has resulted in the tendering of more than 300 MW of solar capacity. These auctions are supported by 15- to 20-year Power Purchase Agreements (PPAs), providing investors with predictability and bankability. What sets North Macedonia apart is its emphasis on procedural clarity: the auctions are administered through online platforms, the selection criteria are clearly defined, and model contracts are provided to ease legal burdens. In addition to large-scale tenders, the government has introduced feed-in premiums and grid connection guarantees for smaller developers, creating opportunities for participation across a broader investor base, including domestic SMEs and municipal initiatives. The presence of enabling policy instruments and clear institutional roles has helped foster a functioning ecosystem for solar investment—an outcome that remains elusive in Albania.

Greece, by contrast, provides a more advanced example of solar integration through its liberalized energy market and well-established regulatory infrastructure. As a member of the European Union, Greece benefits from greater access to climate finance, institutional benchmarking, and technical assistance. Between 2016 and 2023, Greece increased its installed solar capacity from approximately 2 GW to nearly 5 GW. This growth was achieved through a mix of auction-based procurement, strategic grid planning, and institutional reforms involving the Hellenic Energy Regulatory Authority (RAE) and the Renewable Energy Sources Operator (DAPEEP). Of particular relevance to Albania is Greece's ability to link renewable energy development with EU Recovery and Resilience Facility (RRF) funds, which have been used to co-finance solar projects, battery storage systems, and smart grid upgrades. Greece also demonstrates how consistent policy cycles—aligned with broader national climate goals—can guide investment over the long term.

In the case of Croatia, the most notable lesson lies in the country's decentralized approach and its active engagement with local governments. Croatia has promoted rooftop solar installations through targeted grants and streamlined permitting processes, particularly for systems under 50 kW. Municipalities play a proactive role in identifying potential project sites, assisting with permitting, and co-financing installations in public buildings. Croatia's energy planning agency, the Energy Institute Hrvoje Požar (EIHP), has provided vital support in translating national energy goals into localized action. Moreover, the introduction of energy cooperatives—where citizens and local institutions jointly invest in renewable projects—has deepened public participation and created new financing models for rural communities. Although Albania lacks such cooperative structures today, the growing interest in prosumer models and local self-consumption suggests strong potential for similar frameworks to emerge.

Across these three cases, several shared features stand out as critical enablers of solar energy expansion. First, the implementation of predictable and technology-neutral auctions has proven essential for attracting investment. These auctions offer market-based pricing, reduce reliance on subsidies, and ensure competition based on cost and quality. Second, the establishment of dedicated institutional capacity—whether through national regulatory bodies or donor-supported project units—has facilitated more efficient permitting, project tracking, and investor support. Third, the integration of renewable energy development with grid infrastructure planning has been key to avoiding congestion and ensuring the reliability of solar uptake. Rather than treating solar energy as a standalone initiative, these countries have embedded it within their broader energy transition strategies.

Moreover, each of these countries has benefited from access to concessional and blended finance, especially in the early stages of project development. Partnerships with the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), and bilateral donors have helped de-risk solar investments and introduce innovative financial instruments such as viability gap funding, partial risk guaran-

tees, and green bonds. This access to tailored finance has expanded participation beyond well-capitalized firms to include smaller and mid-sized enterprises.

Another important insight concerns the role of local governance. Municipalities have often served as initiators or facilitators of solar projects, either by offering rooftops and land, co-financing pilot installations, or streamlining permits at the local level. Their role is especially crucial in countries like Albania, where national institutional capacity remains uneven. Investing in local capacities—technical, legal, and financial—can help unlock a wave of distributed solar deployment, especially in regions with high irradiation potential but low grid connectivity.

These regional experiences suggest that technical potential, while essential, must be matched by political will, institutional coordination, and policy credibility. Albania has already taken initial steps, such as launching the Karavasta and Spitalla tenders, introducing net metering, and conducting national mapping of solar potential. However, these efforts remain fragmented, isolated, and donor-dependent. To follow the trajectory of its regional peers, Albania must develop a coherent policy framework anchored in rule-based governance, inclusive participation, and long-term planning. In doing so, it can transform its geographic advantage into a strategic asset—positioning solar energy not only as a supplementary source, but as a central pillar of a diversified and resilient national energy system.

5. Policy and Strategic Recommendations

Albania stands at a pivotal moment in its energy transition. The solar potential is evident, investor interest is growing, and the foundational elements of a renewable energy framework are in place. Yet, without coordinated policy reform and institutional strengthening, the country risks failing to capitalize on these advantages. Based on the findings of this study—rooted in the national project coordinated by Luarasi University with AKKSHI support—and guided by successful regional experiences, this section outlines strategic recommendations to overcome current constraints and accelerate solar energy development in Albania.

A central priority is the reform and simplification of the regulatory and permitting environment. The current system is fragmented, opaque, and marked by institutional overlap, particularly between national ministries, local governments, and regulatory agencies. The establishment of a centralized, digitalized permitting portal—a “one-stop-shop” for renewable energy investors—would represent a transformational step. This platform should offer unified procedures for licensing, land-use approvals, environmental clearances, and grid connection, along with real-time tracking and technical guidance. Moreover, Albania should adopt standardized templates for contracts, interconnection agreements, and environmental impact assessments to reduce delays and legal ambiguity.

In parallel, the country must strengthen and stabilize its incentive frameworks. While current VAT exemptions and net metering provisions are commendable, they are inconsistently applied and poorly communicated to potential adopters. Albania should introduce a well-structured feed-in premium or contract-for-difference scheme for projects below utility scale, designed to ensure price predictability while promoting competition. A clear auction calendar for larger projects, with published capacity targets and eligibility criteria, would further improve investor confidence and market visibility. These instruments must be embedded in legal frameworks that guarantee long-term applicability, insulating them from short-term political shifts.

Equally important is the need to align investor interests with national energy goals through financial de-risking instruments. The Albanian government, in collaboration with international partners, should explore the establishment of dedicated green credit lines, loan guarantees, and blended finance instruments aimed at reducing capital costs and attracting diverse investor profiles. Priority should be given to small and medium-sized enterprises (SMEs), cooperatives, and municipalities, which often lack access to commercial debt but are well positioned to deploy distributed solar systems. Capacity-building support for domestic banks and financial intermediaries is also necessary to foster familiarity with solar technologies, project appraisal methodologies, and risk evaluation tools.

Institutional coordination must also be addressed as a matter of urgency. Albania’s energy governance remains characterized by overlapping mandates and fragmented accountability. A high-level inter-institutional body—such as a Renewable Energy Investment Task Force—should be established to oversee solar deployment, coordinate between agencies, monitor implementation of the energy strategy, and engage

with private sector stakeholders on a regular basis. This body could also serve as the institutional anchor for public-private dialogue, ensuring that investor feedback informs regulatory updates and policy design.

At the local level, municipalities must be empowered to act as facilitators of solar deployment. This requires clear mandates, technical training, and budgetary support for local planning offices, as well as the authority to allocate public land and rooftops for solar use. Pilot programs should be launched in high-irradiation regions such as Fier, Vlorë, and Sarandë, where local governments can partner with businesses and community organizations to co-develop solar projects. These pilots could serve as demonstration hubs, generating peer-learning effects and catalyzing replication in other parts of the country.

Incentives should not be limited to financial instruments alone. Regulatory innovation is also necessary to encourage diverse participation. For example, Albania could develop tailored policies for emerging models such as energy cooperatives, floating solar, agri-PV, and industrial symbiosis. These models offer not only environmental benefits but also social and territorial inclusion, particularly in regions vulnerable to energy poverty or economic marginalization.

Finally, a robust public awareness campaign is needed to inform citizens, businesses, and local leaders about the benefits of solar energy and the tools available to support adoption. The lack of clear, accessible information is a recurring barrier, particularly for first-time investors. A dedicated online platform, complemented by in-person outreach programs and demonstration sites, could help demystify the process and build public trust.

In conclusion, Albania's transition to a solar-powered future will depend not only on the country's abundant natural resources but on its ability to enact credible, inclusive, and future-oriented reforms. The private sector has signaled its readiness to lead, but it needs a policy environment that rewards initiative, protects investment, and promotes long-term collaboration. The path forward lies in strategic alignment—between ambition and implementation, between public and private sectors, and between national vision and local action.

6. Conclusion

Albania is at a decisive inflection point in its energy trajectory. With its electricity system historically dominated by hydropower, the country faces both a vulnerability and an opportunity. The reliance on a single renewable source—while environmentally commendable—has exposed Albania to significant risks tied to seasonal variability, climate-induced droughts, and the volatility of regional energy markets. Against this backdrop, the need for renewable energy diversification is not simply a policy ambition; it is a structural imperative. Solar energy, given Albania's geographic advantages and growing technological affordability, stands as the most viable and strategic pathway to achieving that diversification.

This study, developed as a core deliverable of the national project *Potenciali i Energjisë Diellore në Shqipëri*, coordinated by Luarasi University and supported by AKKSHI, has demonstrated that the country possesses both the technical potential and the economic logic to expand solar energy. High levels of solar irradiation, favorable terrain in the southern and western regions, and a growing appetite from the private sector have laid the foundation for a transition. Focus group discussions with investors, engineers, and policymakers revealed a clear alignment of interests: solar energy is widely perceived as a cost-effective, low-risk, and future-proof solution for businesses and communities alike.

Yet, despite this convergence of opportunity and intent, Albania's solar sector remains underdeveloped and largely untapped. The findings of this research have pointed to a set of entrenched barriers that continue to hinder private sector participation. Chief among these are the inefficiencies and fragmentation in the permitting system, the lack of stable and transparent incentive mechanisms, and the absence of targeted financial instruments tailored to renewable energy projects. Investors operate in an environment where returns are promising, but institutional reliability is uncertain—a dynamic that constrains growth and deters long-term planning.

Comparative experiences from North Macedonia, Greece, and Croatia highlight that these obstacles are not insurmountable. With the right mix of regulatory clarity, financial innovation, and institutional coordination, countries across the region have successfully mobilized public and private resources to scale solar deployment. Albania has already taken important first steps, such as initiating international auctions, piloting net metering, and mapping solar potential across its

territory. What remains is the political will and administrative coherence to scale these efforts and translate them into a systematic national strategy.

The recommendations outlined in this paper underscore the importance of reforming Albania's regulatory environment, aligning incentives with investor expectations, strengthening local governance, and fostering public-private dialogue. In doing so, Albania can unlock a virtuous cycle in which solar energy drives not only energy security, but also innovation, local economic development, and alignment with European climate goals.

As Albania looks toward 2030 and beyond, the question is no longer whether solar energy should be central to its energy mix—it is how quickly and how effectively this transition can be realized. The private sector is ready to invest. The technology is accessible. The conditions are favorable. What is needed now is strategic leadership, institutional confidence, and a shared vision of a resilient, diversified, and inclusive energy future. Albania has the opportunity to lead the region not only in hydropower, but in building a next-generation solar economy that benefits all.

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References

- AKKSHI & Luarasi University (2024) Potenciali i Energjisë Diellore në Shqipëri: Raport Shkencor i Projektit. Tiranë: Universiteti Luarasi.
- Energy Community Secretariat (2022) Annual Implementation Report 2022. Available at: https://www.energy-community.org (Accessed: 25 March 2025).
- Energy Community Secretariat (2023) Albania 2023 Energy Profile. Available at: https://www.energy-community.org (Accessed: 24 March 2025).
- Energy Community Secretariat (2023) Policy Guidelines on Renewable Energy Auctions in the Western Balkans. Available at: https://www.energy-community.org (Accessed: 25 March 2025).
- European Bank for Reconstruction and Development (EBRD) (2020) EBRD backs record-low solar tariff in Albania's Karavasta Solar Tender. Available at: https://www.ebrd.com/news/2020/ebrd-backs-recordlow-solar-tariff-in-albania.html (Accessed: 25 March 2025).
- European Commission (2020) Green Agenda for the Western Balkans. Brussels: European Commission. Available at: https://ec.europa.eu/neighbourhood-enlargement/enlargement-policy/green-agenda-western-balkans_en (Accessed: 25 March 2025)
- Global Commission on the Economy and Climate (2018) Unlocking the Inclusive Growth Story of the 21st Century. Washington, DC: NCE. Available at: https://newclimateeconomy.net (Accessed: 25 March 2025).
- International Energy Agency (IEA) (2022) World Energy Outlook 2022. Paris: IEA. Available at: https://www.iea.org/reports/world-energy-outlook-2022 (Accessed: 25 March 2025).
- International Finance Corporation (IFC) (2021) Scaling Up Private Sector Investment in Renewable Energy. Washington, DC: World Bank Group.
- International Renewable Energy Agency (IRENA) (2020) Fostering Effective Energy Transition: Innovation and Investment Trends. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA) (2022) Renewable Energy Statistics 2022. Abu Dhabi: IRENA.
- International Renewable Energy Agency (IRENA) (2023) Renewable Energy Market Analysis: Southeast Europe 2023. Abu Dhabi: IRENA.
- NASA POWER Project (2023) Prediction Of Worldwide Energy Resources (POWER) Data Access Viewer. Available at: https://power.larc.nasa.gov (Accessed: 24 March 2025).
- REN21 (2021) Renewables 2021 Global Status Report. Paris: REN21 Secretariat. Available at: https://www.ren21.net (Accessed: 25 March 2025).
- World Bank (2020) Mobilizing Private Investment for Renewable Energy in Developing Countries. Washington, DC: World Bank.
- World Bank (2021) Western Balkans: Scaling Up Renewable Energy Investments. Washington, DC: World Bank Group.
- World Bank (2023) Global Solar Atlas: Albania Solar Resource Map. Available at: https://globalsolaratlas.info (Accessed: 24 March 2025).