AFRICAN SCHOOL OF REGULATION

INTERNATIONAL SOLAR ALLIANCE

CONFERENCE REPORT

International Online Conference on Regulatory Frameworks for the Deployment and Integration of Solar Energy in African Power Sectors.

African School of Regulation (ASR)

International Solar Alliance (ISA)

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1. Introduction

The International Online Conference on Regulatory Frameworks for the Deployment and Integration of Solar Energy in the Power Sector of African Countries was convened in recognition of the importance of regulatory frameworks in enabling solar deployment. The African School of Regulation (ASR), in collaboration with the International Solar Alliance (ISA), convened a three-day open online high-level conference from 24 to 26 February 2026 titled *"Regulatory Frameworks for the Deployment and Integration of Solar Energy in the Power Sector of African Countries."* The conference was designed to explore how regulation can enable and promote the large-scale deployment and integration of solar electricity generation in African power systems while ensuring sustainable market structures and investment models. The event formed part of ASR's broader mission to strengthen regulatory capacity and promote evidence-based policymaking in Africa's energy sector.

The conference was structured over three thematic days, combining keynote presentations, expert briefings, and moderated panel discussions. The format was designed to encourage dialogue between regulators, policymakers, financiers, utilities, and industry stakeholders, while also allowing wider participation through an open online platform. The conference brought together a diverse group of stakeholders from across the energy sector. Panel discussions featured representatives from institutions such as the African Development Bank, the International Finance Corporation, the African Forum for Utility Regulators, and the African Energy Commission, alongside national government representatives and private-sector experts.

This report summarizes the main insights and conclusions emerging from the conference discussions. It highlights the regulatory, technical, financial, and institutional challenges that must be addressed to unlock solar energy investment across African power systems.

Key Highlights of the Conference

Several important insights emerged from the discussions:

- Solar energy represents a critical pathway for addressing Africa's electricity access gap, given the continent's abundant solar resources and rapidly declining technology costs.
- Regulatory frameworks play a central role in enabling solar investment. Transparent licensing procedures, competitive procurement mechanisms, and bankable power purchase agreements were identified as essential for attracting private investment.
- Grid infrastructure and system flexibility remain major challenges. Participants emphasized the need to strengthen transmission networks, update grid codes, and introduce flexible system management tools to support renewable energy integration.
- Financial risks continue to constrain solar development. High financing costs, currency risks, and weak utility creditworthiness were highlighted as key barriers to investment.
- Regional cooperation and electricity market integration can significantly support renewable energy expansion. Cross-border power trade and regional power pools were identified as mechanisms that can help balance variable renewable generation and improve system reliability.

Overall, the conference underscored the importance of coordinated regulatory reform, infrastructure investment, financial innovation, and institutional capacity building in unlocking the

full potential of solar energy across African power sectors. The discussions provided valuable insights for policymakers, regulators, and investors seeking to accelerate Africa's transition toward a more sustainable and inclusive energy future.

2. Context: Africa's Solar Energy Landscape

The transition toward sustainable and resilient energy systems has become one of the most urgent development priorities across the African continent. As African economies continue to expand and populations grow rapidly, electricity demand is projected to increase significantly over the coming decades. At the same time, the continent faces the dual challenge of expanding energy access while transitioning toward low-carbon energy systems. Within this context, solar energy has emerged as one of the most promising technologies capable of supporting Africa's energy transformation.

Africa possesses some of the richest solar resources in the world, with many regions receiving more than 2,000 kWh/m² of solar irradiation annually. Despite this natural advantage, the deployment of solar photovoltaic (PV) generation across the continent remains relatively limited. As of 2023, Africa's installed utility-scale solar PV capacity stood at approximately 15 GW, representing less than 2% of global installed solar capacity, which exceeds 1 terawatt. In contrast, other regions have experienced much faster solar expansion, with the European Union installing over 260 GW and China exceeding 500 GW of solar PV capacity (International Energy Agency, 2023; International Renewable Energy Agency, 2023). This disparity highlights the substantial untapped potential for solar energy development across African power systems.

At the same time, Africa continues to face one of the largest electricity access gaps in the world. More than 600 million people across the continent lack access to electricity, particularly in rural and peri-urban areas (World Bank, 2023). Expanding electricity supply is therefore essential not only for improving living standards but also for supporting industrialization, digitalization, and broader economic development. Solar PV technologies offer a unique opportunity to address these challenges because they can be deployed across multiple scales, ranging from large utility-scale solar farms to distributed rooftop systems, mini-grids, and standalone solar solutions.

In recent years, the economics of solar power have improved dramatically. The global levelized cost of electricity (LCOE) from utility-scale solar PV has declined by approximately 89% since 2010, making it one of the most competitive electricity generation technologies in many markets (IRENA, 2023). These declining costs, combined with advances in storage technologies and grid management tools, have significantly strengthened the case for solar energy as a key component of Africa's future energy mix.

However, realizing the full potential of solar energy in Africa requires more than favorable natural resources and declining technology costs. Large-scale deployment of solar generation depends heavily on the existence of effective regulatory frameworks capable of attracting investment, ensuring transparent procurement processes, enabling grid integration, and supporting financially sustainable electricity markets. In many African countries, regulatory uncertainty, weak institutional capacity, limited transmission infrastructure, and financial risks continue to constrain renewable energy investment.

3. Barriers and System Constraints

Despite these opportunities, the conference underscored that several structural barriers continue to constrain solar deployment across African power sectors. These challenges span regulatory, financial, institutional, and technical dimensions.

Regulatory and institutional weaknesses remain among the most significant obstacles. In many countries, renewable energy frameworks are either incomplete or inconsistently applied, with complex and time-consuming licensing processes. Fragmented institutional responsibilities further complicate project development, creating uncertainty for investors and delaying implementation.

Procurement challenges also limit solar expansion. The absence of transparent and competitive procurement mechanisms in some markets reduces investor confidence and can result in inefficient project selection. Weak enforcement of contracts, including power purchase agreements, increases perceived risks and raises financing costs.

Financial constraints represent another major barrier. High interest rates, currency volatility, and weak utility creditworthiness significantly increase the cost of capital for solar projects. Delays in payments by off takers further undermine project bankability, discouraging private investment.

In addition to these structural barriers, system-level constraints pose critical challenges for solar integration. Many African power systems were designed around centralized, dispatchable generation and lack the flexibility required to accommodate variable renewable energy. Limited transmission infrastructure restricts the ability to connect solar-rich regions to demand centers, while inadequate system planning increases the risk of congestion and curtailment. The variability of solar generation also necessitates more sophisticated system management. Without adequate flexibility, through storage, demand response, or flexible generation, power systems may struggle to maintain reliability as solar penetration increases. These combined barriers highlight the need for a comprehensive and coordinated approach to solar sector development.

4. Regulatory and Market Solutions

Addressing these challenges requires robust and well-designed regulatory frameworks that promote investment, ensure transparency, and support efficient market functioning. The conference emphasized that regulation plays a central role not only in removing barriers but also in actively enabling solar deployment.

One of the key priorities identified is the streamlining of licensing and permitting processes. Simplified procedures, clear regulatory guidelines, and defined timelines can significantly reduce project development risks and improve investor confidence. Regulatory clarity is particularly important in emerging markets where uncertainty can deter investment.

Competitive procurement mechanisms, especially renewable energy auctions, were highlighted as effective tools for driving cost efficiency and transparency. Well-designed auctions can foster competition among developers, reduce tariffs, and ensure fair and efficient allocation of projects.

Ensuring the bankability of power purchase agreements (PPAs) is another critical component. Strong contractual frameworks that clearly define risk allocation, tariff structures, and payment mechanisms are essential for attracting long-term private investment. Regulatory support for contract enforcement is equally important in reducing perceived risks.

The conference also emphasized the importance of strengthening regulatory institutions. Independent, well-resourced regulators with strong technical capacity are essential for

implementing policies effectively and maintaining market confidence. Building capacity across regulatory agencies, utilities, and system operators is therefore a key priority.

From a system integration perspective, regulatory frameworks must also evolve to support modern grid operations. This includes updating grid codes, enabling the deployment of energy storage, and facilitating demand-side management. By aligning regulatory frameworks with technological advancements, countries can better integrate solar energy while maintaining system reliability.

5. Financing and Regional Market Development

Scaling solar energy in Africa will require substantial financial investment, far exceeding the capacity of public resources alone. Mobilizing private capital is therefore essential, and this depends on creating investment environments that effectively manage risks and ensure predictable returns.

Blended finance mechanisms were identified as a key solution. By combining public and concessional funding with private investment, blended finance can reduce project risks and improve financial viability. Development finance institutions and climate funds play a critical role in providing guarantees, concessional loans, and other risk mitigation instruments. Innovative financing tools such as green bonds, infrastructure funds, and public-private partnerships can further expand access to capital. Strengthening the financial performance of utilities is also essential, as creditworthy off takers are a cornerstone of bankable energy projects.

Regional cooperation was highlighted as a powerful enabler of solar development. Regional power pools and cross-border interconnections allow countries to share resources, reduce costs, and improve system reliability. By integrating electricity markets, countries can better manage the variability of solar generation and optimize the use of available resources. Expanding regional electricity trade also creates opportunities for large-scale renewable energy projects that serve multiple countries. Harmonizing regulatory frameworks across regions can further enhance investment attractiveness and facilitate project development.

Ultimately, the combination of innovative financing mechanisms and strengthened regional cooperation provides a pathway for scaling solar energy deployment across Africa in a cost-effective and sustainable manner.

10. Conclusion

Solar energy has the potential to transform Africa's electricity sector by expanding access, reducing generation costs, and supporting climate goals. However, achieving this transformation will require coordinated action among governments, regulators, investors, utilities, and development partners. By implementing effective regulatory frameworks, strengthening infrastructure, and mobilizing investment, African countries can unlock the full potential of solar energy and build more sustainable and resilient power systems.

References

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