MITIGATING THE RISKS OF PRIVATE SECTOR INVOLVEMENT IN THE ELECTRICITY SECTOR IN SUB-SAHARAN AFRICA

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ABSTRACT

Sub-Saharan African governments increasingly turn to private sector participation (PSP) to address electricity challenges, yet PSP often introduces fiscal, regulatory, and equity risks when implemented in systems with weak governance. This study examines how these risks arise across generation, transmission, and distribution, and identifies where PSP has supported or failed to support improved sector outcomes. While PSP can enhance power outcomes, its benefits depend heavily on the conditions under which it is deployed. The report recommends practical measures to mitigate risk, including stronger governance, clearer regulation, transparent planning and procurement, and protections that ensure electricity services remain affordable, inclusive, and aligned with public goals.

AUTHOR AFFILIATIONS AND ACKNOWLEDGEMENTS

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EXECUTIVE SUMMARY

Sub-Saharan Africa (SSA) faces an electricity access crisis, with over 600 million people lacking access to reliable power. Chronic underinvestment, institutional fragility and fragmentation, and operational inefficiencies have rendered many state-run utilities incapable of sustaining reliable service delivery, let alone meeting rising demand. In response, governments often running on budget deficits and influenced by international financial institutions have embraced private sector participation (PSP) as a means to mobilise capital, improve operational efficiency, and accelerate electrification. Yet the outcomes of PSP across SSA are mixed, raising questions about its effectiveness, equity, and long-term sustainability. This study undertakes a comprehensive, mixed-methods analysis of PSP in SSA's electricity sector. It maps the evolution and extent of private sector engagement across generation, transmission, and distribution; quantifies its prevalence; and assesses its impact on six core performance indicators: financial viability, access, affordability, quality of supply, operational efficiency, and decarbonisation.

KEY FINDINGS

- **PSP is concentrated in generation.** Independent power producers (IPPs) are becoming central to electricity generation in many SSA countries. Here, private participation has helped mobilise capital and close investment gaps, supported by long-term power purchase agreements (PPAs), competitive procurement, and risk-mitigation instruments, particularly from development finance institutions (DFIs) and other agencies providing guarantees, concessional finance, and de-risking support. However, PSP in transmission and distribution remains limited, typically confined to project-specific arrangements such as engineering, procurement, and construction (EPC) or build-own-transfer (BOT) contracts.
- **The impact of private sector participation in SSA's electricity sector is context-dependent.** Its effectiveness depends on how, where, and under what conditions it is deployed.
- **Private sector participation leads to successful sector outcomes when supported by enabling political, policy, regulatory, governance, and institutional factors.** Literature shows that countries with strong political leadership and champions, clear policy and regulatory frameworks, transparent governance, and respect for property rights, supported by a favourable political economy, boost IPP uptake and lead to better outcomes.
- **There is a moderate positive correlation between PSP and sector outcomes.** Overall, PSP shows a modest positive correlation with power sector performance, particularly in operational efficiency,[1] urban access, and quality of supply. However, links to affordability and decarbonisation are weak, indicating that PSP has not substantially reduced cost barriers for consumers or advanced the clean energy transition.
- **Affordability gains from PSP are most evident in transmission and distribution.** While PSP in generation is linked primarily with expanding capacity, the involvement of private actors in transmission and distribution demonstrates a stronger positive association with affordability. This may be linked to efficiency improvements such as more reliable revenue collection, reductions in technical and commercial losses, and strengthened operational management.

[1] Operational efficiency in this case includes loss reduction in transmission and distribution, as well as improved billing and revenue collection.

- **The observed relationship between PSP and sector performance has been catalysed by IPPs** in combination with reforms in transmission and distribution. However, improved performance (particularly in operational efficiency and reliability) may not always be the direct outcome of IPP participation but rather the result of utility performance that creates an environment for attracting them and in which they can thrive and deliver impact.
- **Coherent planning and timely competitive procurement matter.** Structured, transparent procurement processes aligned with long-term power sector planning, coupled with clear award criteria, enhance sector performance and investment outcomes.
- **Contract and risk design are critical.** Poorly structured contracts often undermine long-term fiscal sustainability. Successful PSP models depend on carefully calibrated risk-sharing mechanisms and credible counterparties.
- **Perceived investment risk limits capital flows.** International investors often perceive African power markets as high-risk, which drives up the cost of capital and restricts access to affordable long-term financing. Inflated financing costs driven by biased risk assessments are commonly passed on to consumers through higher tariffs, thereby affecting affordability and equity in electricity access. This perception, driven more by bias than actual performance, undermines the viability of private projects, particularly in smaller or lower-income markets. Existing evidence, however, shows default rates are rare and payment performance is better than many assume.
- **Social considerations are often overlooked.** Labour restructuring, rising tariffs, and limited community engagement have provoked resistance to PSP. Inclusive planning, equitable tariff structures, and participatory project design, including job opportunities for locals, are essential to ensuring social legitimacy.

POLICY RECOMMENDATIONS

- **Prioritise enabling governance conditions to reduce PSP risks**. Governments must focus on strengthening institutional credibility, ensuring transparent procurement, and establishing independent oversight bodies to enable PSP to perform effectively.
- **Pursue governance reforms alongside PSP to reduce performance risks and improve outcomes.** In contexts where governance structures are weak (where there are, e.g., lack of transparency, poor enforcement of contracts, and political interference), PSP has struggled to deliver sustained service improvements and financial stability. Linking governance reform with PSP implementation can mitigate risks such as poor operational oversight, misaligned incentives, and underperformance.
- **Strengthen policy and regulatory institutions to manage PSP effectively.** Independent regulators, consistent policy signals, and clear, enforceable rules reduce uncertainty and help align private incentives with long-term sector goals. This prevents opportunistic behaviour and protects the public interest.
- **Embed PSP within coherent planning and procurement frameworks.** Integrating PSP into national energy plans, supported by transparent and competitive tenders, ensures projects target priority needs, avoid stranded assets, and align with fiscal sustainability. This mitigates the risk of poorly designed or misaligned investments.
- **Ensure proper risk allocation to protect both investors and the public.** PSP can improve risk allocation by assigning "endogenous" risks (within the project's control) to private actors and keeping "exogenous" risks (macroeconomic, political) with the public sector. In addition,

the government should clarify and enforce policies that reduce political and regulatory uncertainty – e.g., committing to stable tariff principles, honouring PSP contracts, and avoiding arbitrary changes.

- **Address market perception and credit bias to reduce sector risk and, in turn, lower PSP financing costs.** Reform domestic and international risk assessment methodologies to better reflect actual sector performance. Reducing perceived risk strengthens credit profiles, lowers financing costs, and ultimately reduces the burden passed on to customers through higher tariffs.
- **Leverage blended financing to overcome the limitations of pure public or pure private models.** Government-only financing can prioritise social outcomes but is often constrained by budget and efficiency limitations. Fully private models may neglect socially important but less profitable investments, such as rural electrification. Blended finance can combine public oversight and social objectives with private capital and efficiency, reducing investor risk while ensuring equitable service delivery.
- **Ensure affordability, equity, and social safeguards.** Integrate targeted subsidies, lifeline tariffs, and rural electrification mandates into PSP frameworks to prevent the exclusion of vulnerable populations, while embedding community engagement, gender-sensitive planning, and fair labour transition mechanisms into electricity sector reforms.

The main contribution of the study is the development of a systematic framework that evaluates PSP involvement across the electricity value chain against sector outcomes, offering stakeholders a practical tool for assessing private participation in SSA's electricity system. However, the quantitative findings should be interpreted with caution. Limited data coverage means that weak correlations might indicate no relationship at all. Moreover, correlations identify associations but not causal effects. Positive results may reflect the fact that PSP tends to occur in markets with stronger performance rather than directly producing such outcomes.

In conclusion, PSP can play a meaningful role in addressing SSA's electricity challenges, but only under the right conditions. Without robust governance, coherent regulation, appropriate risk management, and attention to social equity, PSP risks entrenching inequality and fiscal fragility rather than delivering transformational outcomes. For the majority of African countries with inadequate power infrastructure, blended approaches (e.g., public-private partnerships) are needed to fill this gap. Case studies such as the early rounds of South Africa's Renewable Energy IPP Procurement Programme (REI4P) – a government-initiated auction scheme which attracted significant private capital by providing a clear policy framework and payment guarantees – showcase the potential to expand energy access, showing that with proper policy support, private investors will engage even in new sectors (like renewables). Nevertheless, for Africa to realise its development goals, it must adopt transparent frameworks that incentivise private sector participation, align with national planning processes, and deliver measurable social benefits.

INTRODUCTION

Despite sub-Saharan Africa's vast renewable energy potential and significant natural resources, over 600 million people remain without access to electricity (IEA, 2022). This persistent energy poverty represents one of the main obstacles to sustainable economic growth, human development, and poverty alleviation in the region (World Bank Group, 2025). The implications of electricity deprivation extend far beyond households; it hampers industrialisation, stifles service delivery, and curtails national progress toward Sustainable Development Goal 7: ensuring access to affordable, reliable, sustainable, and modern energy for all by 2030 (UN, 2023). The electricity sector across sub-Saharan Africa (SSA) is characterised by systemic underperformance across the value chain, from generation through transmission to distribution. Chronic underinvestment, institutional fragility, technical and commercial inefficiencies, and fiscal stress have rendered many state-owned utilities incapable of meeting demand, expanding systems, or maintaining service quality (Balabanyan *et al.,* 2021; IEA, 2022; Kapika & Eberhard, 2013). With distressed utilities and fiscally constrained governments lacking the resources to meet SDG 7, private sector participation (PSP) has been positioned as a vital source of capital, technical capability, and project execution capacity (Eberhard *et al.*, 2017b). In many cases, African governments, often with the counsel of development finance institutions (DFIs), have turned to the private sector as a means of revitalising electricity systems (Klagge & Nweke-Eze, 2020; Kruger & Alao, 2024; Nweke-Eze, 2024). This has ushered in a wave of reforms emphasising privatisation, unbundling of utilities, the creation of independent regulatory bodies, and competition *for* and *in* the market (AfDB, 2019; Foster & Rana, 2019).

While PSP was envisioned as a catalyst for boosting efficiency, stimulating innovation, addressing performance failures, and mobilising capital, the reality has been far more complex and contested. The outcomes of PSP across SSA have been uneven, shaped by national contexts, governance quality, and policy coherence. This underscores the importance of understanding not just the potential benefits of PSP, but also the risks it entails and how these can be mitigated to ensure that private investment contributes effectively to sector transformation (AfDB, 2019; Foster & Rana, 2019).

Therefore, this paper interrogates the role of private sector actors in SSA's electricity sector. It explores the historical rationale for PSP, the diverse modalities of engagement across the electricity value chain, and the resulting impacts on sectoral performance. Central to the study is an assessment of how PSP correlates with key sectoral outcomes and under what conditions it leads to improved results or exacerbates existing challenges. To this end, the research adopts a mixed-methods approach. Quantitatively, it constructs a composite index to gauge the extent of PSP in generation, transmission, and distribution, using both proprietary (Power Futures Lab, 2024, 2025) and publicly available datasets (AEP, 2023; Cable.co.uk, 2021; World Bank, 2018, 2021a, 2021b, 2021c, 2022, 2023a, 2023c, 2025a, 2025b). This index is then analysed against sector performance indicators through statistical techniques (Pearson correlation coefficient) to identify patterns and associations. Qualitatively, the paper conducts a systematic review of literature, policy documents, and case studies to unpack contextual factors that drive the success or failure of PSP initiatives across the continent. Country-level examples further contextualise the findings, shedding light on the underlying elements that shape PSP outcomes.

The rest of this report is structured as follows: Section 2 examines the evolution and forms of private sector engagement across the electricity value chain in Sub-Saharan Africa. Section 3 quantifies PSP by country and segment. Section 4 evaluates its impact on sector performance. Section 5 explores key drivers of PSP effectiveness, including governance, regulation, and financing. Section 6 outlines policy implications. The final section concludes by reflecting on the conditions under which PSP can contribute meaningfully to Africa's energy transformation.

PRIVATE SECTOR INVOLVEMENT IN SSA'S ELECTRICITY SECTOR

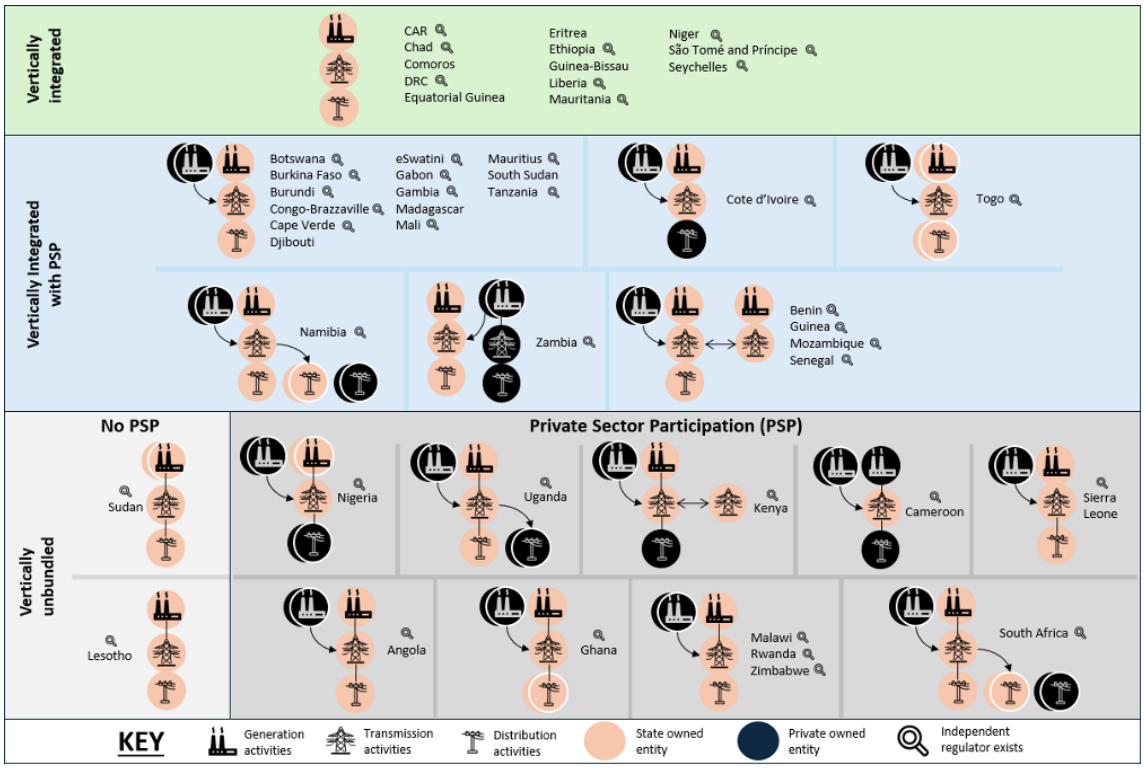
The rationale for private sector participation in SSA's electricity sector is rooted in the systemic failures of public utility governance, economic liberalisation imperatives of the 1990s, and the increasing pressures of global development agendas. The sector's dysfunction became particularly acute in the late 20th century, when most African governments found themselves unable to expand or maintain energy infrastructure amid widespread macroeconomic crises and structural adjustment programs (AfDB, 2019; Foster & Rana, 2019). State-owned utilities were often vertically integrated monopolies operating under opaque regulatory regimes, with limited commercial orientation and poor performance accountability (AfDB, 2019). Financial distress was widespread, driven by below-cost tariffs, poor billing and collection practices, excessive technical losses, soft budgets, inefficiencies in capital expenditure (CAPEX) execution and operations, and overstaffing. Consequently, utilities were unable to generate sufficient internal revenue or attract creditworthy financing for capital expansion (AfDB, 2019; Foster & Rana, 2019; Kapika & Eberhard, 2013). Beneath these failures lay the reality that African governments were in a financial crisis, had huge investment needs, and held development ambitions for the wider economy (Twesigye, 2022).

Against this backdrop, multilateral development institutions such as the World Bank and the International Monetary Fund began to advocate a "standard model" of power sector reform, which aimed to introduce competition, address utility performance failures, enhance efficiency, and mobilise private capital (AfDB, 2019; Foster & Rana, 2019; Foster *et al.*, 2017; Twesigye, 2023). The core components of this model included corporatisation of utilities, unbundling of generation, transmission, and distribution functions, establishment of independent regulators, adoption of cost-reflective tariffs, and liberalisation of electricity markets to accommodate private sector participation (Godinho, 2020; Kemabonta & Johnson, 2025). These reforms were designed not only to improve sector performance but also to realign the power sector with broader macroeconomic stabilisation and privatisation programs being implemented across the continent (Kapika & Eberhard, 2013).

Private sector engagement was therefore positioned not merely as a policy preference but as an urgent necessity. With public investment stagnant and many utilities locked out of capital markets due to their weak balance sheets, PSP was framed as the only viable pathway to meet growing electricity needs, modernise systems, and introduce commercial discipline. It was during this period that independent power producers (IPPs), public-private partnerships (PPPs), and management contracts began to appear across SSA, particularly in generation (AfDB, 2019; Foster & Rana, 2019). In Uganda, uniquely, the first private concessions in anglophone Africa were contracted both in generation and distribution (Twesigye, 2023).

The diffusion and implementation of these reforms varied significantly across countries. As shown in Figure 1, some governments moved aggressively to liberalise their power sectors, including Ghana, Kenya, Nigeria, and Uganda, while others maintained vertically integrated models or only partially adopted reform components (AfDB, 2019; PFL, 2025). Often, the pace and depth of reforms depended on the ease of implementation rather than the stylised sequence. Overall, the figure highlights the diversity of sector structures across SSA, ranging from fully unbundled systems with PSP to vertically integrated utilities without any private participation.

Figure 1: Structure of Electricity Sectors and Private Sector Participation in SSA Countries



Source: Authors' compilation

The rest of this section describes the ways in which the private sector is involved in the electricity sector in SSA across the generation, transmission, and distribution subsectors and analyses and weights the extent of private sector participation in each country.

GENERATION

Electricity generation in SSA represents the clearest and most entrenched domain of private sector participation in the region's power sector. While transmission and distribution remain largely under state control, generation has undergone a more decisive transformation. In particular, the emergence and expansion of IPPs have marked a turning point in how electricity is produced, financed, and governed across much of the continent (Alao & Kruger, 2020, 2022; Eberhard *et al.*, 2016; Eberhard & Gratwick, 2011; Kruger & Eberhard, 2023). This shift is both structural and pragmatic. Structurally, generation lends itself more readily to private involvement because it can be isolated from other segments of the value chain, contractually ring-fenced, and financed as discrete assets.[2] In economic terms, generation is typified by its unique characteristics of competition relative to transmission and distribution segments, which are natural monopolies. Pragmatically, the chronic shortfall in public investment capacity alongside escalating demand and persistent power deficits has made private capital not just desirable but essential (Eberhard *et al.*, 2016). In this context, private actors have stepped in to fill a vacuum left by decades of underfunding and poor performance by state-owned utilities.

[2] This means that projects can be developed and financed on a stand-alone basis (such as power plants with their own revenue streams) without being directly dependent on the performance of the wider utility.

Today, IPPs operate in more than 30 African countries, and their presence is particularly notable in Ghana, Kenya, Nigeria, South Africa, and Uganda, with more recent breakthroughs occurring in Namibia and Zambia. These producers range in size and technology, from large thermal and hydropower facilities to smaller-scale solar and wind projects (PFL, 2024; World Bank, 2025a). Their expansion has been facilitated by policy instruments such as long-term power purchase agreements (PPAs), competitive procurement frameworks, and sovereign-backed guarantees. These tools have helped to reduce investment risk and provide predictable revenue streams, thereby enabling financial closure in otherwise high-risk environments (Eberhard *et al.*, 2017b; Kruger & Eberhard, 2023). However, the story of private generation is not merely one of growth; it is also one of complexity. Not all investments are strictly private. Many generation projects, especially large-scale infrastructure, are backed by external loans to state-owned utilities or involve hybrid ownership structures. For example, Chinese state-owned banks have played a pivotal role in financing thermal and hydroelectric power plants across the continent (China Global South, 2025; Chen *et al.*, 2025). These arrangements often blur the lines between public and private, as projects are owned by the state but built and operated through contracts with private foreign firms, often under conditions that lack transparency and competitive bidding. Complexity is further exacerbated by nontransparent deals which impose huge fiscal and contingent liabilities on governments and consumers through high tariffs or in the event of default, as was the case with the Dowans project in Tanzania (Eberhard *et al.*, 2016). Regardless, in addition to power plant construction, there have been a few firm-level private contracts in generation asset operation, rehabilitation, and management in the form of concessions, such as the recently ended Eskom Uganda Ltd and ENEO in Cameroon, which helped to bring in much-needed private capital.

TRANSMISSION AND DISTRIBUTION

In contrast to the robust growth of PSP in generation, transmission and distribution have seen a far more cautious and uneven integration of private actors. These segments of the electricity value chain, particularly transmission, are traditionally regarded as natural monopolies. Their strategic national importance and the scale of capital required have limited PSP. As a result, the modalities of private sector engagement in these areas have tended to be more limited in scale, narrower in scope, and tightly embedded within state-dominated institutional architectures. Distribution lies at the heart of the sector's reform tensions. It is both politically sensitive due to public visibility, tariffs, and service expectations and operationally complex (ESMAP, 2015; World Bank, 2017).

Private participation in transmission and distribution often relies on concessions or management contracts, where the private operator is responsible for CAPEX investments, system upgrades, loss reduction, revenue collection, and overall business management. The private sector is often brought in not to compete in a conventional market sense but to inject managerial, technical, and financial discipline into segments where state-owned utilities have historically underinvested, mismanaged, or underperformed. For example, private concessions in Uganda's distribution sector improved collection efficiency and reduced losses, while IPPs in Kenya helped diversify supply and mobilise new generation investment (Kapika & Eberhard, 2013; Twesigye, 2023). CAPEX investments are a direct way of addressing the chronic backlog in infrastructure expansion when public borrowing space is limited. System upgrades in this context are driven less by competitive pressures and more by the need to rehabilitate dilapidated infrastructure and meet surging demand and are typically contractual obligations embedded in regulated concessions or performance-based contracts (ESMAP, 2015; World Bank, 2017). While private distribution or transmission companies may not face direct market rivals, they are still accountable to, for instance, regulators through performance-based remuneration structures. An example is the case of Umeme, Uganda's electricity distribution entity, which operated under a long-term concession from 2005 to 2025 (Twesigye, 2023; Twesigye 2025a). In well-designed contracts, meeting or exceeding targets for reliability, loss reduction,

customer satisfaction, or connection rates can trigger financial incentives, while underperformance can lead to penalties, shortened concessions, or even contract termination. The underlying theory is that private operators freed from some of the bureaucratic and political constraints of public utilities can operate with greater efficiency, make faster operational decisions, and mobilise capital more readily (Lundin, 2020). They are also more strongly incentivised toward effectiveness, given their focus on profitability and financial sustainability.

Transmission

Private sector participation in electricity transmission across SSA has been limited and highly selective. Transmission networks are typically considered strategic national infrastructure, and because they involve economies of scale and scope, they are often owned and operated by state-owned transmission system operators. The capital-intensive nature of transmission investments, long lead times for returns, and systemic interdependence with other parts of the grid make the segment unattractive for most private investors. Additionally, transmission is a natural monopoly,[3] meaning competition is not feasible, and regulatory oversight becomes essential but is often underdeveloped (ESMAP, 2015; World Bank, 2017). Where private involvement does exist, it is typically through utility concessions, build-operate-transfer models, or joint ventures with public utilities. Notable examples include Cameroon and Côte d'Ivoire, where concessions or hybrid PPP models have been deployed to operate or expand parts of the transmission system (PFL, 2025). Kenya, South Africa, and Uganda provide a rare case of more structured private participation through independent transmission projects (ITPs), a framework developed to crowd in private investment while retaining state ownership of the grid (Republic of South Africa, 2024). While Kenya and Uganda have opted to pilot ITPs and draw lessons on an ongoing basis, implementation is still pending in South Africa. Altogether, these cases remain exceptions in a region where most transmission networks are still publicly financed and managed.

External financing has played a critical role in transmission development, often blending public loans with technical assistance. For instance, China's Export-Import Bank and the World Bank have been major funders of transmission infrastructure in SSA (Alao & Kruger, 2022). Yet even when external financing is leveraged, the underlying contractual and institutional frameworks often retain public sector liabilities (World Bank, 2017). Sovereign guarantees used to underpin these investments can expose governments to fiscal risks, particularly when the utility is unable to honour payment obligations to private partners due to downstream collection challenges or tariff shortfalls. Unlike generation, where revenue can be more directly contracted through PPAs with a single off-taker, transmission revenues depend on regulated charges collected across the entire electricity sector, making their viability reliant on sector-wide financial health. Although these revenues can be ring-fenced, they remain vulnerable to political interference and diversion, especially in countries with weaker governance or unstable regulatory institutions (ESMAP, 2015). In countries where distribution remains dysfunctional, such as in Nigeria, the entire risk profile of transmission projects worsens (AfDB, 2019). Without strong, integrated planning and regulation, private participation in transmission risks becoming contractually burdensome without delivering long-term efficiency gains.

Distribution

Electricity distribution is the most politically sensitive segment of the power sector as it is very close to the final network user and substantially impacts the end-customer tariff. Distribution companies

[3] Transmission and distribution networks (wires) are considered to be natural monopolies – i.e., once the huge initial fixed costs are paid, average costs decrease with each additional output of electricity generated or as the firm gets larger, because the fixed costs can be spread more widely, creating a reasonable price for the consumer. Competing utilities are thus not economic.

are responsible for connecting, metering, billing, collections, and customer service, functions that expose them directly to end-users and make them the public face of the electricity system (ESMAP, 2015; Twesigye, 2023). Consequently, any attempt to commercialise or privatise distribution operations often triggers intense political scrutiny and public resistance.

Despite these challenges, several countries in SSA have pursued ambitious distribution reforms involving private actors. In Nigeria, the most extensive reform came in 2013 when the government privatised 11 distribution companies, transferring majority ownership to private investors under the oversight of the Nigerian Electricity Regulatory Commission (NERC) (AfDB, 2019). Similarly, Uganda's electricity distribution was managed by Umeme Ltd. from 2005 to 2025 (Twesigye, 2023; Twesigye, 2025a). In Cameroon, electricity distribution is handled by Eneo Cameroon S.A., a private utility operating under a concession agreement with the government, although this is being cancelled in 2025 due to longstanding disputes over investment commitments, service quality, and financial performance (Business & Finance International, 2025). Côte d'Ivoire has adopted a privatised model as well, with the Compagnie Ivoirienne d'Électricité (CIE) responsible for distribution under a long-standing concession with the state (AfDB, 2019; Foster & Rana, 2019).

These arrangements often rely on concessions or management contracts, and in theory, these models promise efficiency gains and service improvements. In practice, their success hinges on good governance, regulatory quality, and political support. Umeme's success was due largely to its robust contract design, strong governance controls, and political support from the highest political office. This concession helped to attract private capital and free up fiscal resources to other sectors while guaranteeing revenue streams to IPPs. Despite its successes, certain stakeholders voiced concerns about the perceived unfair incentives accorded to the concessionaire at the expense of electrification goals and affordability issues (Twesigye, 2023).

MEASURING PRIVATE SECTOR PARTICIPATION

To assess the extent of private sector participation in SSA's electricity sector, this study applies a weighted model that captures the relative degree of private involvement across the three core segments of the electricity value chain: generation, transmission, and distribution. The weighting reflects empirical patterns of private activity, the openness of each segment to investment, and the institutional conditions that either facilitate or constrain market entry. The weighting *is not* a reflection of the quantum of private investments (in nominal terms) or proportion of end-user tariffs, as these are beyond the scope of this study. The allocation of weights reflects observed patterns of private sector entry across SSA. In practice, generation accounts for the overwhelming majority of PSP activity, with IPPs present in most countries, supported by formal contracting frameworks and investment incentives. PSP in distribution is less common, with the presence of a few concession and management arrangements. We acknowledge the contribution of previous management contracts in certain countries like Ghana, Kenya, Liberia, and Tanzania; however, these are excluded in this analysis due to data limitations. PSP in transmission is rare and typically limited to isolated cases, with the sector continuing to be dominated by publicly owned and operated systems. The weighting, therefore, provides a proportional estimate of the relative openness of each segment to PSP across countries in the region rather than a precise measure of investment volumes.

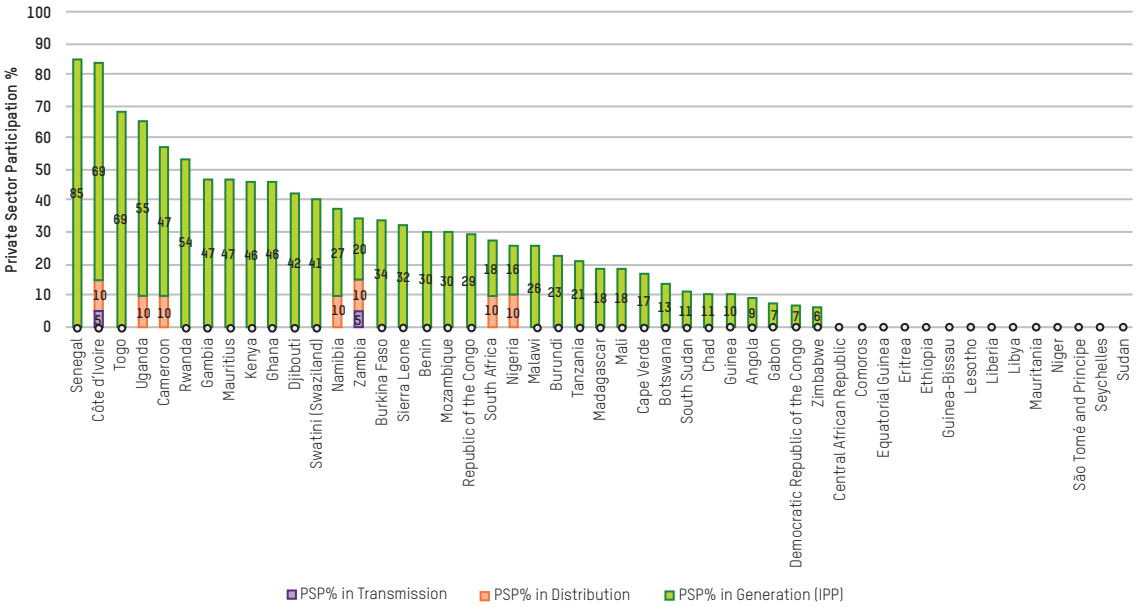
Table 1: Score Distribution for Private Sector Participation in SSA's Electricity Sector, by Subsector

TOTAL SCORE (ALL INDICATORS)	100%
GENERATION	**85%**
Share of IPPs in total installed generation capacity	
TRANSMISSION	**5%**
Private sector participation in transmission (0, no; 5, yes)	
DISTRIBUTION	**10%**
Private sector participation in distribution (0, no; 10, yes)	

Source: Authors.

The final weighting assigns 85 percent to generation, 5 percent to transmission, and 10 percent to distribution, as shown in Table 1. For generation, countries are scored based on the percentage share of IPPs in total installed generation capacity. For transmission, a binary scoring system is used, whereby countries receive a score of 5 if there is any form of private sector participation and 0 if there is none. Similarly, for distribution, countries receive 10 points if PSP is present and 0 if absent. All data on PSP are recorded from the historical inception of private sector involvement in each country and subsector, beginning with the first instance of PSP. For this analysis we exclude mini-grids, micro-grids, and standalone systems, as there is no consistent, high-quality data on their presence across SSA, with standalone generation particularly challenging to capture due to inadequate and fragmented reporting. This weighting provides a realistic approximation of the structure of private sector participation across the region and allows for a comparative view of how different countries have engaged the private sector in their electricity sectors. The application of this model results in a composite index that facilitates cross-country analysis and performance correlation, offering a clearer understanding of where and how the private sector is integrated into power systems across SSA. The outcome of this measurement is presented in Figure 2, which illustrates the relative intensity of private sector participation across the electricity value chain in SSA. In the chart, a score of 0 indicates no PSP, rather than missing data.

Figure 2: Percentage of Private Sector Participation in SSA's Electricity Subsectors (Generation, Transmission, and Distribution)



Source: Authors' calculations

POWER SECTOR PERFORMANCE IN SSA

The growth of private sector participation in SSA's electricity sector has generated widespread debate over its role in addressing the chronic underperformance of public utilities and in shaping more functional, equitable energy systems. While the private sector has been actively promoted as a critical partner in expanding capacity, improving operational efficiency, and mobilising investment, there remains considerable uncertainty about its actual impact on power sector outcomes. Experiences across the region have been uneven, with some utilities showing measurable performance gains under private management, concessions, or partnerships, while others continue to suffer from inefficiency, debt accumulation, and limited political and consumer trust, even after reform. What is clear is that a well-defined contract that stipulates roles, risk allocation, responsibilities, and incentives offers a grounded framework to measure intended outcomes (Twesigye, 2022).

This section describes the elements of power sector performance against which private sector participation will be measured. The framework is built around six core dimensions: financial viability, access, affordability, quality of electricity supply, operational efficiency, and decarbonisation (Table 2). These indicators have been selected for their dual relevance: they are central to long-standing sector reform priorities and are strongly aligned with public interest outcomes. The analysis is conducted at the country level across sub-Saharan Africa, using all SSA countries for which reliable data on the respective indicators are available.

- Financial viability anchors this assessment, reflecting its foundational role in enabling investment, leveraging capital structure levels, expanding access, improving service quality, and supporting the energy transition.
- Affordability and access are weighted heavily, recognising the urgency of equitable and inclusive electricity provision in contexts of widespread income and energy poverty.
- Reliability highlights the need for a consistent, dependable supply of electricity, while operational efficiency captures how well sector institutions manage losses and service delivery.
- Decarbonisation reflects the growing imperative to align energy systems with climate commitments.

Table 2: Score Distribution for Power Sector Performance

POWER SECTOR PERFORMANCE INDICATORS	100%
FINANCIAL VIABILITY	**25%**
Share of operating expenses and debt service covered by cash collected from sales	
ACCESS	**20%**
Average of total electricity access and electricity access improvement	
AFFORDABILITY	**20%**
Share of annual income needed to purchase 100 kilowatt-hours (kWh) of electricity	
QUALITY OF ELECTRICITY SUPPLY	**15%**
System Average Interruption Frequency Index (SAIFI), System Average Interruption Duration Index (SAIDI), and frequency of voltage fluctuations	
OPERATIONAL EFFICIENCY	**10%**
Technical (transmission and distribution) efficiency and technical efficiency improvement	5%
Non-technical efficiency (billing and collection rate)	5%
DECARBONISATION	**10%**
Share of renewable energy generation (including hydropower) in total electricity generation	

Source: Authors.

FINANCIAL VIABILITY

Financial viability is the cornerstone of electricity sector performance, as it underpins the sector's ability to sustain service delivery, expand access, and drive long-term investment. It reflects whether a utility can meet its operating and financial obligations through its own revenue generation. It determines not only whether utilities can sustain service delivery and infrastructure investments, but also whether they are capable of attracting private capital effectively as well as their ability to meet debt obligations (Trimble *et al.*, 2016). In this analysis, financial viability is assessed as the share of operating expenses and debt service covered by cash collected from electricity sales (World Bank, 2025b). This metric captures the basic solvency of a utility and its ability to finance its operations without recourse to continuous state subsidies or debt accumulation. Scores are normalised between 0 and 100, where higher values indicate stronger financial performance. This approach provides a clear and comparative snapshot of utility financial health across SSA.

ACCESS

Electricity access (based on household connection) remains one of the most fundamental indicators of development and a central measure of progress in SSA's power sector (IEA, 2022; World Bank, 2023a). To evaluate access outcomes, this study adopts a composite index that accounts for both current levels of electricity access and the rate of improvement over the past decade. Specifically, electricity access is measured as the mean average of two variables: the national access rate (as a percentage of the population) and the percentage change in that rate over the past 10 years. This dual approach captures not only the extent of access at a given point in time, but also the momentum of progress, offering a more dynamic and context-sensitive view of how energy systems are evolving. Electricity access is included in the broader performance framework because it represents a core outcome of any successful electricity sector reform. Moreover, including access in the performance index ensures that outcomes are assessed not only in terms of commercial or institutional metrics, but also in terms of the sector's contribution to national development goals.

AFFORDABILITY

One of the most immediate and contentious consequences of PSP reforms has been their impact on electricity affordability (AfDB, 2019). As cost-reflective tariffs and commercial operations replace subsidised public models, concerns have intensified over whether low-income consumers are being priced out of access to essential energy services. Affordability is a core dimension of energy justice and a critical indicator of whether electricity sector reforms are delivering inclusive outcomes (Kojima & Trimble, 2016).

While PSP can improve cost recovery and reduce inefficiencies via adoption of commercial practices, it often results in tariff increases, particularly in countries where prior public subsidies and infrastructure deficits masked the true cost of service (Trimble *et al.,* 2016). In such contexts, the burden of reform is frequently borne by consumers, many of whom face stagnant incomes, volatile prices, and weak consumer protections. The affordability of electricity thus becomes not only a technical issue but a politically and socially charged measure of reform legitimacy (Asantewaa *et al.,* 2023).

To assess the impact of PSP on affordability, this study adopts a standardised measure based on the share of income required to purchase a basic electricity bundle. Specifically, affordability is calculated using the following formula:

$$Affordability\ Index = \frac{Average\ Tariff\ (US\$/kWh)}{GNI\ per\ capita\ (US\$)} \times 100$$

This index estimates the percentage of an individual's annual income (approximated by gross national income per capita) needed to purchase 100 kilowatt-hours (kWh) of electricity. Both the tariff and income variables are adjusted using country-specific purchasing power parity conversion factors (World Bank, 2021a, 2021b, 2021c). This adjustment enables more accurate cross-country comparisons by accounting for differences in local cost of living and purchasing power. A lower score indicates better affordability, while a higher score reflects a greater financial burden on consumers. Furthermore, each country's score is normalised on a 0–100 scale, where a value of 0 represents the least affordable electricity bundle in the sample, and 100, the most affordable. The adopted approach facilitates consistent, macro-level comparisons across different income contexts and tariff regimes but has limitations of assuming uniform income distribution. Nevertheless, it offers valuable insight into the cost implications of PSP for end-users.

QUALITY OF ELECTRICITY SUPPLY

The quality of electricity supply is a fundamental component of overall power sector performance, capturing not only the operational reliability of the grid but also the day-to-day experience of consumers (Balabanyan *et al.,* 2021; Twesigye, 2022). Including quality of supply in this performance framework is essential because it reflects the effectiveness of electricity delivery in practical terms. In this study, electricity supply quality is measured using data from the World Bank's Quality of Electricity Supply database, which combines information on the System Average Interruption Duration Index (SAIDI), the System Average Interruption Frequency Index (SAIFI), and the frequency of voltage fluctuations experienced within national electricity networks (World Bank, 2018). Countries are rated on a standardised scale from 1 to 7, where 1 indicates extremely unreliable supply and 7 indicates highly reliable, stable electricity service. This composite score captures both the technical performance of grid infrastructure and the lived reliability of electricity supply among consumers. Scores are normalised between 0 and 100, where higher values indicate more reliable electricity supply. This indexing allows for a consistent, intuitive comparison across national contexts, helping to identify both leaders and laggards in service quality.

OPERATIONAL EFFICIENCY

Operational efficiency is another fundamental measure of electricity sector performance, capturing how effectively utilities convert generated electricity into billed, collected revenue. It encompasses both technical efficiency, often measured by system losses, and commercial efficiency, reflected in billing and revenue collection practices (Balabanyan *et al.,* 2021; Foster & Rana, 2019; Trimble *et al.,* 2016). The operational efficiency score for each country is calculated as the average of two main components:

- Technical efficiency, measured through transmission and distribution losses as a percentage of electricity output, and the percentage improvement in these losses over the past 10 years (World Bank, 2022); and

- Non-technical efficiency, captured by the collection rate, the proportion of billed electricity revenue that is actually collected by the utility (World Bank, 2025b). However, there are other implicit efficiencies related to optimal staffing numbers and complaint resolution time, and connection time.

Both technical and non-technical efficiency scores are first normalised to a 0–100 scale. Their average is then calculated and also normalised to the same scale to derive the final operational efficiency score. By combining both the level and change in technical performance with real revenue collection outcomes, this method provides a comprehensive view of how well utilities are managing their networks and customer interfaces.

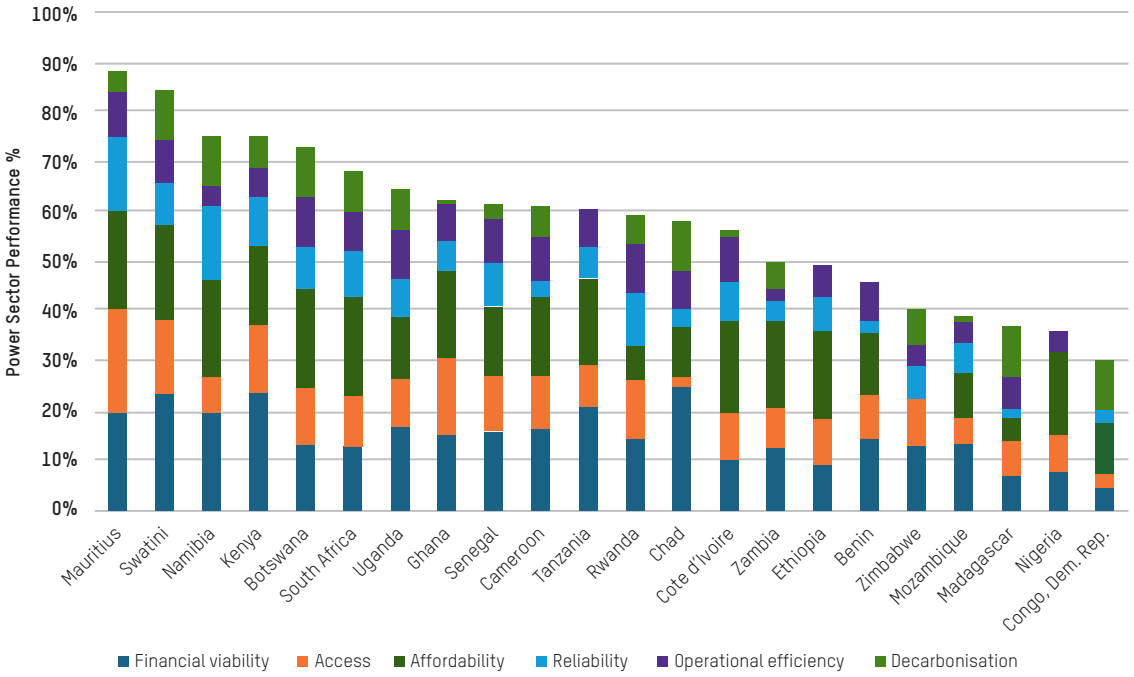
DECARBONISATION

Decarbonisation has emerged as a defining criterion in the assessment of electricity sector performance, particularly in the context of growing climate vulnerability, energy security challenges, and international commitments to reduce carbon emissions. As the global energy transition accelerates, SSA countries are increasingly expected to expand access and meet rising demand while also aligning their generation portfolios with low-carbon development pathways. This has placed renewable energy, particularly solar, wind, and hydropower, at the centre of national electricity strategies and donor-supported reform agendas (Trotter *et al.,* 2022). In this study, decarbonisation is measured as the share of renewable energy in total IPP electricity generation. This indicator captures the extent to which IPPs are contributing to the move from fossil fuel dependence toward cleaner, more sustainable energy sources. However, it should be noted that different African countries are endowed with different energy resources. As countries pursue national development goals, aim to industrialise, address limitations in technology transfer from the global North, and strive for universal energy access, adopting technology-agnostic solutions that combine multiple technologies is a more practical approach than relying on a one-size-fits-all model (Trotter *et al.,* 2022). What matters is that the share of renewables in the energy mix is growing annually by orders of magnitude.

MEASURING POWER SECTOR PERFORMANCE

This study constructs a composite index of power sector performance based on the six developed dimensions, providing a balanced view of sectoral performance across countries. The final performance score, as shown in Figure 3, is computed as the weighted average of these indicators. Only countries for which data is available across all six dimensions are included in this analysis to ensure consistency when correlating data with PSP. The analysis also tested reasonable alternative weighting schemes for the index and found that variations in weights did not meaningfully affect the relative performance rankings of countries or the overall conclusions.

Figure 3: Power Sector Performance Ranking in Sub-Saharan Africa



Source: Authors' calculations.

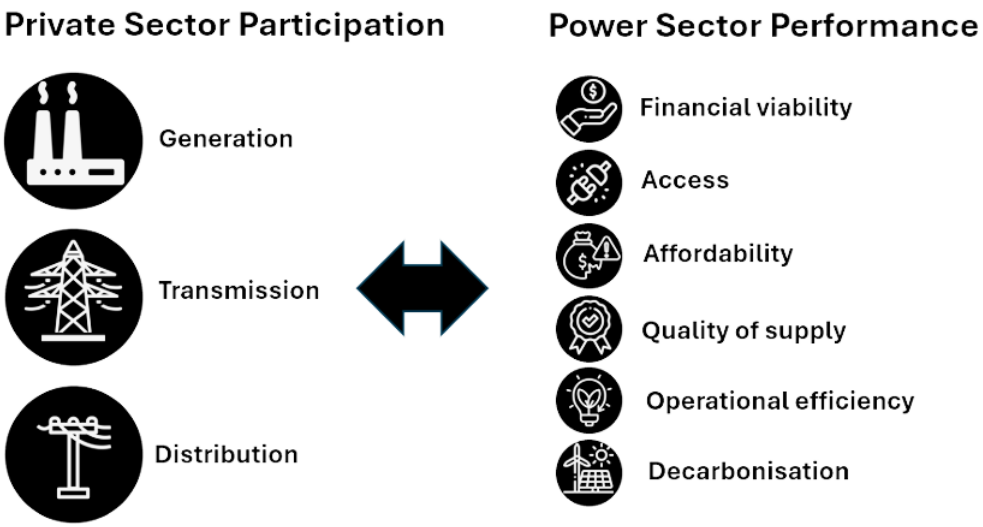
THE IMPACT OF PRIVATE SECTOR PARTICIPATION ON SSA'S ELECTRICITY SECTOR

By approaching PSP as a variable rather than a fixed solution, this section aims to move beyond simplistic comparisons of public versus private and instead examine under what conditions, and in which forms, private sector engagement has contributed to or detracted from the functionality, resilience, and equity of electricity systems in SSA. Beyond descriptive analysis, this section also introduces a quantitative approach to correlating PSP levels with sector performance. Where relevant, the analysis draws on brief illustrative examples to reinforce patterns, both positive and negative, that emerge from the data.

THE RELATIONSHIP BETWEEN PSP AND ELECTRICITY SECTOR OUTCOMES

To examine the relationship between private sector participation and electricity sector outcomes, as illustrated in Figure 4, this study employs Pearson's correlation coefficient (Schober *et al.,* 2018). This method allows us to identify the linear strength and direction of association between the extent of PSP, measured through a composite, weighted index across generation, transmission, and distribution, and the set of performance metrics covering financial viability, access, affordability, quality of electricity supply, operational efficiency, and decarbonisation. The Pearson correlation coefficient ranges from -1 to +1. A value of +1 indicates a perfect positive correlation, where increases in one variable are associated with increases in the other; a value of -1 denotes a perfect negative correlation; and a value of 0 reflects no linear relationship.

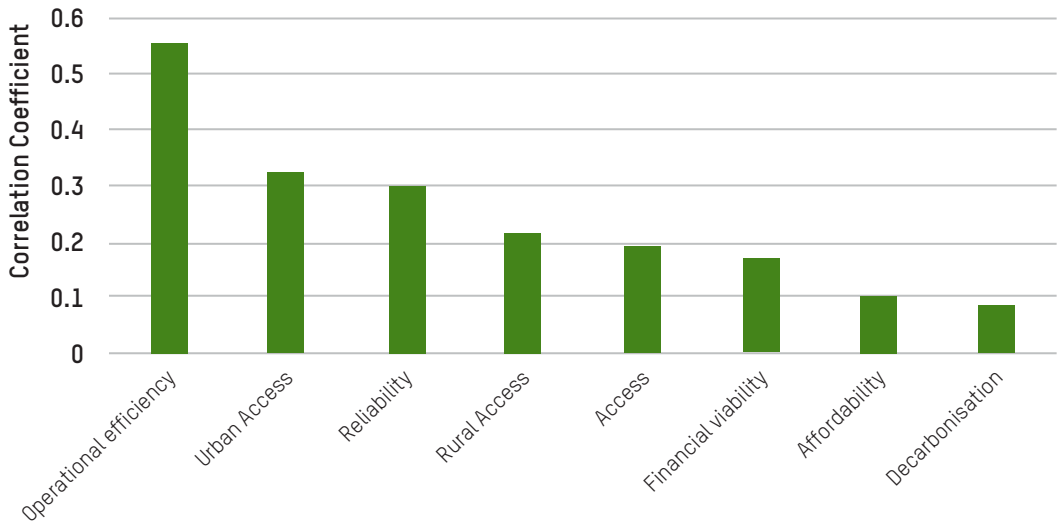
Figure 4: Mapping PSP Engagement to Power Sector Performance Indicators



Source: Authors.

In this analysis, the overall correlation between private sector participation and aggregate power sector performance is +0.384,[4] indicating a moderate positive relationship. However, the result falls slightly below statistical significance[5] (Field, 2017), primarily due to incomplete data coverage across all performance sub-indicators for a significant number of countries. Overall, the PSP-performance relationship implies that, on average, countries with higher levels of PSP tend to perform better across the combined performance dimensions used in this study compared with those with lower levels. When broken down into individual performance metrics as seen in Figure 5, the strongest positive correlation appears between PSP and operational efficiency, with a coefficient of +0.557*. Nevertheless, experience suggests that countries with greater private involvement do not always exhibit lower transmission and distribution losses or higher collection rates. For instance, Uganda's private concession model under Umeme led to improvements in billing and loss reduction (Trimble *et al.,* 2016; Twesigye, 2022), while Nigeria's privatised DisCos have struggled to replicate similar gains due to governance and regulatory weakness as well as financing gaps (AfDB, 2019). Loss reduction is independent of regulatory interventions. While operational efficiency is driven by reform improvements in the transmission and distribution segments of the power sector, its observed correlation with PSP appears to be catalysed by the presence of IPPs, as discussed in Section 4.2.

Figure 5: Extent of Correlation between Private Sector Participation and Power Sector Performance Indicators



Source: Authors' calculations.

A moderate positive correlation is also observed between PSP and urban electricity access (+0.324*)[6] and reliability (+0.301). These findings suggest that private participation may be contributing to greater service availability, particularly in higher-density and commercially viable areas where

[4] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

[5] Statistical significance is a measure used in hypothesis testing to determine whether a result is likely due to chance or reflects a true underlying relationship in the data. It is typically assessed using a *p*-value, with the most commonly used threshold being $p < 0.05$, corresponding to a 95% confidence level, meaning there is less than a 5% chance the result is due to random variation. Stronger evidence is indicated by $p < 0.01$ (99% confidence), while $p < 0.001$ reflects very strong evidence of significance at the 99.9% confidence level.

[6] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

private operators are more likely to invest, though experiences indicate that access could be a function of broader structural and policy factors, including strong public coordination, rather than the absence or presence of PSP, as in the case of Kenya. In terms of reliability, countries such as Namibia have leveraged private generation to stabilise power supply in targeted segments of the grid, whereas countries like Nigeria experience frequent outages despite privatising its distribution network infrastructure (AfDB, 2019). Overall, these mixed experiences indicates that the direction of the relationship should be interpreted carefully. In many cases, private actors are more willing to enter markets where grid availability and stability are already relatively high or where contractual guarantees and grid management capabilities support consistent delivery. In this sense, correlation does not imply causation; improved urban access and reliability may not be the outcome of PSP but rather the condition under which it occurs, often shaped by broader governance and policy factors. Indeed, both access and reliability can be improved with or without PSP, depending on the effectiveness of underlying institutional and policy frameworks.

The correlation between PSP and rural access is weaker, at +0.212, and even lower for overall access at +0.193, though neither of these relationships meets the conventional threshold for statistical significance. However, the relationship suggests that while PSP may support access expansion in certain contexts, particularly through grid-connected solutions, it has not been a decisive driver of electrification for underserved rural populations. Precisely put, electrification is independent of PSP measures and requires additional policy, planning, institutional, and funding interventions. Similarly, financial viability (+0.170) shows only a weak and statistically inconclusive association with PSP. This lends support to the view that private capital does not always drive improved sector solvency. For example, Mauritius has attracted PSP in part due to its strong financial and regulatory environment (Kruger & Alao, 2024). In contrast, Ghana provides a cautionary example of how uncoordinated IPP deployment can contribute to fiscal stress. A wave of take-or-pay IPP contracts led to overcapacity and unsustainable financial obligations for the state utility, undermining overall sector viability (Ackah *et al.,* 2021). However, a well-managed PSP combined with competition will result in positive financial viability.

Affordability (+0.108)[7] and decarbonisation (+0.091) show the weakest correlations with PSP, and these associations do not meet the threshold for statistical significance. This result suggests that overall, private sector participation, to date, has had minimal influence on improving electricity affordability or driving low-carbon transitions. However, as later discussed in Section 3.2, when disaggregated by subsector, a more differentiated picture emerges: PSP in transmission and distribution demonstrates a higher positive correlation (+0.266) with affordability, pointing to a possible link between private involvement in these segments and improvements in revenue collection, loss reduction, or operational efficiency. Nevertheless, affordability may remain an area where sustained public policy intervention is required, irrespective of the level of private sector involvement. Decarbonisation appears to be a lagging area of impact for PSP, with visible results likely to emerge over the longer term. While some IPPs have entered the renewables space in countries like Namibia and South Africa, often spurred by structured procurement programmes and declining technology costs, the overall contribution of PSP to decarbonisation remains marginal (Kruger & Alao, 2024). Tracing decarbonisation efforts in some SSA countries present a learning curve, with impacts potentially appearing over an extended timeframe.

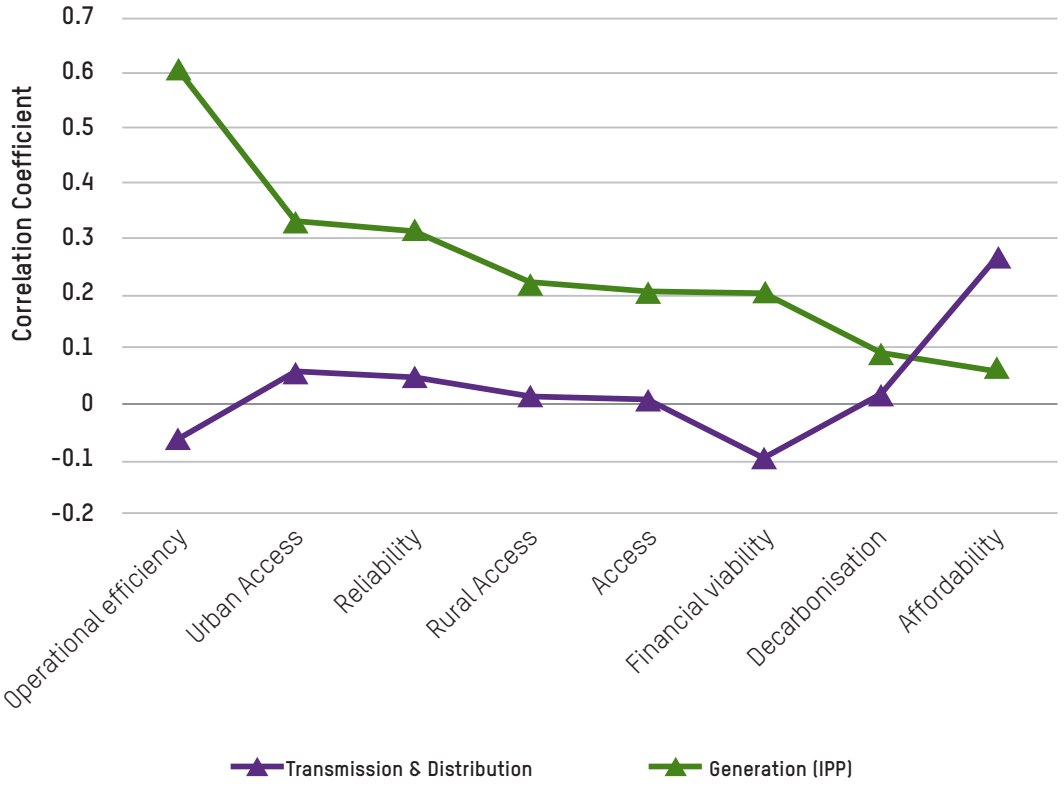
[7] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

INTERROGATING THE IMPACT OF PSP ACROSS ELECTRICITY SUBSECTORS

While aggregate analysis shows a moderate positive relationship between private sector participation and power sector performance, a more nuanced picture emerges when disaggregating by subsector. Specifically, the impact of PSP varies markedly between generation, transmission, and distribution, reflecting both structural characteristics of the power value chain and the differential ease of private engagement across these segments. Figure 6 illustrates this divergence clearly. The PSP impact curve for generation (IPP) shows significantly stronger positive correlations across key performance metrics (mainly security of supply). By contrast, the PSP curve for transmission and distribution shows generally flat or weak correlations, with most indicators falling below statistical significance. However, a notable exception is affordability, which shows a moderate positive correlation with PSP in transmission and distribution, suggesting that private involvement in these segments may be beginning to support cost efficiencies, which in turn is facilitating the stabilisation or reduction of end-user tariffs. We acknowledge there has been considerable PSP and financing at the project level (micro) within generation, transmission, and distribution segments; however, data limitations impede further analysis and are beyond the scope of this report. This visual distinction reinforces the conclusion that PSP in transmission and distribution has had a limited relationship with performance outcomes overall, in contrast to the more substantial impact observed in generation. That said, the positive link with affordability may reflect early gains from targeted reforms and improved loss reduction, facilitated by private operators.

These findings suggest that the observed relationship between PSP and sector performance has been catalysed largely by IPPs, alongside broader reforms in transmission and distribution. However, performance improvements in transmission and distribution seem to occur with or without PSP. In essence, improved performance may not be the direct outcome of IPP participation but rather the result of the broader enabling conditions discussed in Section 5. Given that transmission and distribution face greater regulatory, financial, and political challenges, their limited correlation with performance metrics likely reflects systemic governance constraints rather than an inherent failure of PSP models (ESMAP, 2015). In effect, PSP in these segments may struggle to overcome the entrenched inefficiencies of the broader enabling environment. Thus, while private participation has been easier to scale and more impactful in generation, its role in transmission and distribution remains marginal and heavily contingent on public sector governance, regulatory clarity, and the financial solvency of utilities (World Bank, 2017). The overall weak relationship between sector outcomes and PSP in transmission and distribution underscores that private involvement alone does not guarantee improvements; rather, it is the quality of the institutional environment that determines whether PSP can meaningfully contribute to sector transformation.

Figure 6: Extent of correlation between PSP indicators (transmission and distribution; generation) and power sector performance



Source: Authors' calculations.

RISKS AND BENEFITS OF PSP IN SSA'S ELECTRICITY SECTOR

Evidence from the quantitative analysis and literature review indicates that PSP, particularly through IPPs, has delivered important benefits to the electricity sector in SSA, but it has also introduced significant risks. The benefits are clearest in contexts where strong governance, transparent procurement, and coherent regulation underpin private involvement, while the risks tend to manifest where PSP has been deployed in fragmented, opaque, or weakly governed settings.

PSP's notable benefits include efficiency gains and capital mobilisation. Evidence shows a strong positive correlation with operational efficiency, and Uganda illustrates how private concessions under independent regulation improved billing, increased investment in network expansion, reduced losses, and stabilised revenues (Twesigye, 2022, 2023). IPPs in Namibia and South Africa have also enhanced supply security by diversifying generation and easing pressure on state utilities (AfDB, 2019; Kruger & Alao, 2024). South Africa's procurement programme (REI4P) demonstrates how competitive tendering anchored in strong governance can align private incentives with public goals, driving cost reductions in solar and wind, greater reliability, and measurable decarbonisation gains (Eberhard & Naude, 2017; Filipova & Wewege, 2019; Kruger & Alao, 2022; PFL, 2024). In Mauritius, coherent planning and transparent tenders have consistently attracted investment, enabled capacity expansion, and spurred decarbonisation (Dinesh & Pravesh, 2017; Kruger & Alao, 2024). Uganda further shows how effective regulation strengthened financial viability through cost-reflective tariffs and performance monitoring, making it one of the few SSA countries where revenues cover operating and capital costs (Trimble *et al.,* 2016).

At the same time, PSP has introduced significant risks when deployed without strong institutional and policy safeguards. One of the most pressing risks is fiscal stress: Ghana's rapid signing of unsolicited take-or-pay PPAs created overcapacity, underutilised plants, and rising fiscal liabilities. Fiscal exposure is further heightened by the widespread use of sovereign guarantees to secure IPPs, which create high contingent liabilities for governments (Kruger & Alao, 2024; Kruger & Eberhard, 2023). These risks are compounded by structural credit rating biases that inflate the cost of capital in African markets, raising tariffs and undermining affordability (African Union, 2024). Nigeria's privatised distribution sector provides another cautionary tale, as the absence of cost-reflective tariffs, weak enforcement, and persistent liquidity problems left distribution companies unable to improve performance (AfDB, 2019). These cases show that PSP cannot substitute for effective governance and regulatory performance.

Equity is another major risk. PSP shows little correlation with rural access, as investors favour urban and industrial customers with higher returns (Nweke-Eze & Kioko, 2021). In Zambia, private generation has largely served mining while rural electrification stagnated (Aggarwal, 2019). Without subsidies or cross-financing, PSP can deepen structural inequalities. Restructuring also brings job losses and labour transitions that, without clear safeguards, fuel resistance. Weak community engagement has even derailed projects, as in Kenya's Kinangop Wind Park (Alao & Kruger, 2020). These cases show that socially blind PSP can erode legitimacy and undermine technically sound projects (Alao & Kruger, 2020; Klagge *et al.,* 2020).

In summary, while PSP has demonstrated measurable benefits under supportive governance and procurement frameworks, it has also introduced fiscal, regulatory, and equity risks when poorly structured. Since understanding and addressing these risks is a central objective of this study, we have developed a systematic categorisation of the main risks posed by PSP across the electricity value chain. Table 3 summarises these risks, highlights their relative importance, and notes emerging responses from governments, regulators, and utilities.

Table 3: Risks Posed by PSP in SSA's Electricity Sector

Risk Event (Adverse Outcome)	Underlying Vulnerability / Driver	Type	Importance	Why It Matters	Intervention / Response Example
Fiscal and financial exposure from PSP obligations	Weak planning and project appraisal for PPAs	Internal	High	Governments locked into take-or-pay obligations and contingent liabilities threaten debt sustainability	Competitive auctions; standardized PPAs; alignment with integrated resource plans
	Political pressure to offer guarantees or backstop private investors	Internal	High	Guarantees can create hidden fiscal exposure and raise contingent liabilities	Clear guarantee frameworks; partial/capped guarantees; risk sharing by DFIs

Risk Event (Adverse Outcome)	Underlying Vulnerability / Driver	Type	Importance	Why It Matters	Intervention / Response Example
	Lack of standard or transparent contracts	Internal	High	Non-standard contracts increase risk of cost escalation and disputes	Contract standardization; transparent procurement; independent review
	Credit rating agency bias or market misperception of contingent liabilities	External	High	Misperceived risk raises financing costs and can transfer costs to consumers	Transparent PPP liability disclosure; engagement with rating agencies; blended finance
	Shallow domestic capital markets	External	Medium	Limited financing options increase cost of capital	Develop local capital markets; structured blended finance; currency risk mitigation
Operational inefficiency or cost escalation due to PSP contracts	Weak regulatory enforcement	Internal	High	PSP may extract rents, mismanage projects, reduce competition, and raise long-term costs	Strengthen regulatory autonomy; enforce transparent contracting, performance monitoring
	Regulatory capture or political interference				
	Contract design flaws	Internal	High	Poorly designed contracts can create inefficiencies and higher costs	Standardized contracts; independent contract review; performance-based incentives

Risk Event (Adverse Outcome)	Underlying Vulnerability / Driver	Type	Importance	Why It Matters	Intervention / Response Example
Social and political backlash triggered by PSP or tariff reforms	Rapid or poorly communicated tariff increases	External	Medium–High	Social unrest, strikes, and political opposition can delay or reverse reforms	Gradual tariff reforms; stakeholder communication; lifeline blocks
	Weak stakeholder engagement mechanisms	External	Medium–High	Drives resistance (community/labour), delays project delivery, undermines reform legitimacy, and risks policy reform not being responsive to community needs	Structured public and community engagement; social safeguards; participatory planning and feedback mechanism
Exclusion or inequality in electricity access due to PSP focus on profitable segments	Commercial incentives favour urban/industrial users	Internal	Medium	Rural and poor populations left behind; undermines development goals	Electrification funds; off-grid PPPs; targeted subsidies
	Weak rural/off-grid electrification programs	Internal	Medium	Limits access expansion and affordability for underserved areas	Support off-grid projects; rural-focused PPPs; integrated electrification planning
	Insufficient cross-subsidisation	Internal	Medium	Low-income households unable to access electricity	Cross-subsidies; targeted tariffs; social protection mechanisms

Source: Authors

UNDERLYING SUCCESS FACTORS FOR PSP EFFECTIVENESS

This section introduces a complementary set of indicators to evaluate the conditions under which PSP involvement delivers effective outcomes. While Section 2 presented six performance indicators to measure how electricity sectors perform, the focus here is on the underlying factors that shape those outcomes. The collective evidence from multiple country experiences and thematic studies emphasises that PSP success depends on a combination of institutional, regulatory, structural, financial, political, and social factors (Devkar *et al.,* 2013; Eberhard *et al.,* 2017a, 2017b; Eberhard & Gratwick, 2011; ESMAP, 2015; Gassner *et al.,* 2008; Othman & Khallaf, 2022; Twesigye, 2022, 2023). Table 4 summarises these key success factors underpinning effective PSP in SSA's electricity sector and outlines the main elements contributing to their effectiveness.

Table 4: Success Factors for Effective PSP in SSA's Electricity Sector

Success Factor	Role in PSP Effectiveness
Governance Quality and Effectiveness	Strong institutions, accountability, and political commitment underpin investor confidence and sector stability.
Policy and Regulatory Instruments and Institutions	Clear, transparent, and enforceable rules provide predictability for private actors and safeguard the public interest.
Planning and Procurement Processes	Robust planning and fair procurement ensure competitive, efficient, and timely project delivery.
Financial Viability and Sustainability	Sound financing structures, risk allocation, and bankability attract diverse investors and sustain investment flows.
Social and Equity Considerations	Inclusive approaches protect affordability, expand access, and secure community support for PSP projects.

Source: Authors.

The foundational success factor is the quality and effectiveness of governance. Dedicated procurement agencies with technical, legal, and financial expertise enable PSP to thrive by ensuring transparent and efficient project implementation. This institutional competence must extend to system operators and regulators who coordinate the coexistence of multiple transmission or distribution concessionaires (Devkar *et al.,* 2013; ESMAP, 2015). The presence of a robust and predictable regulatory framework that provides clarity, consistency, and independence is equally pivotal (Devkar *et al.,* 2013; ESMAP, 2015; World Bank, 2023b).

Political commitment and policy coherence are indispensable. Long-term renewable energy targets, stable sectoral policies, institutional and staff capabilities, and high-level political backing foster investor confidence. Conversely, policy reversals, changes in law, ad hoc decision-making, and fragmented mandates erode trust and deter participation, as observed in several African power procurement programmes with weak institutional support (Eberhard *et al.,* 2017a, 2017b; Eberhard & Gratwick, 2011; Kruger & Eberhard, 2023; Stritzke *et al.,* 2021). PSP is most effective when integrated into a coherent planning and structured procurement architecture. When these foundations are

weak or absent, PSP can devolve into fragmented, opportunistic deals that create excess capacity, fiscal stress, or stranded assets. A typical example is the opacity of non-competitive power purchase agreements (PPAs) that impose huge sector risks, high costs, and damaging outcomes to consumers (Twesigye, 2024). Competitive power procurement programmes, when well structured, could successfully align private sector incentives with public affordability goals (del Río, 2017). An auction-based approach for awarding transmission concessions, where bidders compete on the basis of the lowest guaranteed revenue, exemplifies this success factor, ensuring both investment inflow and tariff moderation (ESMAP, 2015).

The financial viability and bankability of projects constitute another cornerstone. In a region where few countries have investment-grade ratings and where most utilities are undercapitalised, attracting private capital requires de-risking instruments and financial guarantees. Well-designed contractual arrangements are required to enhance project bankability. Long-term concessions and BOOT (build-own-operate-transfer[8]) models have been critical in balancing public and private interests. These contracts, when structured properly, allocate risks optimally, ensuring that risks beyond the private sector's control (e.g., demand fluctuations, foreign exchange shocks) are mitigated through guarantees or regulatory mechanisms. Successful cases of attracting private capital into generation, transmission, and distribution have been attributed largely to clear, risk-allocated contracts with guaranteed revenue recovery provisions (Eberhard *et al.,* 2017a; Eberhard & Gratwick, 2011; ESMAP, 2015; Gassner *et al.,* 2008; Othman & Khallaf, 2022). Furthermore, private sector investors are driven by the assurance of reasonable returns, which requires credible off-takers, cost-reflective tariffs, and access to financing. Instruments like credit enhancements, sovereign guarantees, and blended finance mechanisms have proven essential, particularly in African contexts where market risks are pronounced (Eberhard *et al.,* 2017a, 2017b; Eberhard & Gratwick, 2011; Kruger & Eberhard, 2023; Othman & Khallaf, 2022). PPPs have gained credible momentum as a compromise between full privatisation schemes and pure public investment models of service delivery because they share risk allocation among parties best capable of managing them and are politically sustainable.

Finally, social and equity considerations, while not always at the forefront, are increasingly recognised as critical. Ensuring that PSP models include mechanisms to extend services to underserved populations, manage workforce transitions with fairness and transparency, and ensure early and inclusive community participation is essential for sustainable and inclusive sector reforms (Devkar *et al.,* 2013; Kruger & Alao, 2024).

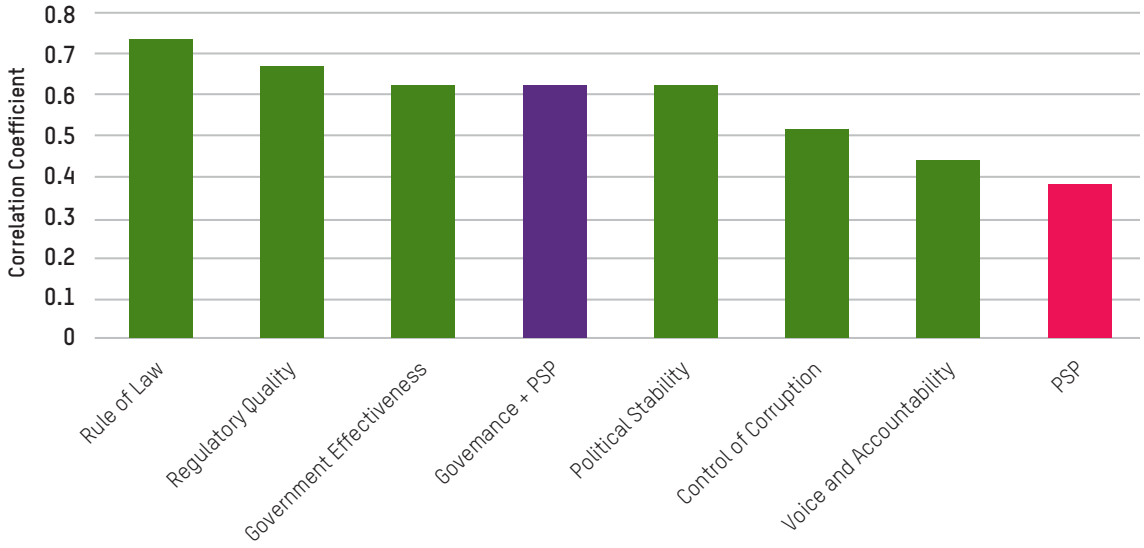
GOVERNANCE QUALITY AND EFFECTIVENESS

Private sector participation in the electricity sector is more likely to succeed and deliver meaningful improvements when it occurs within a context of strong and effective governance. While PSP alone is positively correlated with power sector performance, with a measured correlation of +0.384,[9] the data show that its impact is significantly enhanced when complemented by high-quality governance systems. When governance and PSP are considered together, each first normalised to the same scale and weighted equally, the correlation with power sector performance increases to 0.648*. The governance index is based on the World Bank's Worldwide Governance Indicators (WGI), which describe broad patterns in perceptions of the quality of governance across countries and over time. The WGI is derived from an equal weighting of a set of indicators – voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (World Bank, 2023c). The appendix provides a more detailed description of each indicator.

[8] This model is a public-private partnership in which a private company develops, finances, constructs, owns, and operates an electricity project for a defined period before transferring ownership to the government, typically at no cost.
[9] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

A stable institutional environment, grounded in the rule of law and effective public administration, provides the foundation on which investor confidence and project sustainability are built. As illustrated in Figure 7, the governance indicators all show positive associations with power sector outcomes. While the voice and accountability indicator appears statistically weaker, it still displays a positive correlation with power sector performance. Changing the political economy around utilities, and complementing these changes with corporatisation reforms and incentives, strengthens governance and sends strong signals for performance improvements (Twesigye, 2024). These indicators reflect foundational conditions such as legal certainty, institutional capacity, regulatory clarity, and political stability, all of which shape investor confidence and project execution. Among these, rule of law, regulatory quality, and government effectiveness appear especially influential, indicating that credible public institutions and fair enforcement mechanisms are essential for PSP to thrive. We acknowledge there are instances when de facto situations exhibit different results.

Figure 7: Comparative Strength of Association between Governance Indicators, PSP, and a Composite Governance + PSP Measure with Power Sector Performance



Source: Authors.

The performance gap between PSP on its own and PSP implemented in countries with strong governance highlights that private investment is not a substitute for effective governance but a complement to it. Where governance is weak, PSP may result in short-term gains but often struggles with sustainability, coordination, or public legitimacy (Ackah *et al.,* 2021). Conversely, when PSP is embedded in a context of transparency, accountability, and institutional competence, it is more likely to deliver reliable service expansion, attract long-term financing, and ensure fair outcomes for consumers and the state (Kapika & Eberhard, 2013). This reinforces the need for governments to focus not only on creating space for private participation but also on strengthening the governance environment that enables it. Trustworthy procurement authorities, coherent policy frameworks, inter-agency coordination, and robust oversight mechanisms are all integral to effective power sector reform.

Box 1: Governance as a determinant of private sector outcomes: Lessons from South Africa

South Africa's early rounds of the Renewable Energy IPP Programme (REI4P) offer a benchmark for how effective governance structures can enable PSP to drive measurable improvements in electricity sector performance. Rooted in strong institutional governance**,** the programme benefited from a competent, technically capable procurement office and strong coordination across government departments (i.e., the Department of Mineral Resources and Energy, National Treasury, and the utility, Eskom). This enabled clear policy implementation, efficient project approval processes, and timely project execution (Filipova & Wewege, 2019).

The regulatory substance was reflected in the structured, competitive procurement framework, use of standardised and bankable power purchase agreements, and alignment with national energy planning. Investors were provided with consistent rules and predictable revenue frameworks, enabling market confidence. Rule of law and political stability also played important roles. Legal commitments, such as PPA enforcement and sovereign guarantees, were perceived as credible and enforceable. The overall investment environment was relatively stable, which facilitated long-term financing (Eberhard & Naude, 2017).

These governance conditions contributed to improved sector performance across a number of dimensions:

- Advances in decarbonisation, as private investment in wind and solar rapidly scaled up renewable generation.
- Cost reduction and financial viability: The programme achieved dramatic cost declines, with solar prices falling by 93% and wind by 77%, enhancing long-term affordability and budgetary sustainability (PFL, 2024).
- Electricity reliability: Even with modest capacity shares, renewables significantly reduced stress on the system. The REI4P helped cut the number of hours where residual demand exceeded 30 GW by over 70% in 2021, meaning load-shedding would have been far more severe without it (Kruger & Alao, 2022).

POLICY AND REGULATORY INSTRUMENTS AND INSTITUTIONS

Effective policy and regulatory frameworks are essential enablers of private sector participation in the electricity sector (Devkar *et al.,* 2013). These instruments define the rules that govern market access, tariff setting, licensing, and private investment permissions (Kapika & Eberhard, 2013). Transparent and predictable regulation reduces investor uncertainty, while cost-reflective tariffs are critical to ensuring the financial health of sector institutions (Trimble *et al.,* 2016). National energy policies that openly accommodate private investment provide long-term visibility and help align capital flows with sectoral planning priorities. Data support the importance of regulatory quality. While PSP alone is correlated with power sector performance at +0.384,[10] the correlation increases to +0.421 when PSP is accompanied by electricity regulatory reforms. It is important to note the distinction between the regulatory reforms mentioned here, which pertain specifically to the electricity sector, and the broader governance indicator – regulatory quality – which refers to sovereign-level policy and regulatory performance. This finding underscores the fact that policy and regulatory institutions are fundamental to further unlocking the benefits of private sector engagement in the electricity sector.

[10] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

Box 2: Regulation as a differentiator: Contrasting private sector outcomes in Nigeria and Uganda

Uganda provides an example of how regulatory reform can reinforce PSP outcomes. The establishment of the Electricity Regulatory Authority (ERA) in 2000 provided the sector with a stable, independent, and credible oversight body. ERA was endowed with strong legal autonomy and a clear mandate to oversee licensing, tariff regulation, and performance monitoring, critical pillars for investor confidence and sector governance.

Through clear performance benchmarks and consistent regulatory oversight, ERA incentivised measurable improvements in loss reduction, revenue collections, security of supply and service delivery, particularly by Umeme Ltd and Eskom Uganda Ltd, the two private distribution and generation concessionaires, respectively. ERA's regular use of performance-based targets and transparent monitoring fostered accountability and enabled gradual technical and commercial improvements (Twesigye, 2022, 2023). Uganda now ranks among the better-performing countries in SSA in terms of operational efficiency. A contributor to this progress was also ERA's gradual implementation of cost-reflective tariffs.

These combined regulatory measures strengthened financial viability. As of 2016, Uganda was one of only two countries in SSA where electricity revenues fully covered sector expenditures (Trimble *et al.,* 2016). As of 2025, Umeme Ltd possessed sufficient cash flow to recover its operating and debt service cost, though this was not the case for the state-owned generation (Uganda Electricity Generation Company Ltd [UEGCL]) and transmission (Uganda Electricity Transmission Company Ltd [UETCL]) companies (World Bank, 2025b).

On the other hand, Nigeria's case demonstrates that privatisation without robust regulatory institutions and policy consistency do not yield improved sector performance. Despite undertaking one of the most extensive electricity privatisation programmes in SSA, outcomes have remained disappointing across key performance indicators, exacerbated by a persistent and structural liquidity crisis (AfDB, 2019).

The 2013 unbundling of the power sector and the sale of 11 electricity distribution companies (DisCos) to private investors aimed to improve efficiency, attract capital, and expand service delivery. However, these outcomes have been undermined by weaknesses in the policy and regulatory environment (Eberhard *et al.,* 2016). Specifically:

- Policy inconsistency and weak enforcement eroded the credibility of regulation, deterring long-term investment and undermining sector planning.
- Cost-reflective tariffs were not implemented, despite clear methodologies developed by the regulator (NERC). Hence, DisCos regularly default on payments to the electricity bulk buyer (Nigerian Bulk Electricity Trading), triggering cascading arrears across the value chain, from transmission to generation (Eberhard *et al.,* 2016).
- Tariff freezes and ad hoc subsidies undermined the financial viability of DisCos (IMF, 2023), which were left unable to recover operational costs or service debt. As a result, they have lacked the capital needed to invest in infrastructure upgrades, expand metering, or improve customer service, further entrenching technical and commercial losses and worsening quality of supply (Trimble et al., 2016).

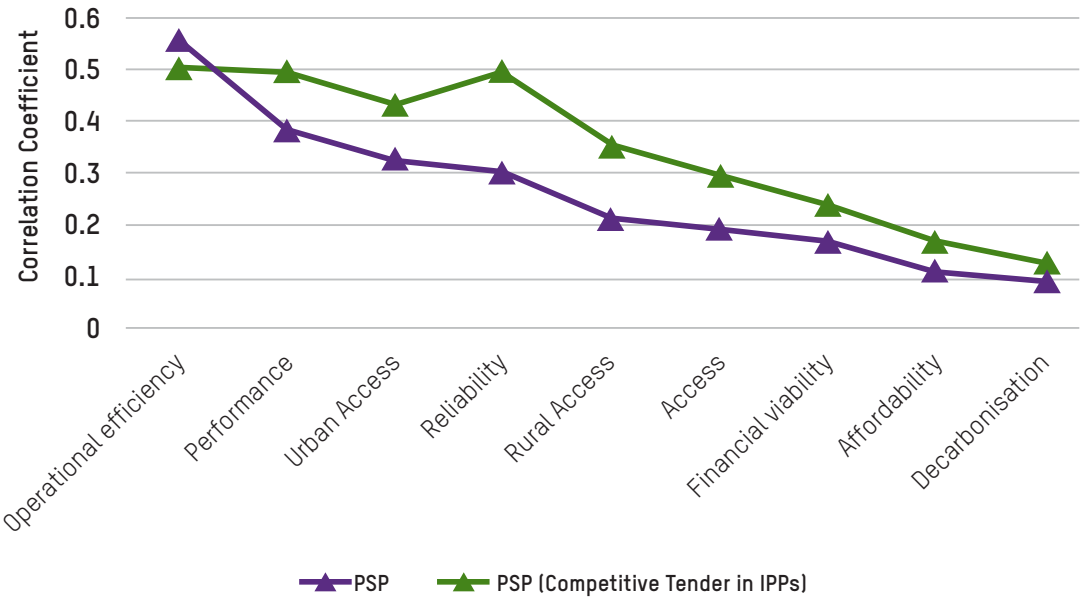
The contrasting examples in Box 2 reveal that private sector participation alone is insufficient. Without robust, independent regulation and coherent policy frameworks, PSP cannot deliver on its potential. In this light, regulatory institutions are not merely facilitators of reform – they are essential to structuring bankable, resilient, and credible power sectors across Africa.

POWER PLANNING AND PROCUREMENT

Coherent power sector planning and competitive procurement mechanisms form the backbone of effective PSP. These are the systems through which governments identify, prepare, and execute power projects ranging from integrated resource plans (IRPs) and long-term capacity expansion models to auction-based procurement and transparent permitting processes. When these foundations are weak or absent, PSP can devolve into fragmented, opportunistic deals that create excess capacity, fiscal stress, or stranded assets (del Río, 2017; Eberhard *et al.*, 2017b). However, when project-level readiness and procurement discipline are embedded in planning systems, PSP becomes a scalable and sustainable tool for sector transformation.

The importance of structured procurement is also evident in performance outcomes. As shown in Figure 8, private sector participation has a moderate positive correlation with a range of power sector performance indicators. However, when PSP is measured using a refined approach that applies established weightings of 85% for generation, 5% for transmission, and 10% for distribution and further disaggregates the generation component to equally weight both the extent of IPP participation and the quality of the competitive tendering framework,[11] the performance outcomes improve significantly across nearly all indicators. This suggests that it is not merely the presence of private actors that matters, but the degree to which they are engaged through disciplined, competitive, and well-aligned planning and procurement systems.

Figure 8: Comparative Performance of PSP with and without Competitive IPP Procurement Frameworks



Source: Authors' calculations.

[11] Countries were ranked based on announcing an auction programme (33%); auction winners announced but no financial close (66%); and auction project reaching financial close (100%).

Box 3: Integrated planning-procurement nexus as a pillar of PSP: A tale of two approaches in Mauritius and Ghana

Mauritius has successfully established a coherent and transparent planning environment led by the Central Electricity Board (CEB). The country uses integrated resource plans (IRPs) and long-term energy scenarios to guide capacity expansion, balancing energy security, cost, and environmental goals.

Procurement is tightly coupled to these plans. Projects are solicited through transparent, competitive tenders, with clearly published criteria, prequalification requirements, and predictable timelines. The regulatory framework, underpinned by an independent regulator, ensures that private bidders operate in an environment of legal certainty and predictable decision-making (Dinesh & Pravesh, 2017; Kruger & Alao, 2024). These institutional features have enabled Mauritius to achieve:

- Reliable service delivery, with high electrification rates and minimal outages.
- A balanced and evolving energy mix, with renewables growing steadily without creating stranded assets.
- Cost control and affordability, supported by well-timed investment aligned with demand projections.
- Private sector confidence, reflected in steady interest from credible international developers.

Tight integration between planning, procurement, and implementation has enabled Mauritius to expand capacity in line with demand, avoiding the fiscal and operational pitfalls often seen in other SSA markets (Dinesh & Pravesh, 2017; Kruger & Alao, 2024).

Conversely, Ghana illustrates the risks of weak coordination between planning and procurement. Faced with power shortages in the early 2010s, the government quickly entered into over 40 unsolicited PPAs, many of which were bilateral deals without competitive bidding or prior system integration studies (Ackah *et al.,* 2021).

The majority of these contracts included take-or-pay clauses, obligating the government to pay for capacity regardless of actual demand. Critically, these decisions were made outside the framework of a national integrated power plan and without rigorous least-cost analysis or project readiness assessment (Alao & Kruger, 2022). As a result:

- Generation capacity significantly overshot peak demand, creating large volumes of idle and underused infrastructure.
- Fixed capacity payments ballooned, contributing to significant fiscal liabilities borne by the government.
- Contracts had to be renegotiated later on, damaging investor trust and delaying subsequent procurement rounds.
- Planning credibility was undermined, and public perception of PSP suffered due to the appearance of expensive, opaque deals.

The sector also faced constraints in evacuating new capacity due to insufficient transmission investment, itself a symptom of uncoordinated planning. These outcomes illustrate how fragmented procurement and weak project screening can produce long-term inefficiencies, even when PSP is active (Ackah *et al.,* 2021; Alao & Kruger, 2022).

FINANCIAL VIABILITY AND SUSTAINABILITY

Enabling Bankability

In SSA, where only Botswana, NamPower, and Mauritius currently maintain investment-grade credit ratings and where only a handful of countries cover both operational and capital expenditures through electricity revenues, the bankability of power sector projects is an absolute necessity (Foster & Rana, 2019; Trimble *et al.*, 2016). These realities reflect a structural financing environment in which utilities are often unable to generate sufficient internal revenues and sovereigns have limited fiscal space to underwrite new infrastructure. As such, governments must take deliberate and proactive steps to establish the financial conditions necessary for private sector investments. This includes ensuring the credibility of revenue streams through instruments such as sovereign guarantees, liquidity support, escrow accounts, and clear revenue recovery frameworks, especially where cost-reflective tariffs or credible off-takers are lacking (Kruger & Eberhard, 2023). However, while sovereign guarantees have been instrumental in unlocking private investment, they have also added significantly to the contingent liabilities on government balance sheets, exacerbating fiscal pressures in countries already managing high debt burdens (Kruger & Alao, 2024). In several African cases, the invocation of such guarantees due to off-taker failure or macroeconomic shocks has strained public finances and raised concerns about long-term fiscal sustainability. One such example is Zambia, where projects with over 10,000 MW of capacity have failed to reach financial close due to lack of sovereign guarantees amidst fiscal strain and macroeconomic shocks (Twesigye, 2025b).

Equally critical is the implementation of sound, enforceable contractual arrangements, such as PPAs, BOOT schemes, and long-term concessions, that assign risks to the parties best able to manage them and provide predictable cash flows for investors (Eberhard *et al.,* 2017a; Eberhard & Gratwick, 2011; ESMAP, 2015; Gassner *et al.,* 2008; Othman & Khallaf, 2022). In Africa's high-risk operating environment, well-structured contracts often serve as the primary source of confidence for private financiers. However, the burden of enabling bankability does not rest with governments alone. Development partners, particularly DFIs and multilateral agencies, need to continue to play a pivotal role in helping de-risk projects and crowd in private capital (Klagge & Nweke-Eze, 2020; Kruger & Alao, 2024; Nweke-Eze, 2024). Their involvement is particularly vital in the SSA context, where market perceptions of sovereign risk inflate borrowing costs beyond what most projects can absorb (African Union, 2024). Through instruments such as partial risk guarantees, blended finance arrangements, and technical assistance for project preparation and procurement, these institutions act as risk absorbers and enablers of financial closure (Klagge & Nweke-Eze, 2020; Nweke-Eze, 2024). Moreover, their participation signals credibility and long-term stability to private investors. In a region where financing challenges are compounded by skewed risk perceptions, underperforming utilities, and limited fiscal headroom, the combined efforts of governments and development partners are indispensable (Kruger & Alao, 2024).

Strengthening financial viability and capital flows is not only about attracting investment but also about shaping the quality of PSP involvement. By lowering risks through credible off-takers, sound contracts, and supportive financing structures, countries can broaden the investor pool. Greater competition, in turn, gives governments leverage to secure better terms and align PSP with policy goals such as affordability, access, and sustainability.

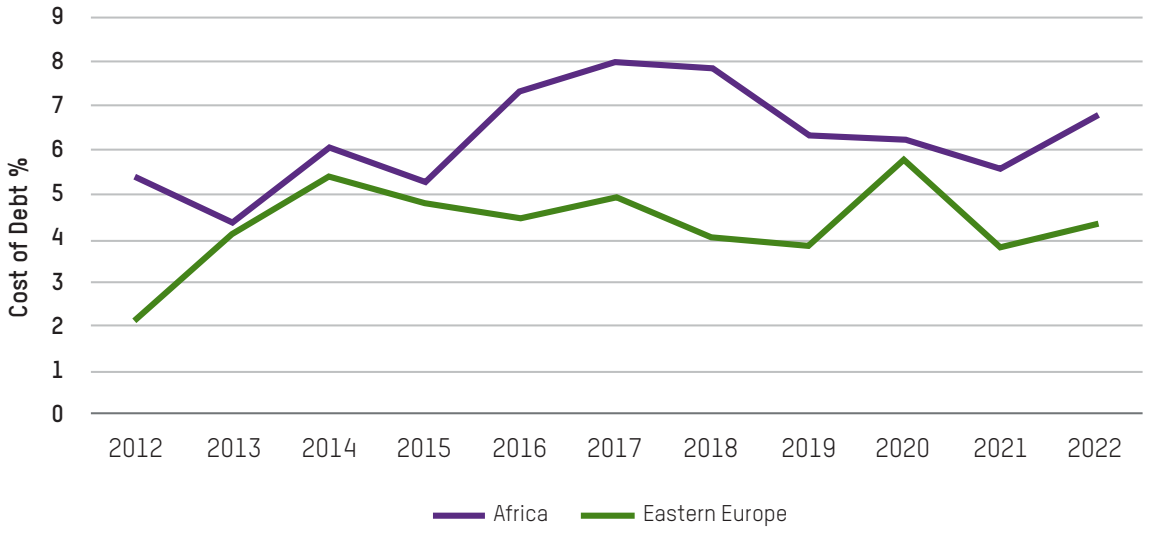
Favourable Financing Arrangements and Biased Credit Ratings

The debate around sovereign credit ratings and their implications for infrastructure financing in developing countries, particularly in Africa, has gained renewed urgency. A growing body of evidence suggests that risk assessments by global credit rating agencies often fail to align with actual

project-level performance or macroeconomic realities. As a result, African countries continue to face disproportionately high borrowing costs, not necessarily because of elevated default risk but because of perceptions shaped by external methodologies that inadequately account for context or nuance (African Union, 2024; ESI Africa, 2025; Friis-Hansen & Schultz, 2025). The scale of this burden is stark. According to the World Bank's 2024 *International Debt Report*, developing countries spent a record US$1.4 trillion servicing foreign debt in 2023, with interest costs rising to a 20-year high. SSA countries, in particular, experienced some of the highest effective interest rates on infrastructure borrowing (ESI Africa, 2025). This pattern is reflected in Figure 9, which compares the average interest expense relative to debt held across a rich sample of countries in SSA and Eastern Europe. It shows that SSA countries pay significantly more for comparable infrastructure investments, even though Africa has a lower default rate than Eastern Europe (Table 5), yet narratives continue to paint Africa as a high default continent.

Given the disconnect between perceived and actual risk, there is growing momentum to reform global credit rating practices. Expanding concessional lending, advancing targeted debt relief, and promoting the emergence of Africa-based credit rating agencies are among the solutions that have been proposed (African Union, 2024; ESI Africa, 2025). In parallel, African governments and sector agencies also have an important role to play in addressing perception risk by systematically collecting, publishing, and disseminating reliable market and credit performance data. Greater transparency on repayment records, default rates, and project outcomes can help counter external biases on the region. IPPs and their funders, too, ought to showcase more of the successful stories to defray the perceived risks and catalyse more investments. Credit rating agencies should revise their methodologies to reflect more applied project context realities rather than subjective political measures. These reforms aim to produce more accurate, context-sensitive assessments that better reflect project-level realities in the region. The impact of inflated borrowing costs is not abstract. Elevated risk premiums constrain African governments' ability to finance infrastructure, limit access to reliable electricity, and raise service costs for consumers. This disproportionately affects lower-income populations, making electricity less affordable and deepening poverty. Correcting these systemic biases is not only a matter of fairness; it is essential to enabling development, expanding access, and supporting a more just global financial system.

Figure 9: Interest Expense Relative to Debt Held (Effective Interest Rate) of Electricity Infrastructure Projects



Source: World Bank 2025b.

Table 5: Cumulative Default Rate for Bank Loans to Infrastructure Projects

Region	1990–2020 Cumulative Default Rate (Basel)
Africa	6.74%
Asia	5.60%
Eastern Europe	10.69%
Latin America	11.08%
Middle East	4.41%
North America	2.35%
Oceania	7.36%
Western Europe	8.90%

Source: Moody's Investors Service 2022.

SOCIAL AND EQUITY CONSIDERATIONS

Social and equity considerations, though often underemphasised in the design of PSP programmes, are increasingly acknowledged as critical for the long-term sustainability, political acceptability, and developmental relevance of electricity sector reforms (Klagge *et al.,* 2020; Devkar *et al.,* 2013; Foster & Rana, 2019; Kruger & Alao, 2024; Nweke-Eze & Kioko, 2021). In many SSA countries, electricity remains unevenly distributed, with rural communities, low-income households, and vulnerable groups, especially women and girls, bearing the brunt of energy poverty. Without deliberate social safeguards, PSP risks exacerbating these inequities (Clark, 2021). Private investment typically targets commercially attractive areas, where returns are higher, demand is more predictable, and infrastructure is already in place. This tendency is reflected in the performance data. The correlation between PSP and urban electricity access stands at +0.324*,[12] while for rural access, it drops to +0.215. This urban bias deepens structural inequalities unless explicitly addressed through policy, planning, and regulatory intervention. In Zambia, where urban access stands at 82% and rural access at just 15% (overall 54%), the considerable PSP in generation has not translated into rural connectivity; instead, new capacity has been targeted at copper mines. Mini-grid and off-grid solutions under PSP frameworks have largely concentrated in peri-urban zones with higher income density, leaving rural areas underserved in the absence of cross-subsidies or targeted electrification funds (Aggarwal, 2019).

Workforce restructuring also presents a significant equity challenge. PSP-driven unbundling or privatisation efforts often involve downsizing or transferring labour from public to private entities. Without transparent transition plans, compensation packages, and retraining programmes, these changes can trigger social unrest, union opposition, and broader political backlash (AfDB, 2019). Community participation is another crucial but often overlooked equity dimension. The failure to engage affected communities in project design and implementation can fatally undermine otherwise viable investments. The Kinangop Wind Park in Kenya is a telling example. Despite having secured regulatory approvals and financing, the project collapsed due to community opposition driven by land disputes, inadequate consultation, and perceptions of exclusion. Kinangop demonstrates that even technically and financially sound projects can unravel without early and inclusive stakeholder engagement, especially in areas where trust in institutions is fragile (Alao & Kruger, 2020). Similarly, the ENEO concession in Cameroon has been forced to an early termination partly due to inadequate stakeholder engagement and buy-in (Twesigye 2025).

[12] All correlational coefficients will be followed by an asterisk to indicate statistical significance at the 95% confidence level. The absence of an asterisk indicates the correlation is not statistically significant at this level. Greater detail is available in the appendix.

Encouragingly, some SSA countries are incorporating social and gender-sensitive provisions into PSP frameworks. South Africa's REI4P includes mandatory commitments to job creation, local content and ownership, and gender targets in project implementation (Filipova & Wewege, 2019; Kruger & Alao, 2024). However, these practices remain the exception rather than the norm. To ensure PSP is not only economically viable but socially legitimate, governments and regulators must embed equity into the design, implementation, and monitoring of reforms. This includes prioritising universal access, protecting affordability for the poor, addressing the gendered dimensions of energy access, managing workforce transitions with fairness and transparency, and ensuring early and inclusive community participation in power projects (Clark, 2021).

POLICY IMPLICATIONS, CONCLUSIONS, AND LIMITATIONS

The main contribution of the study is the development of a structured framework that evaluates PSP involvement across the electricity value chain against sector outcomes. The findings of this study underscore that private sector participation in SSA's electricity sector has not been universally transformative. Its effectiveness depends on how, where, and under what conditions it is deployed. While PSP has delivered meaningful gains in generation, particularly through the rise of IPPs, it has had far less consistent impact in transmission and distribution. Moreover, its contribution to broader development outcomes such as affordability, rural access, and equity remains limited, and in some cases, problematic.

POLICY IMPLICATIONS

- **Prioritise enabling governance and regulatory conditions:** PSP in SSA's electricity sector performs best when implemented within a framework of strong governance and clear contracts. The effectiveness of PSP is significantly enhanced when countries have independent regulatory authorities, transparent procurement systems, and clear enforcement mechanisms. In contexts where public institutions demonstrate credibility and competence, the private sector has been able to operate with greater certainty and accountability. On the other hand, countries where regulatory institutions have been undermined by political interference and inconsistent policy signals have struggled to sustain the gains of privatisation, leading to chronic underperformance and a loss of investor confidence (Devkar *et al.,* 2013; Foster & Rana, 2019; Kapika & Eberhard, 2013; Twesigye, 2022). Therefore, it is essential that governments focus on strengthening the regulatory and institutional architecture as a prerequisite for successful private sector engagement.

- **Embed PSP within coherent sector planning and procurement frameworks:** The alignment of private sector participation with long-term national energy planning is a critical policy requirement. Effective integration of PSP depends on the presence of structured procurement systems and coordinated sector planning mechanisms. Where planning and procurement processes are grounded in integrated resource strategies and competitive tenders, the result is often greater investment reliability, improved cost efficiency, and long-term energy security. In contrast, the absence of coordinated procurement and reliance on unsolicited agreements can result in misaligned investments, including overcapacity and inefficiencies, which place significant fiscal strain on the power system (Kruger & Alao, 2024; Kruger & Eberhard, 2023).

- **Improve risk allocation in PSP contracts**: One of the most pressing implications of PSP in the region concerns the allocation of financial risk through contractual mechanisms. Instruments such as sovereign guarantees, take-or-pay clauses, and credit enhancements are vital in attracting private investment, especially in high-risk environments (Kruger & Alao, 2024). Poorly structured contracts have generated significant contingent liabilities, which undermine fiscal health and force costly renegotiations. Policymakers must ensure that contractual arrangements allocate risk transparently and appropriately, with clear guidelines for enforcement, performance, and dispute resolution (ESMAP, 2015; Othman & Khallaf, 2022). Fiscal prudence and robust risk management should go hand in hand with private capital mobilisation strategies.

- **Reframe financial risk and creditworthiness narratives:** The broader financing environment remains a structural barrier to scaling up PSP in Africa's electricity sector. Despite evidence that infrastructure projects in the region carry moderate levels of credit risk, sovereign credit ratings continue to reflect disproportionate pessimism. These ratings significantly raise borrowing costs, creating an unfavourable financing environment that hinders both public and private infrastructure investment (African Union, 2024; ESI Africa, 2025). Addressing this challenge requires reforms to global credit rating methodologies and the promotion of regional credit rating institutions that are better attuned to local realities. In parallel, there is an urgent need to expand access to concessional finance and blended funding mechanisms that can reduce project risk and crowd in private capital on more affordable terms.
- **Target reforms to address social safeguards and community participation:** Social equity is an essential dimension of electricity sector reform, particularly in the context of PSP. Electricity access in many countries remains skewed toward urban and wealthier areas, while rural and low-income populations remain underserved. Left unchecked, PSP can deepen these disparities, as private investment tends to prioritise commercially viable regions. Governments must therefore integrate affordability protections into their regulatory frameworks, including targeted subsidies and cross-subsidisation. Moreover, the restructuring processes associated with privatisation or unbundling often result in job losses and labour disruptions, especially where workforce transition plans are lacking (AfDB, 2019). The failure to engage communities meaningfully in the planning and implementation of projects can also lead to resistance or failure of otherwise bankable investments (Alao & Kruger, 2020). For PSP to be socially legitimate and politically sustainable, governments must institutionalise community engagement, integrate gender-sensitive and inclusive development goals, and implement fair and transparent labour transition frameworks.

CONCLUSION

This study confirms that PSP can play a meaningful role in the reform and expansion of electricity systems in SSA but only under the right conditions. While private actors have provided much-needed capital and helped modernise portions of the sector – particularly in electricity generation – the outcomes in transmission and distribution segments have been mixed and often contingent on broader institutional, regulatory, structural, financial, political, and social conditions. The findings of this study affirm that PSP, when embedded within robust governance and regulatory frameworks as well as transparent procurement mechanisms and coherent sector planning, can contribute positively to power sector performance. However, these gains are not automatic. The strongest correlations between PSP and performance are observed in countries where governance is credible, regulatory agencies are functional, and policy environments are stable. Conversely, in contexts where institutions are weak, PSP has often produced limited or even adverse outcomes, such as overcapacity, fiscal strain, high tariffs, and social inequities. In summary, PSP can be a valuable tool for accelerating power sector transformation, but only when it is thoughtfully designed, responsibly governed, and firmly aligned with the public good. Further, sustainable electrification requires not just more investment, but smarter, fairer, and more accountable systems that prioritise resilience, equity, and long-term development.

LIMITATIONS

This analysis provides important insights into the relationship between PSP and electricity sector performance in SSA. However, several limitations should be noted when interpreting the findings:

- **Data availability and consistency:** Data coverage for key performance indicators is uneven across countries. In some cases, incomplete or missing data limited the ability to construct fully representative composite indicators, contributing to weakening statistical significance of correlated data.
- **Scope of PSP measurement:** The PSP indicator reflects the extent of private participation in generation, transmission, and distribution but does no, for instance, capture the quality of contractual arrangements and enforcement. Consequently, differences in performance may stem from qualitative factors not fully represented in the index. The analysis also excludes mini-grids, micro-grids, and standalone systems due to the lack of consistent, comparable data across SSA, which limits coverage of decentralised or off-grid PSP contributions.
- **Causality versus correlation:** The analysis identifies statistical correlations between PSP and sector performance but does not establish causality. Observed relationships may be influenced by broader enabling conditions which could independently affect both PSP and performance outcomes.
- **Time lag in impact:** Some PSP impacts may take many years to materialise. The cross-sectional nature of parts of the dataset may therefore understate longer-term benefits or costs, especially in countries where PSP is relatively recent.
- **External contextual factors:** Electricity sector outcomes in SSA are also shaped by external factors beyond PSP, such as fuel price volatility, climate shocks affecting hydropower, and donor influences. These influences are difficult to fully isolate in the correlation analysis and may contribute to observed variations across countries.

APPENDIX

CORRELATION MATRIX WITH STATISTICAL SIGNIFICANCE

Indicator 1	Indicator 2	Correlation	*p*-value	Statistical significance ($p < 0.05$?)
Decarbonisation	Affordability	-0.01531962	0.921377156	FALSE
Operational efficiency	Financial viability	0.493481192	0.00890281	TRUE
Reliability	Financial viability	0.468877118	0.007798532	TRUE
Access	IPP	0.203685875	0.164958952	FALSE
Affordability	IPP	0.064501827	0.670197356	FALSE
Financial viability	IPP	0.201512678	0.225051664	FALSE
Operational efficiency	IPP	0.604132701	0.000846612	TRUE
Reliability	IPP	0.315213577	0.069392963	FALSE
Rural access	IPP	0.222950088	0.155837167	FALSE
Decarbonisation	IPP	0.093898356	0.534799034	FALSE
Urban access	IPP	0.333505515	0.030900456	TRUE
Access	IPP + tender	0.310205695	0.031892072	TRUE
Affordability	IPP + tender	0.130590234	0.38701471	FALSE
Financial viability	IPP + tender	0.271528377	0.099138272	FALSE
Operational efficiency	IPP + tender	0.547201093	0.003137664	TRUE
Reliability	IPP + tender	0.52041851	0.001604253	TRUE
Rural access	IPP + tender	0.37577221	0.014190214	TRUE
Decarbonisation	IPP + tender	0.131381496	0.384119477	FALSE
Urban access	IPP + tender	0.448835461	0.002869238	TRUE
Competition reforms	Performance	0.187443985	0.40354234	FALSE
Control of corruption	Performance	0.513989491	0.014403346	TRUE
Electricity regulator quality	Performance	0.270690354	0.235298864	FALSE
Governance	Performance	0.648068471	0.001108041	TRUE
Governance + tenders in IPPs	Performance	0.634426915	0.001517923	TRUE
Governance + IPPs	Performance	0.636462593	0.001449633	TRUE
Governance + PSP	Performance	0.618767886	0.002140419	TRUE
Governance + PSP (tender in IPPs)	Performance	0.618939945	0.00213256	TRUE
Governance + reforms	Performance	0.552216355	0.004959288	TRUE
Government effectiveness	Performance	0.622479624	0.001976193	TRUE
IPP	Performance	0.410611289	0.057668437	FALSE
IPP + tender	Performance	0.529400663	0.011286711	TRUE
Political stability	Performance	0.618326288	0.002160703	TRUE
PSP	Performance	0.384477097	0.077274171	FALSE

Indicator 1	Indicator 2	Correlation	*p*-value	Statistical significance ($p < 0.05$?)
PSP (tender in IPPs)	Performance	0.497552818	0.018463643	TRUE
Reforms	Performance	0.15718703	0.484803115	FALSE
Regulatory quality	Performance	0.670655854	0.000635636	TRUE
Rule of law	Performance	0.741003807	7.98153E-05	TRUE
Structural reforms	Performance	-0.01072025	0.962235486	FALSE
Voice and accountability	Performance	0.439854408	0.040516557	TRUE
Access	PSP	0.192871143	0.189048728	FALSE
Affordability	PSP	0.108495915	0.472925729	FALSE
Financial viability	PSP	0.170300365	0.306674549	FALSE
Operational efficiency	PSP	0.556793103	0.002557027	TRUE
Reliability	PSP	0.301427721	0.0831988	FALSE
Rural access	PSP	0.211641921	0.178462854	FALSE
Decarbonisation	PSP	0.091117565	0.547016454	FALSE
Urban access	PSP	0.323557064	0.036599751	TRUE
Performance	PSP + regulation (electricity)	0.420917651	0.057414517	FALSE
Performance	PSP + structural (electricity)	0.201338617	0.368925421	FALSE
Performance	PSP + competition (electricity)	0.315068232	0.153229771	FALSE
Access	PSP (tender in IPPs)	0.294793611	0.041951586	TRUE
Affordability	PSP (tender in IPPs)	0.168179238	0.263893283	FALSE
Financial viability	PSP (tender in IPPs)	0.238883893	0.148627947	FALSE
Operational efficiency	PSP (tender in IPPs)	0.505283871	0.007179662	TRUE
Reliability	PSP (tender in IPPs)	0.497729328	0.002742268	TRUE
Rural access	PSP (tender in IPPs)	0.355003261	0.021056923	TRUE
Decarbonisation	PSP (tender in IPPs)	0.12697565	0.400403061	FALSE
Urban access	PSP (tender in IPPs)	0.431514392	0.004326942	TRUE
Access	PSP in T&D	0.012117085	0.934853724	FALSE
Affordability	PSP in T&D	0.265817747	0.074176273	FALSE
Financial viability	PSP in T&D	-0.09666711	0.563706445	FALSE
Operational efficiency	PSP in T&D	-0.05643358	0.779796223	FALSE
Reliability	PSP in T&D	0.04762101	0.788687967	FALSE
Rural access	PSP in T&D	0.015019779	0.922147828	FALSE
Urban access	PSP in T&D	0.060104114	0.705351716	FALSE
Performance	PSP in T&D	0.00159175	0.994353207	FALSE
Decarbonisation	PSP in T&D	0.017421841	0.910170973	FALSE
Rural access	Urban access	0.649945543	3.19331E-06	TRUE

GOVERNANCE INDEX

The governance index is based on the World Bank's Worldwide Governance Indicators (WGI), which describe broad patterns in perceptions of the quality of governance across countries and over time. The WGI is derived from an equal weighting of a set of indicators – voice and accountability, political stability, government effectiveness, regulatory quality, rule of law, and control of corruption (World Bank, 2023c).

Voice and Accountability: This indicator reflects the extent to which citizens in a country can participate in selecting their government, as well as the degree of freedom of expression, association, and press. It encompasses core dimensions such as electoral process and pluralism, civil liberties, press freedom, the participation of women and minorities, and the independence of media and civil society.

Political Stability: This indicator captures perceptions of the likelihood of political instability and politically motivated violence, including terrorism. It encompasses a range of threats such as coups or armed conflict; ethnic, religious, or political violence; terrorist attacks; and incidents of political assassinations or upheaval.

Government Effectiveness: This indicator measures the quality of public services, the competence and independence of the civil service, and the quality of policy formulation and implementation, including the credibility of government commitments. It reflects aspects such as bureaucratic quality, service delivery, policy coordination, and the overall capability of public institutions.

Regulatory Quality: This indicator captures perceptions of the government's ability to formulate and implement sound policies and regulations that facilitate private sector development. It includes factors such as the ease of starting and operating a business, openness to market competition, the quality of trade and investment policies, and the effectiveness of tax and labour market regulation.

Rule of Law: This indicator measures the extent to which individuals and institutions have confidence in and abide by the rules of society, particularly in areas such as contract enforcement, property rights, and the effectiveness of the police and judiciary. It also reflects the likelihood of crime and violence and incorporates elements like judicial independence, respect for property rights, and the ability to uphold legal agreements.

Control of Corruption: This indicator captures perceptions of the extent to which public power is used for private gain, covering both petty and grand forms of corruption, as well as the undue influence of elites and private interests over public institutions. It considers the prevalence of bribery, corruption in procurement and licensing, state capture, and the effectiveness of anti-corruption enforcement mechanisms.

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