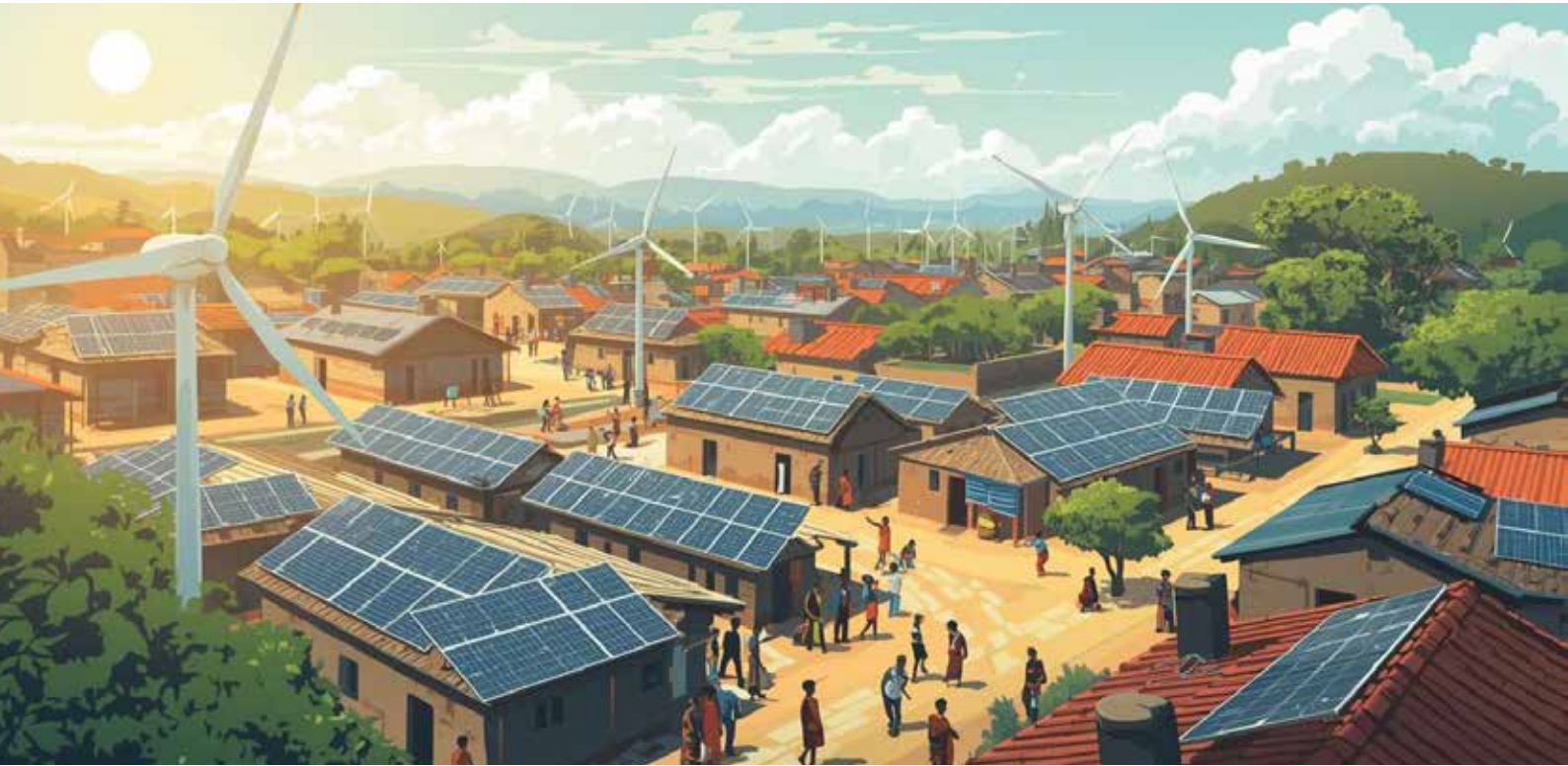


## ACCELERATING ENERGY ACCESS IN KENYA: THE RELEVANCE OF DISTRIBUTED RENEWABLE ENERGY SOLUTIONS



### SUMMARY

This is a policy brief by the Sustainable Energy Access Association Kenya (SEAA-K) underscoring the relevance of Distributed Renewable Energy (DRE) in advancing Kenya's universal energy access goals while enhancing energy security, environmental sustainability, economic empowerment, and energy independence. It recommends targeted financial incentives, blended financing models, public-private partnerships, integrated clean cooking strategies, cohesive regulatory frameworks, structured multi-stakeholder platforms, and strengthened county-level planning as priority actions to accelerate DRE deployment.

### KEY MESSAGES

- Grid extension alone is insufficient- Over 20% of Kenya's population will remain unelectrified without DRE solutions to bridge last-mile gaps in a cost-effective and scalable manner.

- DRE enhances system resilience and energy security- Distributed systems decentralise power generation, reducing grid vulnerabilities and ensuring uninterrupted electricity for critical services during grid failures or disasters.
- DRE drives decarbonisation and economic empowerment- By replacing fossil fuels with renewables, DRE lowers carbon emissions while creating jobs, enabling productive uses, and stimulating local economic development.
- Policy, financing frameworks and technology must evolve- Dedicated incentives, de-risking instruments, streamlined permitting and modern innovations are urgent.
- Clean cooking integration is non-negotiable- Clean cooking must be mainstreamed as a core component of energy policy to reduce household air pollution, deforestation, and gender disparities in energy poverty.

## INTRODUCTION

Access to affordable, reliable, sustainable, and modern energy is a critical enabler of socio-economic development including education, healthcare, and poverty reduction. Nonetheless, the supply of energy in Africa amidst rapid population growth, digitalization, and urbanization has, for decades, not matched the demand (IEA, 2022). This is despite the region's considerable potential for renewable energy from its rich natural resources, including hydropower, solar energy, and wind power. Africa accounts for just 6% of global energy use, with overall electricity access rates lower than global levels. The situation is particularly critical in rural Sub-Saharan Africa, home to over 57% of the continent's population. A report by IEA indicates that 590M people in Sub-Saharan Africa, accounting for 43% of the population still lack access to electricity, with rural areas disproportionately affected.

Correspondingly, more than 600 million Africans will continue to face harmful cooking conditions until 2150 if current trends persist.

Kenya's energy sector is crucial for its economic growth and its Vision 2030 goal of becoming a middle-income nation (Gopalakrishnan, C., et al.). However, rural electrification remains a challenge, with over 30% of the Kenya's rural population still lacking reliable power (Aoko, 2024). The centralized grid struggles to reach remote areas due to high costs coupled with other factors like underinvestment, low generation capacity, aging and vandalized infrastructure. As a result, Kenyans, particularly the rural residents continue suffering from insufficient access to clean and affordable energy, with negative spillover effects on sectors such as healthcare, agriculture, education, and economic growth, as locals struggle to meet their basic energy needs.

Distributed Renewable Energy (DRE) offers a viable and transformative solution. By deploying decentralized technologies such as solar mini-grids, stand-alone systems, and productive-use appliances, DRE overcomes the limitations of centralized grid expansion. Its flexibility, affordability, and scalability make it uniquely positioned to deliver last-mile connectivity, stimulate local economies, and strengthen climate-smart livelihoods.

Moreover, DRE aligns with Kenya's commitments under the SDGs, the Paris Agreement, and national climate change policies by reducing reliance on fossil fuels while ensuring inclusive growth.

The urgency to scale DRE solutions is further underscored by the Mission 300 initiative, which emphasizes renewable energy expansion, utility efficiency, and private sector investment as levers for achieving universal access (World Bank & AfDB, 2024). By aligning national priorities with this continental initiative, Kenya can leverage Mission 300 to unlock financing, attract private investment, and expand distributed renewable solutions. DRE, therefore, stands at the heart of Mission 300's ambition, serving as the cornerstone for inclusive electrification, regional integration, and sustainable growth.

## UNPACKING DECENTRALIZED AND DISTRIBUTED RENEWABLE ENERGY (DRE)

Distributed Renewable Energy (DRE) and Decentralized Renewable Energy are closely related concepts but differ in focus. DRE refers to small-scale renewable energy systems such as rooftop solar, small wind turbines, or biogas units that are located close to the point of consumption (Vezzoli et al. (2018). These systems can be grid-connected or off-grid and aim to improve energy efficiency by reducing transmission losses (Gray Group International, n.d). In contrast, decentralized renewable energy emphasizes the shift from centralized power generation to local or community-based systems that are often autonomous and locally managed. While both use renewable technologies, decentralized energy highlights local ownership, control, and decision-making, particularly important in expanding energy access in remote or underserved areas. In essence, DRE focuses on the technical distribution of energy, while decentralized renewable energy focuses on governance and access.

## RELEVANCE OF DRE TO REALISING ENERGY ACCESS IN KENYA

Over 60% of Sub-Saharan Africa's un-electrified populations live in areas where grid extension is either too costly or unfeasible. Distributed energy systems offer a viable alternative, allowing for the integration of renewable energy sources such as solar, wind, and biomass into decentralized energy models. DRE have advantage in last-mile delivery, reducing reliance on fossil fuels & enabling localized energy systems (IEA, 2022; SEforALL, 2023). This results in enhanced energy security, promotes environmental sustainability, provides economic incentives, and fosters energy independence while enhancing grid reliability and efficiency.

- 1. Energy Resilience and Security-** DRE systems make a robust and resilient network, ensuring a continuous power supply even in eventualities of natural disasters or grid failures. With DRE, consumers have greater control over their energy supply, reducing their vulnerability to external interruptions.
- 2. Enhanced Grid Reliability and Transmission Efficiency-** Distributed energy systems strengthen the reliability of the main electric grid by supplying additional power during peak demand periods, thereby preventing overloads and ensuring uninterrupted service.
- 3. Environmental Sustainability-** DRE systems rely on renewable sources of energy such as solar, wind, and hydro, which significantly reduce carbon footprint, and reliance on fossil fuels. Besides, DRE reduces the need for large-scale power plants, long-distance transmission infrastructure, thus minimizing habitat disruption and landscape impact.
- 4. Economic Incentives-** DRE has potential to stimulate local economic development through productive uses of energy such as refrigeration, agro-processing, ICT, and MSMEs. Additionally, the DRE value chain creates local job opportunities across various skill levels and the prosumers benefit from selling surplus energy back to the grid through net-metering plans.
- 5. Cost Savings-** Besides, DRE reduces transmission and distribution cost since energy is produced at or within the point of use. Consequently, consumers directly benefit from lower electricity bills and shield themselves from the volatile pricing.
- 6. Energy Independence and Self-Sufficiency-** By generating their own power from renewable sources, consumers reduce their reliance on volatile energy markets and geopolitical uncertainties. This fosters energy independence, providing consumers greater control over energy costs while also creating a sense of ownership and empowerment within communities.

## POLICY RECOMMENDATIONS

- 1. Financial Incentives and Risk Mitigation Instruments-** Providing tax incentives and import duty exemptions for DRE technologies and components will lower upfront costs and enhance market growth, as shown in Rwanda where VAT exemptions on solar products spurred rapid market expansion (BloombergNEF & GOGLA, 2020). Consequently, the association recommends institutionalising Renewable Energy tax exemptions and incentives in energy legislation, such as Energy Act or through dedicated Renewable Energy Incentive Regulations to provide long-term certainty beyond annual Finance Act amendments.
- 2. Blended Finance Models-** Despite the high debt risk for many African countries, loans consistently dominate energy funding, making up over 78% of total energy funding from 2022 to 2024. Conscious of the rising debt risk for Kenya, this policy brief recommends a blended financing model for DRE combining grants, concessional loans, and commercial investment to reduce project risks and improve bankability, as demonstrated by the Beyond the Grid Fund for Zambia, which catalysed over 900,000 off-grid connections by leveraging donor funds to de-risk private investments (SEforALL, 2021).
- 3. Leveraging Public-Private Partnerships (PPPs) -** SEAA-K recommends the establishment of a dedicated public-private partnerships unit within the Rural Electrification and Renewable Energy Corporation (REREC) to streamline collaboration between government entities, private developers, and local communities. To ensure effective implementation, Kenya could introduce a tiered subsidy scheme, offering a percentage of the capital investment required for mini-grid projects. This would mitigate financial risks for developers and make projects more viable while ensuring rural communities receive affordable, reliable, modern energy.
- 4. Integration of Clean Cooking in Energy Access Strategies-** Despite the critical role of clean cooking in achieving universal energy access, it consistently remains inadequately addressed in most national and county energy plans. As such, SEAA-K recommends recognition and integration of clean cooking as a central pillar of Kenya's energy access agenda, integrated at the same strategic level as electrification targets.

## 5. Enhanced Stakeholder Engagement and Capacity Building-

The current low community awareness of DRE solutions and benefits, coupled with limited inclusion of local voices in energy planning, has significantly contributed to low DRE uptake, ownership and sustainability. To address this, SEAA-K recommends the establishment of structured multi-stakeholder platforms involving government agencies, private sector actors, civil society organisations, and local communities including marginalized groups, for inclusive and effective DRE policy and implementation. Ethiopia's National Electrification Programme (NEP) Multi-Stakeholder Platform illustrates the value of such coordination in aligning off-grid investments with national targets (World Bank, 2019).

## 6. Regional Cross-Learning Platforms and Multi-Stakeholder Dialogues-

SEAA-K recommends establishment of regional cross-learning platforms for sharing experiences, innovations, knowledge management, and lessons learned from DRE implementation across East Africa and beyond. Such platforms will facilitate peer-to-peer learning, joint problem-solving, and harmonisation of regulatory approaches, accelerating market growth and reducing implementation barriers.

## 7. Cohesive DRE Policy and Regulatory Framework-

SEAA-K recommends rationalisation of permitting and licensing processes for mini-grid and stand-alone systems to eradicate bureaucratic costs and delays. This has worked in Tanzania, where the country's simplified mini-grid regulations under its Small Power Producers framework has facilitated over 100 mini-grid projects (World Bank, 2017).

## 8. Strengthening County-Level Energy Planning-

This policy brief recommends empowerment and capacity building of county governments to integrate DRE within County Energy Plans and County Integrated Development Plans (CIDPs). For instance, Kitui County's inclusion of solar mini-grids in its CIDP facilitated resource allocation for electrifying rural markets and schools (Kitui County Government, 2018).

## 9. Strengthening Community Capacity as End-Users of DRE-

To ensure sustainability, SEAA-K recommends dedicated programs to build the capacity of communities as informed consumers and co-managers of DRE systems. This includes training on system use, maintenance, and basic troubleshooting; promoting consumer awareness of energy rights, tariffs, and financing options; and strengthening local institutions such as Community Energy Committees or cooperatives to enhance ownership and accountability. Equipping communities with knowledge and agency will increase uptake, reduce system misuse or abandonment, and foster long-term sustainability of DRE investments.

## CONCLUSION

Accelerating distributed renewable energy deployment is indispensable for Kenya to achieve universal energy access, climate resilience, and economic development goals. Realising this potential requires an enabling environment anchored in cohesive policies, sustainable financing mechanisms, public-private collaboration, integrated clean cooking strategies, and inclusive stakeholder engagement. By adopting the recommendations outlined in this policy brief, Kenya can unlock the transformative power of DRE, ensuring no household is left behind in the energy transition while advancing its Vision 2030 aspirations.

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