



TaTEDO-SES0 | FEATURE ARTICLE

Africa Energy Transition (AET) Programme

Unlocking Tanzania's Renewable Energy Potential:

Business Opportunities, Green Growth, and a Just Energy Transition

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Tanzania stands at a defining moment in its energy history. Blessed with some of Africa's most abundant renewable energy resources including solar, hydro, wind, geothermal, and biomass, yet long constrained by financing barriers, regulatory uncertainty, and low private-sector engagement, the country is now poised to unlock the transformative power of clean energy. A landmark study commissioned by TaTEDO-Sustainable Energy Services Organization (TaTEDO-SES0), implemented in partnership with WWF Tanzania Country Office under the Africa Energy Transition (AET) Programme, charts a practical roadmap for investors, policymakers, and development actors seeking to seize this opportunity.

78.4% Population with electricity access (2020)	66%+ Labour force employed in agriculture	<5% Bank lending reaching renewable energy	0 Import duty Wind generators, solar PV, and thermal equipment
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A Country Endowed — and Ready

Tanzania's energy transition is backed by policy ambition and resource richness. The country's National Energy Policy (2015) places the private sector at the centre of the transition, while the National Five-Year Development Plan (2021/22–2025/26) targets generating 4,915 MW of electricity by 2025/26, compared to just 1,602 MW in 2019/20. With the Julius Nyerere Hydropower Station (2,115 MW) approaching completion on the Rufiji River, and a 50 MW solar plant recently commissioned in Kishapu district, the infrastructure pipeline is real and growing.

Yet the study's central finding is clear: renewable energy investment in Tanzania remains far below its potential. The sector attracts less than 5 percent of total bank lending, and vast resources such as geothermal, wind, and off-grid solar, remain almost entirely untapped. Closing this gap requires more than good intentions; it demands bankable business models, smarter financing, and coordinated policy action.

"The renewable energy transition in Tanzania is no longer simply an environmental necessity — it is a major economic opportunity capable of transforming livelihoods, strengthening resilience, and driving inclusive green growth."



To identify where that opportunity is greatest, TaTEDO-SESO's research combined rigorous literature review with direct consultations with financial institutions, government ministries, energy entrepreneurs, and civil society actors across Dar es Salaam, Dodoma, Iringa, and Mwanza.

Tanzania's Renewable Energy Landscape

Tanzania's energy mix is currently dominated by hydropower. Existing renewable source carries distinct investment potential:

Renewable Energy Resource Overview

- **Solar:** 2,800–3,500 sunshine hours per year; 4–7 kWh/m² daily irradiation — among the highest in Sub-Saharan Africa
- **Hydropower:** Existing installed capacity of ~567 MW under Small Power Purchase Agreements, with the 2,115 MW Julius Nyerere Dam transforming national supply
- **Geothermal:** Estimated 650+ MW potential along the East African Rift Valley in 50 identified sites across northern, south-eastern, and coastal zones
- **Wind:** Significant grid-scale potential in Singida (9.9 m/s average) and Njombe (8.5 m/s), with REA assessing eight additional regions
- **Biomass:** Widely used for cooking; advanced clean cooking solutions offer major health, gender, and climate co-benefits

Off-grid electrification is also advancing rapidly. Tanzania's rural electrification expansion through REA-led programmes supported by DFID and SIDA has made the country one of Sub-Saharan Africa's fastest-growing electricity access markets. TANESCO manages 18 mini-grids, while dozens of private and faith-based operators have pioneered innovative micro-grid solutions at the community level.

Agriculture: Where Renewable Energy Has the Greatest Impact

The study identifies Tanzania's agricultural sector as offering the most immediate, high-impact, and bankable renewable energy investment opportunities. With more than 66 percent of the workforce employed in farming, fishing, and livestock keeping, and post-harvest losses estimated at up to 40 percent in some value chains, the economic case for clean energy in agriculture is compelling.

The report maps three core technology clusters including solar irrigation, solar cold chains, and solar drying. Each of which can be delivered through multiple business models and financing structures.

1. Solar-Powered Irrigation: Bringing Water to the Farm

Tanzania has some 44.62 percent of its land classified as agricultural, yet only 5 percent of that land is irrigated. Solar-powered water pumps are increasingly proving to be a cost-efficient, environmentally sound solution — enabling farmers to draw water from canals, wells, and reservoirs without incurring fuel costs or dependence on an unreliable grid.

The research highlights five proven business models for solar irrigation deployment in Tanzania:

- Assembly and local manufacturing of solar pump components — reducing acquisition costs and building supply chain resilience
- Sales and installation services (as practised by Davis & Shirliff and Simusolar, which operates across nine regions)
- Pay-as-You-Go (PAYGo) lease-to-own financing — exemplified by DOBEAM Energies, which uses embedded chip technology to enable remote pump management
- Rental models for seasonal use during peak irrigation periods
- Community-based irrigation schemes for cooperative farming communities

SPOTLIGHT: Simusolar — Operating in nine Tanzanian regions, Simusolar offers customised solar irrigation packages with 3–22-month flexible payment plans and a two-year warranty. Fully 72 percent of its customers report increased incomes — a testament to the transformative power of well-designed, affordable solar irrigation finance.



Huzi Drip Irrigation Mango Farm in Chamwino, Dodoma powered with Solar PV system

2. Solar-Powered Cold Chains: Fighting Post-Harvest Loss

Post-harvest loss is Tanzania's hidden agricultural tax. For perishable produce such as vegetables, fruit, fish, and dairy. Inadequate cold chain infrastructure destroys up to 40 percent of output before it reaches consumers, costing farmers income and threatening food security. Solar-powered refrigeration and cold storage technologies (SPCSTs) offer a game-changing solution.

These walk-in or mobile cold rooms, built from insulated materials or converted shipping containers fitted with rooftop solar panels and battery storage, can keep produce fresh for more than three weeks without any connection to the national grid. The study identifies five investment models:



- Product Sales Model: importing or manufacturing and selling cold storage systems with after-sales service
- PAYGo / Lease-to-Own: making refrigeration accessible to small-scale farmers through affordable instalments
- Energy-as-a-Service (EaaS): a third-party company installs, owns, and maintains the system; users pay for cooling
- Community cold storage: cooperative-owned facilities serving farming or fisheries clusters
- Public-Private Partnerships: government incentives combined with private investment and operation

SPOTLIGHT: East African Foods Ltd — *This agritech company works with 10,000 smallholder farmers in Tanzania's northern regions, using solar-powered cold rooms and digital systems to pre-cool and distribute bananas and horticultural produce. Their technology-driven model has enabled farmers to access over TSh 4 billion in bank loans from CRDB, NMB, and Equity Bank.*

3. Solar Dryers: Adding Value, Reducing Waste

Solar dryers remove moisture from agricultural produce and fish using clean, renewable energy preventing mould, extending shelf life, and enabling farmers to access higher-value dried product markets. In Tanzania's fisheries communities, dependence on firewood for fish drying is a significant driver of deforestation and environmental degradation. Solar dryers offer a clean, profitable alternative.

Key benefits identified in the study include:

- Reduced post-harvest losses across agricultural and fisheries.
- Higher income through value-added dried goods (spices, dried fruit, fish products, flour)
- Year-round market access and improved food quality
- Economic empowerment particularly for women and youth operating community drying enterprises
- Significant reduction in firewood use and greenhouse gas emissions

Business models range from cooperative ownership and leasing arrangements to professional drying service providers and integrated processing hubs that combine drying with milling and packaging.

The Financing Gap — and How to Close It

Perhaps the study's most urgent finding is the severe financing deficit in Tanzania's renewable energy sector. Despite growing demand and viable business models, renewable energy receives less than 5 percent of total bank lending, a figure that has remained stubbornly low for five consecutive years according to Bank of Tanzania data. The barriers are well understood but require concerted action to overcome.

Key Financing Barriers Identified by the Study

- Limited understanding of renewable energy risk profiles among commercial banks and microfinance institutions
- Absence of de-risking instruments such as guarantee schemes and revolving funds
- Policy and regulatory instability including the 2019 mini-grid tariff episode that forced some operators to close
- No clear national framework for compensating mini-grid investors when the TANESCO grid arrives
- Weak end-user financing infrastructure, making it difficult for smallholders to afford clean energy technologies

The study recommends a multi-pronged financing reform agenda. Development partners and government should co-design targeted de-risking instruments such as guarantee schemes, revolving funds, and concessional credit lines to crowd in commercial bank lending. Results-based financing mechanisms (as used by REA with development partners) should be expanded. Tanzania's 2022 national carbon trading guidelines should be leveraged to channel climate finance into renewable energy projects. And the government should consider issuing dedicated renewable energy bonds to mobilise domestic capital at scale.

In March 2023, TAREA, in collaboration with the Renewable Energy Efficiency Partnership (REEP), launched a renewable energy financing platform that will allow investors to present projects directly to financial institutions, a promising step in the right direction.

Policy Priorities for Accelerating Investment

The enabling environment for renewable energy investment in Tanzania has improved significantly in recent years, with the Ministry of Energy, REA, EWURA, and the Tanzania Investment Centre (TIC) each playing important roles. TIC, for example, offers attractive incentives to renewable energy investors, including zero import duty on solar PV equipment, zero duty on raw materials for battery and PV manufacturing, and zero-rated VAT on exports.

Yet stakeholders consulted by TaTEDO-SESO continue to call for deeper reforms. The study's policy recommendations are specific and actionable:

- Fast-track the development of a national mini-grid masterplan to give investors clarity on market boundaries and viability
 - Introduce PPP frameworks to unlock geothermal, wind, and tidal wave resources currently beyond private-sector reach.
 - Expand TIC's incentive package to include tailored schemes for agricultural, livestock, and mining-sector renewable energy projects
 - Ensure transparent, location-sensitive tariff-setting for mini-grid operators to reduce subsidy dependence
 - Harmonise rural electrification planning with existing private-sector mini-grid investments and enforce compensation obligations
 - Build renewable energy capacity among financial institutions through structured engagement, training, and technical assistance
 - Strengthen national carbon credit awareness so that renewable energy projects can access this growing revenue stream
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TaTEDO-SESO's Role in Driving the Transition

As Tanzania's leading civil society organisation dedicated to sustainable energy access and clean cooking solutions, TaTEDO-SESO has been at the forefront of this transition for over three decades promoting renewable energy and energy efficient technologies and services through adaptive research, capacity building, awareness raising and behavioural changing and advocating for enabling environment.

The AET Programme, implemented in partnership with WWF Tanzania Country Office, represents a strategic effort to catalyse Tanzania's just energy transition, shifting away from coal dependence, expanding renewable energy investment, supporting women-led clean energy enterprises, and mobilising climate finance. This business opportunities research is one of several outputs designed to build the evidence base for policy advocacy and investor engagement.

"As a leading voice for sustainable energy in Tanzania, TaTEDO-SESO remains committed to championing practical, inclusive, and investment-ready solutions that serve communities, businesses, women, and youth across the country."

The message from this research is clear: Tanzania's renewable energy sector is no longer a frontier; it is an investment-ready market. Solar irrigation, cold chains, drying, and mini-grid power generation are not future possibilities; they are proven, profitable, and scalable today. What is needed now is the coordinated will of government, investors, development partners, and innovators to unlock this potential at the scale that Tanzania's ambitions demand.

About This Article

This feature article is based on the research report 'Renewable Energy Business Opportunities in Tanzania', commissioned by TaTEDO-Sustainable Energy Services Organization (TaTEDO-SESO) as part of the Africa Energy Transition (AET) Programme, implemented in partnership with WWF Tanzania Country Office.

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