

Company Profile: M/S. Green Innovations and Energy Limited

Company Overview

M/S. Green Innovations and Energy Limited is a dynamic startup company committed to developing renewable energy solutions in Tanzania. Promoted by a group of highly experienced individuals from diverse backgrounds, our team brings significant exposure to international business and greenfield project development. With extensive experience in the energy sector, our key promoters have contributed to numerous successful projects globally.

The company has formed a joint venture with an India-based group to develop the first Biomass Fired Thermal Power Generation project in the Mbeya Region. With seed capital already secured for preliminary project work, the joint venture partners are ready to fast-track the project by bringing in the required equity contribution, marking a significant milestone in Tanzania's renewable energy landscape.

Mission, Vision, and Values

Mission:

To drive sustainable energy access through innovative biomass power generation, supporting Tanzania's development while promoting environmental stewardship.

Vision:

To be a pioneering force in renewable energy across Africa, setting standards for sustainability, innovation, and economic growth.

Core Values:

- **Sustainability:** Committed to eco-friendly and renewable energy solutions.
- **Innovation:** Leveraging advanced technologies for efficient energy production.
- **Integrity:** Ensuring transparency, accountability, and ethical practices.
- **Collaboration:** Building strong partnerships to achieve shared energy goals.

Products and Services

- **Biomass Fired Thermal Power Generation:** Developing and operating biomass power plants to deliver clean and renewable energy.
- **Energy Project Development:** Managing renewable energy projects from concept to commissioning.
- **Advisory Services:** Providing consultancy on renewable energy strategies, regulatory frameworks, and project financing.

Our Team

Our leadership includes industry veterans with a proven track record in energy and project development. Together, we are committed to delivering impactful renewable energy solutions that benefit communities and the environment.

Achievements and Future Goals

- Formation of a strategic joint venture with an India-based partner.
- Secured seed capital for the Mbeya Biomass Power Project.
- Plans include scaling our renewable energy portfolio, forging key industry partnerships, and supporting Tanzania's renewable energy targets.

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Concept Note: 10 MW Biomass Power Generation Plant in Mbeya Region, Tanzania

1. Executive Summary

This project proposes the development of a **10 MW biomass power plant** in **Mbeya Region, Tanzania**, utilizing **paddy husk and maize stalks and stems** as feedstock. The plant will contribute to Tanzania's **renewable energy mix**, reduce dependence on fossil fuels, and support rural electrification. The project is a **Greenfield investment**, strategically located in an **agricultural hub** with abundant biomass resources.

2. Justification & Rationale

- **Abundant Feedstock Availability:** Mbeya is a major producer of **rice and maize**, ensuring a **steady supply of paddy husk and maize residues**.
- **Energy Demand & Supply Gap:** Tanzania faces **power shortages**, and rural electrification remains a challenge. The biomass plant will provide **stable power** to the grid and local industries.
- **Sustainability & Climate Impact:** The plant will utilize **agricultural waste**, reducing **open-field burning**, lowering **carbon emissions**, and promoting **circular economy practices**.
- **Government & Policy Support:** Tanzania's **renewable energy policies** encourage investments in **clean energy**, with potential for **feed-in tariffs** or **PPAs (Power Purchase Agreements)** from TANESCO.
- **Key Benefits:** Clean energy, waste valorisation, rural electrification, carbon emission reduction.

3. Why Biomass? Competitive Advantages

- **Abundant Feedstock:** Mbeya's rice and maize production generates **over 50,000 tons of biomass waste annually**.
- **Low-Cost & Sustainable Energy:** Reliable **base-load power**, unlike solar/wind intermittency.
- **Circular Economy Impact:** Reducing field burning, improving air quality, and creating new revenue streams for farmers.
- **Carbon Credit Revenue Potential:** Eligible for international carbon markets.

4. Market Opportunity & Energy Demand in Tanzania

- **Growing Energy Demand:** Tanzania's energy deficit and increasing industrial power needs.
- **Renewable Energy Gap:** Limited biomass power projects despite government incentives.
- **Rural Electrification Needs:** Powering Mbeya's agricultural sector and local industries.
- **Government Policy Support:** Feed-in tariffs, renewable energy incentives, and net metering policies.

5. Technical Concept

- **Capacity:** 10 MW grid-connected biomass power plant.
- **Feedstock:** Paddy husk (from rice mills) and maize stalks/stems (from farms).
- **Technology:**
 - **Direct combustion system** with **high-pressure steam turbine**.
 - **Gasification technology** as an alternative for higher efficiency.
- **Heat recovery for co-generation** (possible drying applications for rice mills or agro-industries).
- **Key Components:**
 - Biomass storage & handling system
 - Boiler & steam turbine
 - Ash management system
 - Grid connection infrastructure
- **Plant Location:** Industrial zone or near major agricultural areas in Mbeya, ensuring:
 - **Proximity to feedstock sources** (reducing transportation costs).
 - **Grid access** for smooth power evacuation.
 - **Water availability** for steam cycle operation.

6. Feedstock Availability & Supply Chain

- **Estimated Biomass Requirement:**
 - Paddy husk: ~10,000–12,000 tons/year.
 - Maize stalks/stems: ~25,000–30,000 tons/year.

- **Sourcing Model:**
 - Direct procurement from **rice mills and maize processors**.
 - **Out-grower program** engaging local farmers to **supply biomass waste**.
 - **Storage & logistics:** Centralized **biomass collection centres** to ensure supply continuity.
- **Sourcing Strategy:**
 - Long-term supply agreements with rice mills and maize processors.
 - Direct partnerships with **farmer cooperatives** for agricultural waste collection.
 - Storage & logistics plan for **year-round feedstock availability**.
- **Supply Chain Efficiency Measures:** Cost optimization through bulk procurement and decentralized collection centres.

7. Commercial & Financial Projections

- **Capital Investment:** Approx. **\$20–30 million**, covering:
 - Equipment procurement (boiler, turbine, gasifier, etc.).
 - Civil works and infrastructure.
 - Transmission line & grid connection.
- **Revenue Streams:**
 - **Electricity sales** to TANESCO or private off-takers.: **\$6.4–9.6 million/year**
 - Potential **carbon credits** under international climate finance mechanisms.: **\$300,000–600,000/year**.
 - By-products: **Biochar, ash for fertilizers, heat for agro-processing industries**.: **\$200,000–500,000/year**
- **Project Financing:**
 - **Equity & debt mix** (PPP model possible).
 - **Development financing institutions (DFIs)**

- **Investment Returns**
 - **Annual EBITDA: \$3.4–5.2 million.**
 - **IRR (Internal Rate of Return): 12–18%** (depending on financing structure).
 - **Payback Period: 6–8 years.**
 - **Debt Service Coverage Ratio (DSCR): 1.3–1.8.**

8. Risk Analysis & Mitigation Strategies

Risk	Mitigation Strategy
Feedstock Supply Variability	Contractual agreements with suppliers, diversified feedstock sources
Grid Connection Delays	Early engagement with TANESCO, feasibility studies
Regulatory Hurdles	Close coordination with EWURA, TANESCO, and TIC
Technology Risks	Partnering with experienced EPC contractors
Financing Challenges	Engaging impact investors & and blended financing

9. Impact & ESG (Environmental, Social, and Governance) Benefits

- **Environmental Impact:**
 - **Reducing CO₂ emissions by ~50,000 tons/year.**
 - **Eliminating open-field burning of biomass waste.**
- **Social & Economic Impact:**
 - **200+ jobs created in biomass collection, plant operations, and maintenance.**
 - **Supporting local farmers by creating a biomass market and monetizing agricultural waste.**
 - **Enhancing rural electrification and industrial productivity.**
- **Alignment with SDGs:** Affordable & Clean Energy (SDG 7), Climate Action (SDG 13), Economic Growth (SDG 8).
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Financial Projections & Investment Model for the 10 MW Biomass Power Plant

1. Financial Projections

A. Capital Expenditure (CAPEX) Estimates

The total project cost is expected to range between **\$20–30 million**, covering:

- **Plant & Equipment** (boiler, turbine, gasifier, control systems) – **\$12–18 million**
- **Civil Works & Construction** – **\$3–5 million**
- **Grid Connection & Transmission Line** – **\$2–3 million**
- **Pre-development Costs** (land, permits, feasibility studies) – **\$1–2 million**
- **Contingency Reserve** (~10%) – **\$2–3 million**

Total CAPEX Estimate: \$20–30 million

B. Operational Expenditure (OPEX) Estimates

Annual operating costs will include:

- **Feedstock Procurement & Logistics** – **\$1.5–2.5 million/year**
- **Labor Costs** (50–100 employees) – **\$500,000–800,000/year**
- **Maintenance & Spare Parts** – **\$800,000–1.2 million/year**
- **Electricity for Operations & Water Usage** – **\$250,000–400,000/year**
- **Admin, Taxes, and Miscellaneous Costs** – **\$300,000–500,000/year**

Total Annual OPEX Estimate: \$3.5–5.5 million

C. Revenue Projections

Potential revenue sources:

- I. **Electricity Sales to TANESCO or Private Buyers**
 - Tariff estimate: **\$0.08–0.12 per kWh**
 - Annual generation: **80,000 MWh (assuming 85–90% plant availability)**
 - Annual revenue: **\$6.4–9.6 million**

II. Carbon Credits Revenue

- Estimated at **\$5–10 per ton of CO₂ avoided**
- Potential earnings: **\$300,000–600,000/year**

III. By-Product Sales (Biochar, Ash for Fertilizer, Heat Supply)

- Additional revenue: **\$200,000–500,000/year**

Total Estimated Annual Revenue: \$6.9–10.7 million

D. Financial Performance Metrics

- **EBITDA = \$3.4–5.2 million/year** (after OPEX)
- **Project IRR: 12–18%** (depending on CAPEX and financing structure)
- **Payback Period: 6–8 years**
- **Debt Service Coverage Ratio (DSCR): 1.3–1.8** (ensuring bankability)

2. Investment Model & Financing Structure

Balanced mix of **equity, debt, and grants/subsidies**.

A. Potential Financing Structure

Funding Source	Contribution (%)	Amount (USD)
Equity Investment	30%	\$6–9 million
Debt Financing (DFIs, Banks)	50%	\$10–15 million
Grants & subsidies	20%	\$4–6 million

Total Investment Required: \$20–30 million

B. Potential Investors & Lenders

1. **Equity Investors** (Private Investors, Renewable Energy Funds)
 - African Renewable Energy Fund (AREF)
 - Infra Co Africa
 - Private equity firms focused on green energy

2. **Debt Financing** (Development Finance Institutions, Banks)
 - African Development Bank (AfDB)
 - Tanzania Investment Bank (TIB)
 - International Finance Corporation (IFC)
 - Local commercial banks (CRDB, NMB)
3. **Grants & Subsidies**
 - Green Climate Fund (GCF)
 - Sustainable Energy Fund for Africa (SEFA)
 - Government incentives for renewable energy projects

Next Steps

1. Preliminary M.O.U with TANESCO
2. Project Site Selection
3. **Detailed Feasibility Study** (Techno-economic analysis, final CAPEX & OPEX estimates).
4. **Regulatory approvals** (TANESCO, EWURA, NEMC for environmental clearance).
5. **Engage Potential Investors & Lenders** (Investor Due Diligence & Financial Commitments)
6. **Negotiate PPA or Offtake Agreement** (Ensuring guaranteed revenue stream).
7. **Secure Permits & Regulatory Approvals** (Environmental, energy, and land-use clearances).
8. **EPC contracting and technology selection.**
9. **Construction & commissioning** (~24 months' timeline)

. Project Timeline

- Feasibility Study: Completed
- Permitting and Approvals: Ongoing
- Financial Close: Expected Q4 2025
- Construction: Q1 2026 to Q4 2027
- Commissioning: Q1 2028