



Green energy solutions for digital connectivity and services in underserved communities: Mozambique and Madagascar

KGGTF grant in support of digital operations



Current state of Digital and Energy Development in Madagascar



Digital Development:

- **Limited internet penetration:** Internet penetration remains low (32%), especially in rural areas, due to high costs and limited infrastructure. Mobile penetration 79% (Active SIM: 23 millions)
- **Low connectivity access:** Limited fiber backbone infrastructure limit high-speed access outside of urban centers.
- **Emerging digital initiatives:** Some government-led digital initiatives, such as efforts in e-governance, are starting, though they face challenges due to limited connectivity.
- **Focus on digital skills development:** There is an increasing emphasis on developing digital skills through partnerships with donors and private sectors, including initiatives in digital education.

Energy Development:

- **Low electrification rate:** Approximately 35% national electrification rate, with only about 15% rural access.
- **Renewable energy rate:** 56% of national production is from solar and hydro power, with some off-grid solar solutions introduced for remote areas.
- **Limited energy infrastructure:** Outdated and limited power generation and distribution networks; current grid does not reach most rural populations.
- **Future renewable energy production:** hydro 7800 MW
2000kWh/m²/Year

Current state of Digital and Energy Development in Mozambique



- **Digital Development:**
 - **Low but growing internet access:** Mobile network coverage has expanded, though data costs remain high, limiting usage in rural areas. Internet penetration remains low (~22%).
 - **Government digital transformation initiatives:** Mozambique has several projects implementing e-governance, digital ID and digital finance programs with donor support.
 - **Challenges in digital literacy:** Significant portions of the population lack digital skills, and education programs are limited.
 - **Infrastructure sharing potential:** Telecom companies are exploring infrastructure-sharing models to lower costs and improve rural connectivity, though regulatory frameworks are still developing.
- **Energy Development:**
 - **Low rural electrification rate:** Overall national electrification rate is about 34%, with rural access significantly lower.
 - **Dependence on hydropower:** Hydropower is the primary source of energy, leaving the country vulnerable to climate risks like drought.
 - **Emerging renewable energy solutions:** Off-grid and mini-grid solar solutions are increasing, with government support through projects like the Mozambique Energy for All Program.
 - **Regional energy potential:** As part of the Southern African Power Pool (SAPP), Mozambique has regional energy trade opportunities and is a potential hub for clean energy in Southern Africa.



Advancing Mozambique and Madagascar's shift to a green, resilient, and inclusive development pathway



- For **Madagascar and Mozambique**, climate change adaptation and mitigation is critical:
 - High vulnerability to extreme weather events, rising sea levels, and changing climate patterns.
 - Frequent cyclones, floods, and droughts, which cause severe damage to infrastructure, disrupt food and water security, and exacerbate poverty.
- **Adaptation** measures, like strengthening infrastructure and developing early-warning systems, are critical to protect communities, especially in low-lying coastal regions.
- **Mitigation** efforts, such as investing in renewable energy, help reduce the greenhouse gas emissions that contribute to further climate risks.
- **Integrating climate adaptation and mitigation into development plans** is essential not only for safeguarding human lives and livelihoods but also for ensuring sustainable economic growth and resilience in the face of climate uncertainty.





The importance of greening digital infrastructure



- For **digital infrastructure**, this means ensuring
 - (i) requirements for **renewable energy solutions** to power the digital infrastructure, and identification of opportunities for co-deployment of green energy solutions to power local communities simultaneously;
 - (ii) compliance with ‘**Green ICT Standards**’ and **infrastructure robustness requirements** to reduce GHG emissions and increase resilience to climate shocks.

Rationale and objectives of the KGGTF grant



- The KGGTF grant aims to **facilitate the use of green energy solutions for digital connectivity and services** in Madagascar and Mozambique.
- It **directly informs operations** that support greater adoption of next generation, climate-smart and energy-efficient digital technologies, while promoting digital inclusion for underserved communities.

| Country | Project | Objective |
|------------|---|--|
| Mozambique | Mozambique Digital Acceleration Project (MDAP, P176459) US\$ 200 M, IDA credit | Increase digital adoption and inclusion and support accelerated digital transformation |
| Mozambique | ProEnergia Plus (P175295) US\$ 300 M IDA grant + US\$ 38M from Energy For All Multi-donor Trust Fund | Increase access to energy and broadband services in project areas and strengthen the operational performance of the electric utility |
| Madagascar | Digital and Energy Connectivity for Inclusion in Madagascar (DECIM, P178701) US\$ 375 M, IDA credit | Expand access to renewable energy and digital services |



Activities

- **Knowledge output** for green energy solutions for digital connectivity and services in underserved communities
 - Assessment of technical solutions for implementing solar-based energy solutions for digital infrastructure – **ongoing**.
 - Conceptual designs and business models adapted to the Mozambique and Madagascar context for dedicated solutions – **ongoing**.
 - Development of a set of guidelines, standards and specifications for energy-efficient and climate-smart digital infrastructure taking local conditions into account, designed for incorporation in policy and bid documents for digital connectivity infrastructure – **ongoing**.
- **Policy analysis** outlining the current green digital policy frameworks in Mozambique and Madagascar, identifying gaps and proposing actionable recommendations – **to be completed by March 2025**.
- **Technical assistance and capacity building**
 - Technical workshops – **to be completed by March 2025**.
 - In-depth exchange of knowledge with other countries, including Korea – **ongoing**.



Learning from South Korea

- Gain deeper insights into South Korea's experience in deploying climate-smart energy and digital solutions to directly inform investments under World Bank-financed project.
- Support efforts to build resilient, secure, and energy-efficient digital infrastructure in Madagascar and Mozambique, while promoting digital inclusion for underserved communities.



Expected outcomes by the end of the grant



- Improved energy-efficiency of digital infrastructure financed under WB projects



- Increased knowledge of good practices for green energy solutions for digital connectivity and services among Implementing Agencies in Mozambique and Madagascar



- Increased understanding of needed considerations for the development of climate informed policy in the ICT sector amongst Mozambican and Malagasy policy makers and relevant agencies



- Increased capacity among Implementing Agencies in Mozambique and Madagascar to support the greening of ICT



Thank you!

Obrigado

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