

# How REREC's diversified strategy is building Kenya's energy security from the ground up



High mast flood lights in Embakasi South Constituency, Nairobi County.

Kenya's journey toward energy security is often viewed through the lens of large-scale, national grid projects. However, the silent and persistent work of the Rural Electrification and Renewable Energy Corporation (REREC) is building a more resilient, diversified, and sustainable energy future from the grassroots up.

By strategically deploying a mix of on-grid and off-grid renewable solutions, REREC is not only expanding energy access, but is also fundamentally contributing to Kenya's energy security, reducing dependence on volatile fossil fuels and decentralising power generation. This approach, which places women's empowerment and the concept of REREC Energy Centres at its core, aligns perfectly with the national aspirations of Vision 2030 and the Bottom-Up Economic Transformation Agenda (BETA).

## Decentralisation and the Last Mile: The pillars of security

Traditional energy security models often focus on centralised generation and large-scale infrastructure, which

are vulnerable to single points of failure. REREC's strategy directly addresses this vulnerability through decentralisation.

The 31 solar mini-grids installed in remote and off-grid locations under the Government funded programme as well as the Kenya Electricity Modernisation Project (KEMP) funded by the World Bank, provide a reliable, localised power source. These systems operate independently of the national grid, ensuring that a power outage elsewhere does not affect these communities. Furthermore, the Last Mile Connectivity Programme (LMCP) extends the national grid to households and public facilities near existing transformers, offering flexible payment options that make connection affordable for low-income families, many of them women-headed. This approach acknowledges that energy security is not just about having power but also ensuring all citizens can access and afford it.

## Reducing reliance on fossil fuel imports

REREC's mandate to promote renew-



Energy and Petroleum CS Hon Opiyo Wandayi during the launch of Madongoni/Majikuko Rural Electrification Project in Msambweni, Kwale county.

able energy directly tackles Kenya's energy security vulnerabilities by reducing reliance on external sources of energy, particularly volatile and price-sensitive fossil fuels. By leveraging Kenya's abundant solar, biomass, and wind resources, REREC is developing a domestic energy supply chain. The solarisation of boreholes, the installation of standalone solar systems, and the push for biogas and clean cookstoves, all contribute to reducing communities' dependence on imported diesel, kerosene, and gas. This provides greater stability in energy costs, benefiting both consumers and the national economy.

## REREC's Energy Centres: Hubs for women's empowerment

The Energy Centres are the operational engine of this bottom-up strategy, perfectly aligning with BETA's emphasis on empowering communities at the grassroots level, particularly women. These centres move beyond being simple training sites. They are incubators of change.

**Skill development:** Training programmes at the centres prioritise women's participation, equipping them with the skills to manufacture, install, and maintain renewable energy products. This directly creates jobs and stimulates the MSME economy.

**Entrepreneurship:** Empowered women's groups and Jua Kali artisans become entrepreneurs, building local



Energy PS Alex Wachira (centre) during the commissioning of Kandutura rural electrification project in Laikipia North.

markets for renewable energy technologies and driving self-reliance.

Practical demonstrations: Centres like the Jamhuri Energy Centre, with its clean cooking hub, provide hands-on experience and education on tiered cooking solutions, empowering women to choose safer, cleaner, and more efficient methods.

## Multidimensional advocacy: Beyond the academic context

The success of REREC's work requires a multidimensional approach to advocacy that recognises the complexities of cultural and social contexts. Simply providing technology is not enough. Its acceptance is shaped by how it interacts with existing social structures, beliefs, and practices.

From an academic perspective, REREC's work offers invaluable data for research. Studies can analyse the effectiveness of mini-grids versus last-mile connections, the socio-economic impacts of clean cooking, and the factors that influence technology adoption. This evidence-based approach helps refine policies and ensures interventions are effective.

From a social and cultural perspective, REREC navigates a complex landscape where technology adoption can be influenced by deeply ingrained traditions. For instance, the promotion of clean cooking must contend with the cultural significance of traditional cooking methods, often tied to social

rituals and perceived food taste. Similarly, introducing new technologies requires addressing local power dynamics, social norms, and ensuring that interventions do not disrupt valued community practices. The sensitisation barazas are crucial here, serving as forums for dialogue and dispelling misconceptions, such as those that led to the vandalism of Mageta solar panels. They allow for the integration of community feedback, ensuring projects are culturally sensitive and socially acceptable.

## A call to action: The path to a resilient future

REREC's integrated approach – combining its Energy Centres, last-mile connectivity, mini-grids, and a nuanced understanding of multidimensional advocacy – is building a more secure, resilient, and sustainable energy future for Kenya. It is an agenda where women are not just beneficiaries but also actively empowered as entrepreneurs, technicians, and decision-makers. By recognising that energy security and economic transformation are intrinsically linked to social and cultural contexts, REREC is moving beyond simply implementing policy. It is engaging in a more profound transformation, proving that a secure energy future is built from the ground up, one empowered community at a time

## REREC's successes and impact in rural electrification

The Rural Electrification and Renewable Energy Corporation (REREC) was established under the Energy Act 2019 as the successor to the Rural Electrification Authority. Its mandate is to oversee the implementation of the Rural Electrification Programme and to spearhead the development of renewable energy in Kenya.

In line with the National Electrification Strategy aimed at achieving universal electricity access, the Corporation has been implementing grid extension projects across the country. These projects are financed through diverse channels. Some are fully fund-

ed by the Government of Kenya through the Exchequer, while others are supported through partnerships with development partners and stakeholders, including a **Matching Fund Programme** with county governments and constituencies through the National Government Constituency Development Fund (NG-CDF).

The Matching Fund Programme, introduced by the then Rural Electrification Authority in the 2009/10 financial year, was designed to supplement Exchequer funding. Under this arrangement, REREC contributes up to a maximum of **Ksh5 million per constituency**, matched

shilling-for-shilling with stakeholder contributions. Notably, stakeholders are not subject to any maximum contribution limit.

To implement projects, the Corporation procures materials and engages frame contractors for labour and transport services. With an active

presence in every county, REREC has engineers and technicians deployed nationwide to supervise project implementation, uphold construction standards, and ensure timely completion.

## Achievements and challenges mitigated

Table 1: Summary of the projects designed, constructed and commissioned in the 2022/23, 2023/24, and 2024/25 financial years

Financial Year	Number of Commissioned Projects	Number of Connected Customers
FY 2024/2025	885	78,127
FY 2023/2024	868	62,139
FY 2022/2023	987	52,503
<b>TOTAL</b>	<b>2,740</b>	<b>192,769</b>

Table 2: Challenges and mitigation measures faced by REREC towards realisation of the rural electrification mandate

Challenge	Effect	Mitigation Measure
Unavailability of full complement of materials	Delayed project implementation	Implement a robust annual materials procurement plan with periodical review, and include strategic buffer stocks
Insufficient technical personnel	Delays in project design and project completion.	Recruit and deploy technical staff in line with the approved staff establishment
Inadequate transportation fleet	Slows down field operations and site supervision	Procure additional vehicles and ensure proper maintenance of existing fleet
Insecurity in certain project areas	Stalled or abandoned projects, leading to project delays	Foster multi sectoral collaboration and coordination in affected areas
Vandalism and theft of energy infrastructure	Stalling of project implementation, reworks	Enhance stakeholder engagement
Delayed metering of completed projects	Increased risk of commercial losses and customer dissatisfaction, denied revenue collection through 5% levy	Enforce strict adherence to the Service Level Agreement
Poor road network in some areas	Delays in project implementation	Multi-sectoral collaboration with county governments, KeRRA, to pave temporary access roads
Denial of wayleave consent	Delay in project implementation due to re-routing	Intensify public sensitisation and stakeholder engagement on the community's role in facilitating project implementation
Land acquisition challenges for substations	Project delays and costs escalation	Strengthen multi-sectoral collaboration, including county governments and the National Land Commission

# Hybridisation of Laisamis Diesel Power Station

The Rural Electrification and Renewable Energy Corporation (REREC), established under the Energy Act of 2019, is the successor of the Rural Electrification Authority (REA). The Act, which came into force on March 28, 2019, expanded REREC's mandate to include spearheading Kenya's transition to green energy along with implementing rural electrification projects.

In remote areas where grid extension is economically unviable, REREC has deployed off-grid solutions like use of solar energy and diesel generators to provide power to its mini-grids. To date, REREC has constructed 27 solar mini-grids and 20 diesel generators in various underserved and remote locations countrywide.

Following the high operational costs of diesel power generation plants, REREC launched a hybridisation initiative in 2013. This programme aimed to integrate solar photovoltaic (PV) systems with existing diesel power plants to reduce operational costs, enhance power reliability, and promote sustainability. Among the targeted stations were Laisamis (80kW), Eldas (30kW), Rhamu (50kW), and Takaba (50kW), setting the foundation for a transformative shift toward greener and more efficient energy solutions.

## Overview of Laisamis Diesel Power Station

Laisamis Diesel Power Station is situated in Laisamis Constituency, Marsabit County. The plant is equipped with two diesel generator engines of 150kVA and 500kVA capacities, which has a peak demand of 79kWh. It currently supplies power to 198 customers, including schools, hospitals, administrative facilities, and businesses.

The station produces an average of 39,767 kWh of energy per month with a diesel consumption of 19,500 litres per month, costing approximately Ksh3.3 million monthly.

## Remedial actions (2023/24 Fiscal Year)

In the 2023/24 financial year, REREC allocated a budget for the hybridisation of Laisamis Diesel Power Station. The scope included the supply, installation, testing, and commissioning of the hybrid system:

- Supply and installation of 100kW solar PV panels.
- Supply and installation of 120kWh lithium-ion batteries.
- Supply and installation of two 50KW hybrid inverters.
- Cladding and installation of two 2,400BTU air-condition units on the equipment room.
- Wiring and integration of the system with existing plant switchgear.



Buna Solar mini-grid in Wajir County.

The works were completed, and the hybrid system commenced operation on November 27, 2024.

## Solar hybridisation system performance

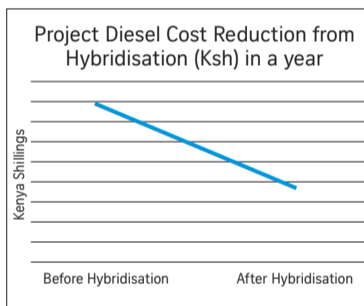
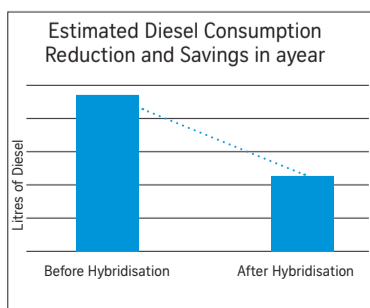
The station's diesel consumption before hybridisation was about 19,500 litres per month (234,000 litres/year), amounting to approximately Ksh3.3 million per month (Ksh40 million per year).

After hybridisation, the station consumed 1,680 litres in five days and a total of 6,987.8kWh of energy was dispatched, out of which 1,763.8kWh was from solar. Comparing with the station's diesel usage/consumption before hybridisation, it now saves about 10,176 litres of diesel in a month, which translates to a monthly savings of Ksh1.7 million.

The average power generation per day was 1,340kWh, while consuming an average of 650 litres in a day, translating to an average cost of Ksh82.5 per/kWh. Therefore, for every unit of energy dispatched from solar, the cost savings are significant.

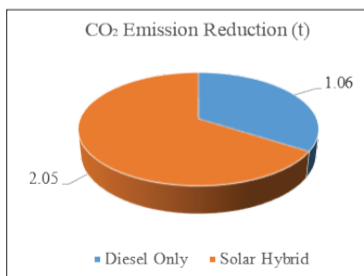
Savings in diesel consumption for a period of one year is estimated to be 122,112 litres compared to the 234,000 litres before hybridisation.

Projected cost savings for a period of one year is estimated to be Ksh20 million. In 10 years' time, the station would have saved approximately Ksh200 million, which will significantly reduce operational costs of the station.



## Environmental benefits

For the period of one week the solar hybrid system has been running, we have reduced carbon-dioxide emissions by 2.1 tons as shown in the pie chart. The mini-grid is expected to achieve a reduction of 81.6 tons monthly, and 979 tons yearly.



## Strategic implications

The successful hybridisation of Laisamis Diesel Power Station underscores REREC's commitment to:

- Promote renewable energy adoption in line with Vision 2030 and Kenya's Nationally Determined Contributions (NDCs).
- Enhance energy access and reliability in off-grid regions.
- Reduce dependency on costly options, thereby easing financial burdens on public resources.
- Support Kenya's transition to a low-carbon energy and to meet its Nationally Determined Contributions targets.
- Contributing to global climate change goals.



Solar mini-grid evacuation substation in Buna, Wajir County.



Solar mini-grid battery bank in Buna, Wajir County.

## Recommendations

To build on this success, we propose for extension and scaling-up of the hybridisation pro-

gramme to other diesel-powered stations to achieve wider cost savings and environmental benefits.