ENERGY CENTRES

The Energy Centres serve as the technical outreach arm of the Rural Electrification and Renewable Energy Corporation (REREC). Their primary role is to raise awareness and support the adoption of sustainable energy solutions through:

- Training & Sensitization on Renewable Energy Technologies.
- Practical Demonstrations and display of Renewable Energy Technologies in all the Energy Centres e.g on Solar applications, biogas utilization, improved and clean cooking solutions and agroforestry.

The Energy Centres are a critical resource for driving sustainable development in their regions of coverage by building local capacity, providing free technical knowledge, and promoting clean technologies. This empowers communities, conserves the environment, and reduces energy poverty.

Currently, there are seventeen (17) operational REREC Energy Centres across the country.

Table 1: Counties of Coverage by the Energy Centres

S/No.	Energy Centre	County	Counties of Coverage
1	Bukura	Kakamega	Kakamega, Kisumu, Vihiga and part of Bungoma
2	Busia	Busia	Busia, Siaya and part of Bungoma
3	Garissa	Garissa	Garissa and Tana River
4	Jamhuri	Nairobi	Nairobi, Kiambu, Kajiado and Narok
5	Kericho	Kericho	Bomet and Kericho

S/No.	Energy Centre	County	Counties of Coverage
6	Kisii	Kisii	Kisii, Nyamira, parts of Homabay and parts of Narok (Kilgoris and Narok West
7	Kitui	Kitui	Machakos, Makueni and Kitui
8	Lodwar	Turkana	Turkana and West Pokot
9	Maralal	Samburu	Samburu and parts of Laikipia
10	Marsabit	Marsabit	Marsabit
11	Migori	Migori	Migori, Homa Bay and part of Narok (Kilgoris)
12	Mirangine	Nyandarua	Nyandarua, Nakuru and parts of Laikipia (West & North)
13	Mitunguu	Meru	Meru, Embu, Tharaka Nithi and Isiolo
14	Mtwapa	Kilifi	Mombasa, Kilifi, Lamu, Tana River, Kwale and Taita Taveta
15	Uasin Gishu	Uasin Gishu	Uasin Gishu, Trans-Nzoia, Nandi, Baringo and Elgeyo Marakwet
16	Wajir	Wajir	Wajir and Mandera
17	Wambugu	Nyeri	Nyeri, Muranga, Kirinyaga & parts of Laikipia (East & Central)

TRAINING AND SENSITIZATION ON RENEWABLE ENERGY TECHNOLOGIES

The Energy Centres offer training and sensitization on Improved Cook Stoves, Clean Cooking, Solar Technologies, biogas technology and other emerging technologies to the communities in their counties of coverage as illustrated below;

Solar Technologies

Service Description:

This encompasses the full spectrum of photovoltaic (PV) systems for lighting, solar thermal applications for water heating, cooking and drying agricultural products. Training covers system sizing, component selection (panels, batteries, inverters, charge controllers), installation best practices, maintenance, and safety protocols. It ranges from solar home systems (SHS) to basic solar systems and solar water pumping for irrigation or domestic use.

Key Benefits:

Energy Independence: Reduces reliance on the national grid power and the expensive polluting fossil fuels (kerosene/diesel).

Cost Savings: Eliminates recurring fuel expenditures and offers a long-term return on investment.

Productivity: Enables extended business hours, improved lighting for study, and reliable power for water pumping.

Environmental: Zero emissions during operation; mitigates deforestation caused by charcoal and firewood use.

Client Impact:

Households: Transition from "energy poverty" to reliable electricity for lighting, phone charging, and entertainment, improving quality of life and children's study environments.

Farmers: Adoption of solar water pumps increases crop yields through reliable irrigation, reducing the labor associated with manual watering.

SMEs: Small businesses (salons, welding, shops) experience increased revenue by operating beyond daylight hours and utilizing power tools without the noise and fumes of generators.

Improved Cookstoves

Service Description:

Sensitization focuses on the transition from traditional three-stone fires to energy-efficient cookstoves supporting Kenyas' aim to achieve universal access to clean cooking by 2028. This includes training on the mechanized production of the different types of improved cookstoves (rocket stoves, ceramic jikos, institutional stoves), proper use of various production tools, liners preparation and firing, proper stoves usage techniques, fuel optimization, and the health benefits of reduced smoke exposure. Communities, faith based groups, students in attachement are sensitized and trained on how to fabricate the improved stoves and fireless cookers.

Key Benefits:

Fuel Efficiency: Reduces firewood or charcoal consumption by 30% to 60% compared to traditional stoves.

Health: Drastically reduces Indoor Air Pollution (IAP), lowering the risk of respiratory infections (pneumonia, lung cancer) and eye diseases, particularly for women and children who spend the most time near the cooking area.

Time Savings: Reduces the time spent collecting firewood, allowing women to engage in income-generating activities or education.

Cost Saving: reduced amount of charcoal used in improved cookstoves leads to cost savings.

Client Impact:

Women: Reduced exposure to toxic smoke leads to better long-term health outcomes. Time saved from fuelwood collection is redirected toward economic empowerment and childcare.

Low-Income Households: Significant reduction in monthly expenditure on cooking fuel (charcoal/wood), freeing up household income for food, school fees, and healthcare.

Clean Cooking

Service Description:

The Energy Centres promotes the transition to modern, non-biomass cooking fuels and technologies. Training covers the use of bioethanol stoves, electric pressure cookers (EPCs), induction cookers, LPG etc at their clean cooking hubs. It emphasizes the operational safety, efficiency benefits, and environmental advantages of moving away from solid biomass setting a roadmap for 100 percent transition to clean cooking.

Key Benefits:

Zero Deforestation: Eliminates the need for wood and charcoal entirely, preserving forest cover.

Speed and Convenience: Modern fuels (electricity/ethanol) offer faster cooking times and cleaner kitchens free from soot and ash.

Climate Mitigation: Reduces emissions of black carbon and methane, which are potent short-lived climate pollutants.

Gender Dignity: Removes the drudgery and safety risks associated with collecting firewood (e.g., risk of physical assault or wildlife encounters).

Client Impact:

Urban and Peri-Urban Dwellers: Cleaner kitchens lead to easier cleaning, improved aesthetics, and safer environments for children, who are no longer exposed to open flames on the floor.

Institutions: Schools and hospitals using LPG, electric or ethanol cooking benefit from safer, more sanitary kitchens and predictable fuel costs compared to fluctuating firewood/charcoal prices.

Biogas Technologies

Service Description:

Training and sensitization cover the anaerobic digestion of organic waste (animal manure, kitchen waste) to produce methane gas for cooking and lighting, with bio-slurry as a by-product used as a rich organic fertilizer. Sessions include sensitization on bio-digester types, bio-digester sizing based on livestock numbers, feedstock management and utilization of bio-slurry.

This sensitization program also covers the production and utilization of biofuels derived from non-edible oilseed-bearing trees, primarily *Jatropha curcas* and *Croton megalocarpus.*

Key Benefits:

Waste-to-Energy: Converts livestock and kitchen waste into a high-energy cooking fuel.

Agricultural Value: The bio-slurry by-product is a nutrient-rich organic fertilizer that outperforms raw manure in crop production and soil regeneration.

Sanitation: Reduces the spread of pathogens and odors associated with untreated animal waste.

Cost Reduction: Provides a "free" fuel source after initial installation, eliminating spending on cooking fuel.

Client Impact:

Livestock Farmers: Farmers (especially in dairy hubs) see dual benefits: reduced fuel costs for milk pasteurization/cooking and improved soil fertility for fodder crops via slurry application.

Rural Institutions: Boarding schools with large kitchens and cattle populations achieve energy self-sufficiency for cooking, significantly reducing their operating budgets.

Briquette Production

Briquette production training focuses on converting biomass waste into high-density, clean-burning fuel briquettes. Sensitization covers the entire

value chain: feedstock identification and collection (agricultural residues like maize stalks, rice husks, coffee husks; sawdust; invasive species like water hyacinth; and municipal organic waste), carbonization (for bio-coal briquettes), binder preparation, manual and mechanical briquetting techniques, drying, packaging, and marketing. The training emphasizes both household-level manual production using simple presses and commercial-scale production using motorized extruders.

Key Benefits:

Waste Valorization: Transforms agricultural and municipal waste—often burned openly or left to rot—into a valuable energy commodity, addressing waste management challenges.

Deforestation Reduction: Provides a sustainable alternative to charcoal and firewood, reducing pressure on natural forests and indigenous trees.

Superior Combustion: Briquettes burn longer, hotter, and with significantly less smoke than traditional firewood or low-quality charcoal, offering a consistent heat output.

Income Generation: Creates a viable micro-enterprise opportunity with low barriers to entry, utilizing locally available waste materials.

Health Improvement: Reduced smoke emissions compared to traditional biomass cooking lowers indoor air pollution and associated respiratory illnesses.

Client Impact:

Rural Farmers: Farmers convert crop residues (e.g., maize cobs, bean husks) that would otherwise be discarded into fuel for household use or a saleable

product, creating an additional income stream from existing agricultural activities.

Urban and Peri-Urban Youth: Youth groups and unemployed individuals establish briquette production enterprises with minimal capital investment. These enterprises supply urban households and institutions with affordable cooking fuel, creating employment and reducing urban waste.

Institutions: Schools, prisons, and hospitals that adopt briquettes for their large-scale kitchens achieve predictable fuel costs and reliable supply, insulating them from seasonal charcoal price volatility.

Environmental Stewards: Communities located near invasive species (e.g., water hyacinth in Lake Victoria, Mathenge in Laikipia and Garisssa) learn to harvest and convert these environmental pests into fuel, simultaneously restoring ecosystems and creating economic value.

Charcoal Production

This training addresses the charcoal value chain by replacing the traditional, environmentally destructive earth mound kiln (which has efficiency rates of only 8–12%) with modern, improved kilns. Sensitization covers various kiln technologies suitable for different scales. Training includes site selection, feedstock preparation (species selection, drying, stacking), carbonization process management (airflow control to prevent over-burning), cooling techniques, and the utilization of by-products such as wood vinegar and charcoal dust (which can be used for briquette production). Critically, the training also covers sustainable harvesting practices and the importance of working with woodlots rather than natural forests.

Key Benefits:

Improved Efficiency: Modern kilns achieve conversion efficiencies of 25–35% compared to the 8–12% of earth mound kilns. This means 2–3 times more charcoal is produced from the same amount of wood, significantly reducing the volume of wood required to meet demand.

Reduced Deforestation: By producing more charcoal per tree, modern kilns lower the overall forest footprint of charcoal production, helping preserve biodiversity and forest cover.

Higher Quality Product: Charcoal produced in modern kilns is more uniform, carbonized consistently, and produces less dust and fines, commanding a higher market price.

Worker Health and Safety: Traditional earth mound kilns expose producers to prolonged, high-intensity smoke and the risk of uncontrolled burn-overs. Modern kilns reduce smoke exposure and provide controlled, safer operating conditions.

By-Product Utilization: Training includes capturing wood vinegar (a natural pesticide and organic fertilizer) and charcoal dust (used for briquettes), creating additional value streams and eliminating waste.

Lower Emissions: Controlled carbonization results in significantly lower emissions of methane, black carbon, and carbon monoxide compared to the smoldering, uncontrolled earth mound kilns.

Client Impact:

Charcoal Producers (Artisanal and Commercial): Producers who transition to modern kilns experience higher yields per tree, allowing them to maintain or increase income while reducing their raw material (wood) costs. The ability to produce consistent, high-quality charcoal builds customer

loyalty and enables access to premium markets (hotels, restaurants, institutions) that reject low-quality, smoky charcoal.

Woodlot Farmers: Farmers who have established energy woodlots (via the Agroforestry service) learn to integrate charcoal production into their farm management cycle. By carbonizing lower-grade or thinned trees in modern kilns, they generate a significant cash crop from their trees without depleting the woodlot's long-term timber value.

Conservation Agenda: At a national level, the widespread adoption of modern kilns directly contributes to Kenya's goal of achieving 30% tree cover and reducing pressure on water towers (Aberdares, Mau Forest, Mt. Kenya) where illegal charcoal production has historically caused severe environmental degradation.

Emerging Renewable Energy Technologies

Service Description:

This forward-looking category introduces clients to next-generation technologies that are becoming viable in Kenya. It includes sensitization on Solar PV for E-Mobility (charging e-motorcycles/boda bodas), Solar Refrigeration (vaccine storage and agri-storage), Battery Energy Storage Systems (BESS) for commercial applications, Small Wind Turbines (for specific geographical zones like the ASAL regions) and green hydrogen.

Kitui Energy Centre trains on agri-solar with a demonstration unit on solar powered drip irrigation at the centre.

Key Benefits:

Future-Proofing: Prepares communities for the transition to electric mobility and mechanized agriculture.

Value Chain Addition: Reduces post-harvest losses through solar cold storage; reduces operating costs for transport via e-mobility.

Innovation: Encourages entrepreneurship in emerging green economy sectors.

Client Impact:

Youth and Entrepreneurs: Creation of new business models, such as "Boda Boda" charging stations (where youth earn income charging electric motorcycles) and cold-storage-as-a-service hubs for horticulture farmers.

Public Health: Solar refrigeration ensures the integrity of vaccines and medicines in remote dispensaries where grid power is unreliable.

Agroforestry

Service Description:

Recognizing the symbiotic relationship between trees and energy, this service focuses on establishing Energy Woodlots. Training involves nursery establishment, tree species selection (specifically fast-growing such as Grevillea and Calliandra), planting techniques, and sustainable harvesting cycles for firewood and construction materials.

Key Benefits:

Sustainable Fuel Supply: Creates a dedicated, renewable biomass source so families do not have to deplete natural forests.

Soil Conservation: Trees prevent soil erosion, improve water retention, and provide shade.

Diversified Income: Farmers can sell surplus wood, timber, or tree seedlings.

Carbon Sequestration: Actively captures carbon dioxide, contributing to climate change adaptation.

Client Impact:

Rural Landowners: Farmers transform unproductive land into "green banks"—savings accounts in the form of timber and fuelwood that can be harvested in times of need.

Community Cohesion: The Energy Centres often facilitate the distribution of tree saplings, fostering community groups focused on land restoration and collective energy security.

Cross-Cutting Impacts:

Economic Empowerment: By reducing energy expenditure and creating green jobs (artisans, masons for stoves, nursery attendants, solar and biogas technicians), these services contribute to the Bottom-Up Economic Transformation Agenda (BETA) in Kenya.

Gender Equity: Because the trainings specifically address cooking, water pumping, and household energy, they disproportionately empower women by reducing domestic drudgery and health risks.

Climate Resilience: The combination of agroforestry, clean cooking, and solar energy directly supports Kenya's Nationally Determined Contributions

(NDCs) to the Paris Agreement by reducing reliance on wood fuel and fossil fuels.

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Fig 1: Tree Nursery

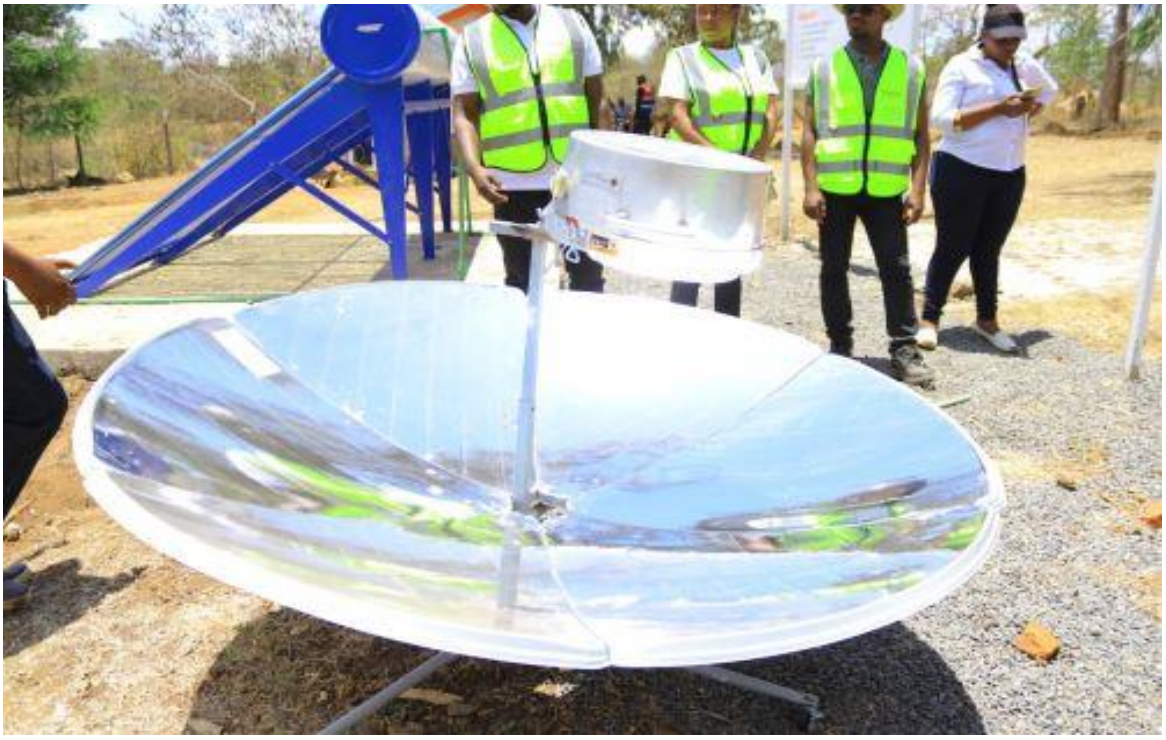

Fig 2: Demonstration on Solar Parabolic

Fig 3: Solar Water Heating System

Fig 4: On-site Biogas demonstration

Fig 5: On-Site liners kilns

Fig 6: Biogas installation by Energy Centres artisans

Fig 7: Improved Cook Stoves

Fig 8: Liners production

Fig 9: Demonstration on Briquette production

Fig 10: Solar PV Motorcycle Charging Station