



## SOKOTO ENERGY RESEARCH CENTRE (SERC) (ENERGY COMMISSION OF NIGERIA)

(FEDERAL MINISTRY OF INNOVATIONS SCIENCE AND TECHNOLOGY)  
USMANU DANFODIYO UNIVERSITY SOKOTO

### SOME SERC ACTIVITIES IN PICTURES

BIOMASS SYSTEM		
Fixed dome Biogas plant	Spiral Solar water heater	Danjawa 250 litres Solar water Heating System
SOLAR THERMAL SYSTEM		
Portable Biogas digester	Community based solar water heater	Kilishi Solar Dryer at Kuchi
Double hole Saw-dust stove	Parabolic Solar cooker	Solar Dryer at Danjawa Village
SOLAR PHOTOVOLTAIC PROJECTS		
7.2 Kw Danjawa Solar PV Electrification	Solar Water pumping at Birjingo community	2 Kw Solar PV back - up UDUS Internet System
Community based improved wood Stoves	Box Type Solar Cooker	Solar Distiller
WIND AND METEOROLOGY		
Distribution of improved wood stoves to Danjawa Community	5 Kw wind electricity generation	Meteorological instrument installed at SERC

## **CIRCULAR TOP BOX SOLAR COOKER WITH MULTIPLE ADJUSTABLE REFLECTING BOOSTERS**

The novel features of this type of solar box cooker are the circular top absorber and additional reflecting boosters. The reflecting boosters are adjustable suitable for directing solar reflection from time to time as the same moves. The cooker can be used for boiling type of cooking such as rice, potatoes, yams, etc boiling. Depending on solar intensity it can boil 0.5kg (sufficient for about 6 adults) of rice in averagely 1Hr. The circular top minimizes the sides shadow effects of the common rectangular or square top type of box solar cooker.



### **Thermoelectric (Peltier Effect) powered Air blower Charcoal Stove.**

SERC has developed a charcoal stove that utilizes thermoelectric (Peltier effect) to power an air blower for combustion of coal/charcoal for cooking. This device eliminates the problem of manual air supply to support combustion of charcoal during cooking. The operation of the stove is therefore more efficient.



## **Hybrid (Active and Passive) Large Scale Solar Dryer for Crops and Jerky Meat (“Kilish”) Drying Applications.**

This Solar dryer consist of Perspex as glazing material and is provided with air blowers powered by solar photovoltaic modules. It can work on natural convection or forced convection depending on the type and moisture content of the product to be dried. The dryer can be expanded for large scale drying for agricultural and industrial applications.

**This dryer has been patented.**



**Hybrid-(Active/Passive) Large Scale Solar Dryer**



**Solar Dryers: Combined mode; Direct and Indirect Types for Domestic Applications**



Natural convection (Thermosyphon) Solar thermal water heating systems



Evacuated tubes forced convection solar water heating system for domestic and industrial applications

### SOLAR THERMAL SYSTEM



Spiral Solar water heater



Danjawa 250 litres Solar water Heating System



Community based solar water heater



Killishi Solar Dryer at Kuchi



Parabolic Solar cooker



Solar Dryer at Danjawa Village



Box Type Solar Cooker



Solar Distiller



Concrete Solar Distiller

WIND AND R

## 2-Solar Photovoltaic technologies



Solar PV mini-grid in a village in Sokoto, Sokoto State



Solar Water Pumping for Students in Sokoto, Sokoto State

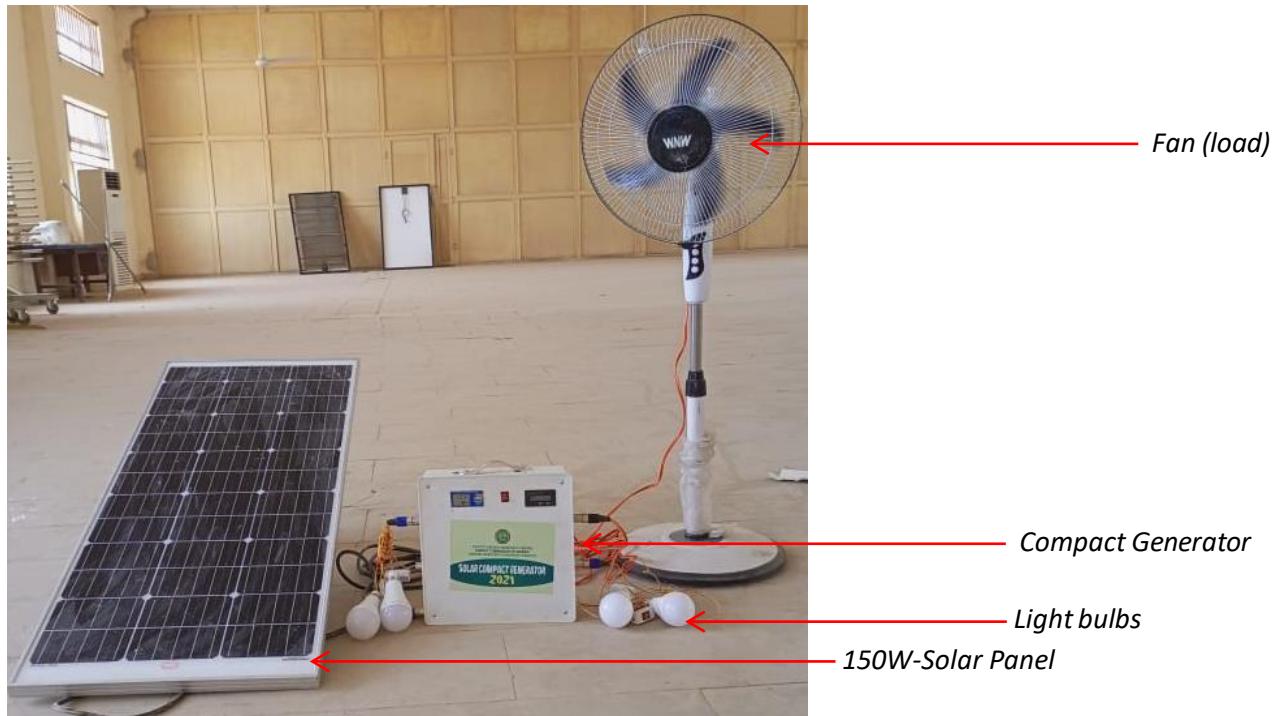


SERC Solar Compact DC Generator



SERC Solar Compact DC/AC Generator

Each of the compact generators can be used for powering of electrical appliances such as lightings, laptop, TV, decoder, fan, other small household appliances.



SERC - DC Solar Compact Generator with loads

### 3-Biomass energy conversion technologies



Fixed dome Biogas plant



Portable Biogas digester



Double hole Saw – dust stove



Coal Stove



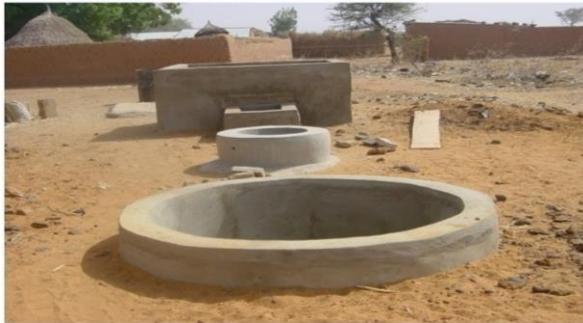
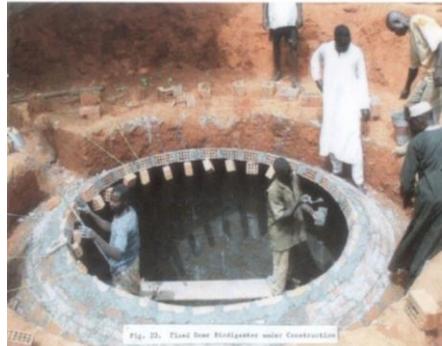
Community based improved wood Stoves



Distribution of improved wood stoves to Danjawa community



Different biogas plants and gas holders



Dome Type Biogas Pilot Plant at Danjawa

## Wind Energy Conversion Systems

### *Construction of the blades*



Plate 1a -Raw Pieces of wood .



Plate 1b-Raw Pieces of wood being curved into wind turbine plates



Constructed wind turbine tower



5 Kw wind electricity generation



Pumped storage micro hydro power demonstration system and locally fabricatedTurbine



**SERC CONDUCTS YOUTHS (MALES & FEMALES) TRAININGS IN SOLAR PV SYSTEMS  
INSTALLATIONS AND CONSTRUCTION OF SOLAR COMPACT GENERATORS**



**Solar-Powered Evaporative Cooler (Desert Cooler)**

**Solar Powered Village Electrification (10kW -Standalone Minigrid Pilot Project at 'Garu Village"**



**Installations of Solar Modules carried out by SERC Staff in Progress**



**Power Distribution from the Solar PV Power House and installations of street lights  
"Garu" Village Community**



**Garu Village Completed Array of Solar Modules  
Installed by SERC**