

# THE USE OF RENEWABLE ENERGY IN DEVELOPING COUNTRIES”

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UNITED NATIONS/AUSTRIA/EUROPEAN SPACE AGENCY SYMPOSIUM  
ON SPACE APPLICATION FOR SUSTAINABLE DEVELOPMENT TO  
SUPPORT THE PLAN OF IMPLEMENTATION OF THE WORLD SUMMIT  
ON SUSTAINABLE DEVELOPMENT: “SPACE TOOLS FOR MONITORING  
AIR POLLUTION AND ENERGY USE FOR SUSTAINABLE  
DEVELOPMENT.” GRAZ, AUSTRIA,  
12 – 15 SEPTEMBER 2006.



# INTRODUCTION

The level of development in any Nation is a function of its harnessed energy resources.

This is because energy is inevitable for all facets of development, be it social, economic or industrial.



Energy is an essential input to all aspects of modern life. The objective of the energy system is to provide energy services.



**Energy services are the desired and useful processes that result from the use of energy like:**

- **lighting**
- **provision of air-conditioned indoor climate,**
- **refrigerated storage,**
- **transportation,**
- **appropriate temperatures for cooking etc.**



# Renewable energy resources

- hydro,
- solar,
- wind
- biomass

These Energy Resources have enormous potential to meet the growing energy needs of the rural areas in the developing world, while offering sustainable solutions to the global threats to climate change.



# ENVIRONMENTAL CONCERNS.

The major environmental problems related to energy production, distribution and consumption in developing countries are:

- deforestation,
- air pollution
- land pollution
- Flooding etc .



# THE RENEWABLE ENERGY POTENTIALS IN DEVELOPING COUNTRIES (like NIGERIA)

Renewable energy resources play a very important role in providing solutions to the energy needs of the rural dwellers in the developing countries, and provision of electricity supply in the country.



For the purpose of this presentation, the renewable energy sources that will be considered are:

- hydro,
- solar,
- biomass
- wind





## HYDRO:

**Hydropower is one of the major sources of base load electricity generation. Despite its high initial capital cost, hydropower provides one of the cheapest and cleanest sources of electricity.**



## SOLAR:

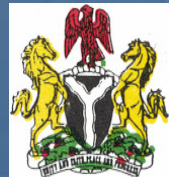
Solar radiation on the earth's surface varies in intensity with location, season, day of month, time of day, instantaneous cloud cover and other environmental factors.



# Solar Energy Technologies

These are of two types, namely:

**Solar-thermal and Solar Photovoltaic**



# BIOMASS

Organic, non-fossil material of biological origin is called Biomass.

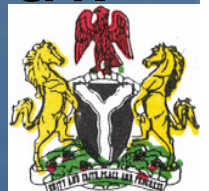
The Biomass resources of Nigeria can be identified as wood, forage grasses and shrubs, animal waste and waste arising from agricultural, municipal and industrial activities, as well as aquatic biomass.



## WIND:

Wind is a natural phenomenon related to the movement of air masses caused primarily by the differential solar heating of the earth's surface.

Wind energy potential in Nigeria shows that the annual average wind speed at 10m heights varies from about 2m/s in the coastal areas to about 4m/s in the far north.



# RENEWABLE ENERGY USE IN DEVELOPING COUNTRIES (NIGERIA-A CASE STUDY)

Renewable energy resources power are in use in the rural areas of Nigeria. mainly for electricity generation and other rural energy needs.



- **SOLAR COOKERS:** These are box type arrangements where most local dishes are cooked within one hour. Example is shown below



- **SOLAR WATER HEATERS:** The heaters are based on flat-plate collectors with storage tanks and can heat water to temperatures of up to 80°C and are used in hospitals, hotels, industry and private residences.

**SOLAR CROP DRYERS:** portable cabinet dryers as well as large scale units, for community use have been developed. These dryers, which can attain temperatures of up to 60-70, are used for drying various agricultural produce.

- **SOLAR MANURE DRYERS**

A natural circulation solar manure dryers of various sizes have been developed for drying of poultry waste and other similar materials.





## Solar PV projects in Nigeria

- Solar – PV 7.2 kwp kwaldwalawa village electrification, Sokoto State.
- 1.87 kwp Iheakpu-Awka Village electrification/TV viewing centre, Enugu State.
- 1.5 kwp Nangere Water supply scheme
- Solar dryer – 2 tones solar Rice Dryer, Adani – Enugu State
- 1.5 tone solar forage dryer, Yauri - Kebbi State.
- 5.0 kwp PV power Rural Health Centre Laje, Ondo State
- 4.7 kwp ill-destitute Centre, Amaudo, Abia State.



# Bio-Digesters

Nigeria has abundant biomass resources. Bio-digesters constructed from metal sheet and are used for the production of biogas and bio-fertilizer.



## Wind Projects

A number of wind powered water pumps have been developed and installed in some northern states of Nigeria,



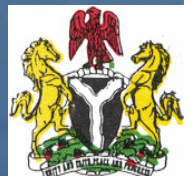
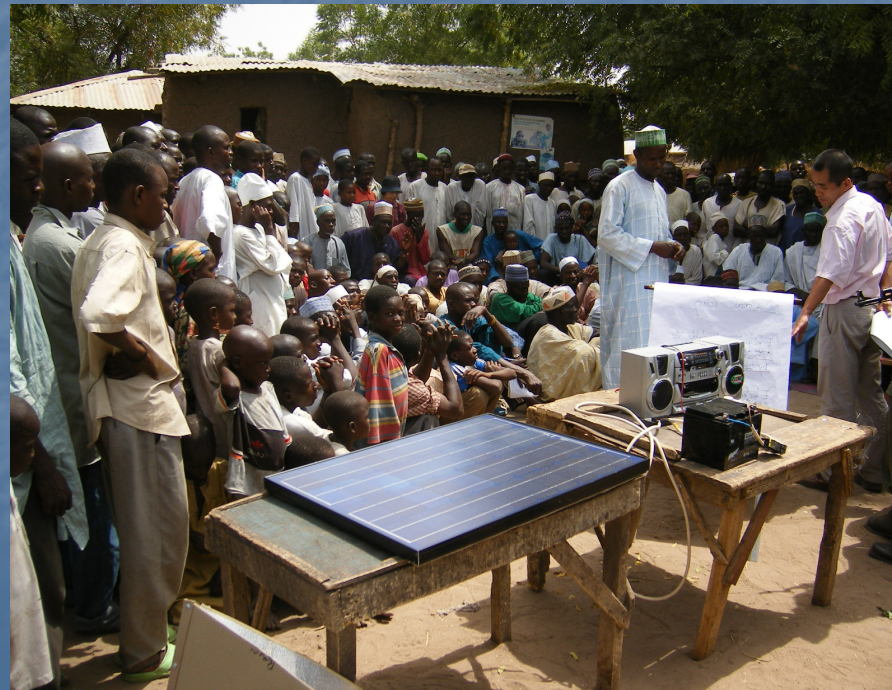
# Frameworks in the RE Development

- INSTITUTIONAL
- POLICY

# INTERNATIONAL COLLABORATIONS

## ■ ON SOLAR

Nigeria with the assistance of Government of Japan is currently undergoing Masterplan Study on the Utilization of solar energy.



The viability of the solar energy was demonstrated in three States namely Jigawa, Ondo and Imo States.

Tables 1.1, 1.2 and 1.3 show the Pilot Project equipment for Public facilities as installed in each state



# Table 1.1

## Pilot Project Equipment: Individual Facilities for Garkon Alli Village, Jigawa State

S.N	ITEMS OF EQUIPMENT	QUANTITIES
1.	Solar Home System (SHS)	40 Houses
i	PV Module 60W	1pc/house
ii	Charge Controller (12V, 6A)	1Set/house
iii	Battery (Sealed type, 65Ah)	"
iv	Circuit Breaker (2p – 10A)	"
v	Stand/cable	1lot/house
vi	Fluorescent lamp (DC 12V – 11W)	2sets/house
2.	Battery and House wiring for BCS	20 Houses
i	Charge Controller (2V, 6A)	1Set/House
ii	Battery (Vent type, 80Ah)	"
iii	Circuit breaker (28 -10A)	"
iv	Stand/cable	"
v	Fluorescent lamp (DC 12V-9W)	2 sets/set



# Table 1.2

## Pilot Project Equipment: Individual Facilities for Oke Agunla Village, Ondo State

S.N	ITEMS OF EQUIPMENT	QUANTITIES
1.	Solar Home System (SHS)	60 Houses
i	PV Module 60W	1pc/house
ii	Charge Controller (12V, 6A)	1Set/house
iii	Battery (Sealed type, 65Ah)	"
iv	Circuit Breaker (2p – 10A)	"
v	Stand/cable	1lot/house
vi	Fluorescent lamp (DC 12V – 11W)	2sets/house





# Table 1.3

## Pilot Project Equipment: Individual Facilities for Umuikoro Opehi Village, Imo State

S.N	ITEMS OF EQUIPMENT	QUANTITIES
1.	Solar Home System (SHS)	60 Houses
i	PV Module 60W	1pc/house
ii	Charge Controller (12V, 6A)	1Set/house
iii	Battery (Sealed type, 65Ah)	"
iv	Circuit Breaker (2p – 10A)	"
v	Stand/cable	1lot/house
vi	Fluorescent lamp (DC 12V – 11W)	2sets/house



The Japanese Team in collaboration with their Nigerian counterparts conducted Twenty (20) workshops/ public awareness in some selected villages in the three states including FCT, Abuja.



# ON WIND

Nigeria, in collaboration with an international consultant, Lahmeyer , has produced an “Onshore Wind Energy Map of Nigeria”



# World Solar Programme (1996 – 2005)

- Nigeria participated in the just concluded UNESCO World Solar Programmes (UNESCO – WSP) aimed at the promotion of market penetration of Renewable Energy Technologies Worldwide.



# Challenges

- Lack of sustainability in the usage of Renewable Energy Technology (RET)
- Lack of adequate awareness on RET
- Lack of requisite manpower to maintain the devices.
- Lack of production of RET devices e.g. solar modules, turbines etc.



## Recommendations:

- **Access to Renewable Energy Technology (RET) in rural areas**
- Incentives (e.g. tax relief, subsidy etc) should be provided for users and investors of RET.



- There is the need for local production of the devices (e.g Solar PV plant in Nigeria)
- Government should support the diffusion of the technology through appropriate legislation.



- Women should be trained on how to produce and use simple renewable energy devices like improved wood stoves to reduce health hazards.
- Funds should be provided to support Research & Development in Renewable Energy Technology.





# CONCLUSION

This symposium has afforded the organizers and participants the opportunity to have a close insight into how Renewable Energy in a developing country (especially in Africa); and the need for the developed countries and Organizing Agencies to continue and improve on their support for the propagation of the use of RET developing countries.



**THANK YOU FOR THE ATTENTION**

