

ECOWAS Solar Thermal Energy
Capacity Building and
Demonstration Programme
13 -14 June 2014, Praia, Cape
Verde



Summary of Activities at the National Centre for Energy Research and Development (NCERD), University of Nigeria, Nsukka.

NAME OF PRESENTER: Okala Nwoke

Solar thermal energy Situation in Nigeria /A Situacao de Energia Solar Termico no seu pais/ La situation de l'énergie solaire thermique dans votre pays

- **Need for solar thermal Energy in Nigeria.**
 - Drying of agricultural produce such as grains , root crops , meat and fish.
 - Drying of poultry droppings and other animal manure
 - Hot water preparation for bathing.
 - Chick brooding.
 - Industrial process heat
 - Water treatment.
 - Solar cooling , drying of laundry and timber.
- **Where is solar thermal energy used:**
 - Solar thermal energy is presently in use for drying of grains, root crops, meat, and poultry droppings.
 - It is also in use for the drying of laundry and timber.
 - There are a few cases of its use for chick brooding and hot water preparation for bathing.
 - The most wide spread method of crop drying is the open to air sun drying technique.
- **Other institutions dealing with solar thermal energy:**
 - Sokoto Energy Research Centre at Usman Dan Fodio University, Sokoto, Centre for Energy and Power Systems Research at Federal University of Technology, Owerri and most university departments of Agricultural and Mechanical Engineering. The German International Cooperation (GIZ) in Nigeria, also deals with solar thermal energy.

Experiences of your institution concerning solar thermal energy:/ Experiências da vossa instituição em matéria de energia solar térmica/ Expériences de votre institution en matière d'énergie solaire thermique

- **Short background on solar thermal energy at NCERD**
 - NCERD has developed various prototypes of solar crop dryers, improved single tank, flat plate thermosyphon systems for solar water heating, trombe wall solar chick brooding system, hatchery using solar thermal energy are some of the systems developed.
- **Activities**
 - Our activities at the solar thermal unit of NCERD involve research, development, dissemination and training in the area solar thermal energy and its applications.
- **Trainings? Target groups?**
 - We have trained staff of some ministries in Nigeria on solar drying and solar water heating technologies. National Youth Service Corp (NYSC) members through the Energy Commission of Nigeria receive training. In future, we hope to mount short courses, diplomas and degree programmes in collaboration with relevant academic departments in the University of Nigeria.
- **Research?**
 - Presently, we are working on efficient and cost effective solar thermal storage systems, solar cooling and water disinfection using solar energy.
- **Production of technologies or components.**
 - Components are produced at NCERD for the purposes of research and for job orders.

Experiences of your institution concerning solar thermal energy:/ Experiências da vossa instituição em matéria de energia solar térmica/ Expériences de votre institution en matière d'énergie solaire thermique

National production of solar collectors, imports of solar thermal systems or components and statistics on the total installed collector area in Nigeria.

A recent survey (2014) by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH under the Nigerian Energy Support Programme on Solar Water Heaters (SWH) for Shaving of Electricity Peak Load and CO₂ Reduction reports that there no commercial production of SWH systems in Nigeria.

- A survey conducted by NCERD in 2011 in south eastern Nigeria also reported the absence of commercial ventures in the production of solar thermal systems.
- The GIZ report shows that flat-plate and evacuated-tube solar water heaters are imported from Germany, Malaysia, India, China, and Turkey. Most of the companies import the systems only when an order is received from a client.
- The Renewable Energy Department of Energy Commission of Nigeria (ECN), as contained in GIZ report, confirmed that there are no reliable data , on the installed collector area in Nigeria. However, a few demonstration systems built by the research centres exist. An example is a 2000 capacity chick brooder for a commercial farm in Nsukka by NCERD. Installation of SWHs at the maternity ward of Usman Danfodio University (UDU) teaching hospital by SERC.

Existing key barriers for solar thermal energy/ Menciona 3 principais barreiras existentes para a energia solar térmica/ Cite trois principaux obstacles pour l'énergie solaire thermique

- **Three existing key barriers for solar thermal energy.**
 - **Low level of awareness amongst the Nigerian populace of the capabilities of solar thermal technologies,**
 - **Near absence of policy in Nigeria for incorporation of renewable energy into the energy mix of organizations. The National Renewable Energy Master plan (REMP) developed by the Energy Commission of Nigeria (ECN) articulates short, medium and long term roadmaps for harnessing renewable energy and integrating it into the national energy mix for sustainable development. It was drafted in 2005 and revised in 2012 (REMP, 2005, 2012). However, it is yet to be a binding legal document because it has not been approved by the national assembly,**
 - **For those that aware of the capabilities of solar thermal technologies, high cost of system acquisition on comparative basis to other conventional technologies is a limitation.**

Needs and expectations / Necessidades e expectativas/ Besoins et attentes

- **What are needs and expectations of your institution on a ECOWAS solar thermal program?**
 - The needs of our institution are more on reserach capacity building. Research equipment provision, training of our staff on modelling skills, simulation tools and solar thermal testing systems. Joint execution of solar thermal projects.
- **Expectations to ministries of energy?**
 - Assisting in the formulation of policies that would promote the use of solar thermal energy.
- **Expectations to ministries of housing/urban planning/buildings?**
 - Assisting in the formulation of policies that would promote the use of SWH and other solar thermal energy efficient systems such as solar cooling technology.
- **Expectations to chambers of architects?**
 - Exposure to energy efficient building concepts. Introduction of such concepts to the curriculum of university degree programmes.
- **What needed for dissemination of solar thermal energy broadly?**
 - Policy formulation and enforcement. For instance the mandatory installation of solar water heating systems on building.
 - Incentives such as subsidizing the cost of solar thermal systems.

Pictures



Brooded chicks at 8 weeks



Day old chicks inside solar energy brooding system

Pictures



Solar fish dryer



Fig 2. Pictorial View of the Hybrid Solar Dryer.

Pictures



Flat Plate,
Thermosyphon
, single tank
SWH system



Pyramidal shaped solar still

Thank you for the attention.

