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## CONCEPT NOTE

### *National Training Workshop on The Use of HOMER Software as a tool for RE Project Design*

*Date: May 29 - 30, 2014*

**Location: Freetown, Sierra Leone**

**Jointly organized by the ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) and the United Nations Industrial Development Organization (UNIDO)**

## **1. PURPOSE AND OBJECTIVES OF THE EVENT**

### **Background**

The ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE), in collaboration with the United Nations Industrial Development Organization (UNIDO), is organizing a two-day training workshop on HOMER as a tool for renewable energy (RE) project design from **May 29 to 30, 2014**, in Freetown, Sierra Leone.

A key challenge facing RE development in Sierra Leone is the lack of technical capacity to plan, build and run RE projects. The success of such projects depends on the successful planning, design, operation and maintenance of the technology and equipment. This training workshop is part of ECREEE's objectives in building capacities in ECOWAS Member States in RE project design and appraisal, and to create an ECOWAS network of certified trainers in different RE project tools.

The training will use theoretical concepts, simulations and practical exercises to prepare trainees on the use of HOMER with the view to addressing key barriers to the deployment of RE&EE technologies and services in the ECOWAS region. Examples from some of the many RE projects UNIDO have been involved with in Sierra Leone will be used to highlight the learning points.

### **About HOMER**

The HOMER energy modeling software is a powerful tool for designing and analyzing hybrid power systems, which contain a mix of conventional generators, combined heat and power, wind turbines, solar photovoltaic, batteries, fuel cells, hydropower, biomass and other inputs. It is currently used all over the world by tens of thousands of people.

For either grid-tied or off-grid environments, HOMER helps determine how variable resources such as wind and solar can be optimally integrated into hybrid systems. Engineers and nonprofessionals use HOMER to run simulations of different energy systems, compare the results and get a realistic projection of their capital and operating expenses. HOMER determines

the economic feasibility of a hybrid energy system, optimizes the system design and allows users to really understand how hybrid renewable systems work.

As distributed generation and renewable power projects continue to be the fastest growing segment of the energy industry, HOMER can serve utilities, telecoms, systems integrators and many other types of project developers – to mitigate the financial risk of their hybrid power projects. HOMER Energy provides software services and an on-line community to the diverse group of people who are using HOMER to design hybrid systems. More information can be found at <http://homerenergy.com/index.html>. HOMER is software developed in English, no French version is available.

### **Training Objective**

The main objective of the training is to increase the knowledge on simulation and dimensioning tools for energy systems in Sierra Leone through ECREEE's Train-the-Trainers Network on Renewable Energy and Energy Efficiency Project Planning and Design.

The workshop aims at achieving the following specific objectives:

- To empower an expert pool in Sierra Leone to conduct further HOMER Software training.
- To understand the complexity of hybrid systems and the need for simulation and dimensioning tools available now to the public.

### **Expected Results**

By the end of the workshop, it is expected that the participant will be able to perform the following tasks:

- Complete a HOMER software based exercise.
- Provide help desk services.

## **2. ORGANIZATIONAL PARTNERS**

### **About ECREEE**

As a policy response to the rising energy security concerns, continued lack of access to energy services in rural areas and the need for climate change mitigation the ECOWAS Energy Ministers established the first regional renewable energy promotion agency in Sub Sahara Africa. The Secretariat of the ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) was inaugurated on 6th July 2010 with support of the ECOWAS Commission, the Governments of Austria, Spain and technical assistance of the United Nations Industrial Development Organization (UNIDO). The ECREEE Secretariat is based in Praia, Cape Verde. ECREEE works through a network of National Focal Institutions (NFIs) which interlinks the Secretariat with all ECOWAS Member States.

The overall objective of ECREEE is to contribute to the sustainable development of West Africa by improving access to modern, reliable and affordable energy services and energy security, and a reduction of negative energy related externalities (e.g. local pollution, greenhouse gas (GHG) emissions) through the dissemination of RE&EE technologies and services. ECREEE aims at the creation of favorable framework conditions for renewable energy and energy efficiency markets. The Centre supports activities, programs and projects directed to mitigate existing technical, legal, institutional, economic, financial, policy and capacity related barriers. The ECREEE activities include fund mobilization, policy support, knowledge management and awareness raising, capacity development and business and investment promotion.

### **About UNIDO**

The United Nations Industrial Development Organization (UNIDO) is the United Nations' specialized agency with the mandate to promote industrial development in the world's developing and least developed nations. The Organization supports governments, businesses and other stakeholders in their efforts to meet the challenges of, and to remove the barriers to, their industrial development. To do so, UNIDO mobilizes knowledge and information, builds capacity, and facilitates the transfer of technology to enhance competitiveness and advance the adoption of climate change mitigation measures. UNIDO's strategy is built upon three pillars:

Poverty reduction through productive activities, trade capacity building and energy and environment. UNIDO is one of the lead United Nations agencies in the field of renewable energy for productive uses and industrial energy efficiency.

### **3. ORGANISATION OF THE EVENT**

#### **Target Participants**

- Participants (25) are degree holders with Engineering/Scientific background and representatives of selected government departments, academic institutions, industry, and NGOs etc. who are contributing or intend to contribute to RE projects Development in Sierra Leone. There is no age limit.

#### **Requirements from the candidate**

##### **a) Prior to the Training**

Technical Requirements:

- Understanding of the basics of Hybrid, Stand-alone and Grid-connected systems using different types of energy resources;
- Good overview of simulation tools and software for electricity;
- Understanding of cost and economic analysis of power systems' life cycle.

Note:

- Prior to the training, instructions on how to install the HOMER Legacy software will be provided. The candidate will ensure the safe installation on his/her own computer.

##### **b) During the Training**

- The participant is required to bring his/her own laptop and to install the HOMER Legacy software which is available free-of-charge at: <http://homerenergy.com/>.
- The participant is expected to complete all the practical exercises.

#### **4. FINANCIAL AND ADMINISTRATIVE ARRANGEMENTS**

Financial and administrative arrangements for the invited participants will be made in accordance with ECREEE's rules and regulations. ECREEE will provide the participants with the following:

- Lunch and coffee break;
- Printing of reading material and certificates

#### **Exclusion of Liability**

ECREEE will not assume responsibility for any of the following costs, which may be incurred by the participant in connection with attendance of the training workshop.

- Compensation for salary and any related allowance during the period of the workshop;
- Costs incurred in respect of travel and accident insurance, as well as medical and hospitalization bills in connection with attendance at the workshop;
- Compensation in the event of death, disability or illness;
- Loss or damage to personal property while attending the workshop;
- Any others not explicitly mentioned in this concept note.

#### **Logistic Arrangements**

UNIDO will provide support in the required logistic arrangements and assure the successful organization of the training workshop.

#### **5. OTHER INFORMATION**

##### **Recognition of Completion**

A certificate of training completion will be awarded to the trainees.

##### **Registration Process**

Candidates are required to submit their applications on <http://www.ecreee.org/homer-online-questionnaire> before May 16, 2014. Candidates will be informed of the status of their application before May 23, 2014. Further information on the training, including reading material, is available on <http://www.ecreee.org/event/national-training-workshop-use-homer-software-freetown-sierra-leone> .

## **Enquiries and Correspondence**

All enquiries and correspondence prior to the workshop should be addressed to:

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## TRAINING SCHEDULE

<b>DAY 1: INTRODUCTION TO HOMER</b>	
<b>TIMES</b>	<b>ACTIVITIES</b>
08:00 – 09:00	Registration
09:00 – 10:00	Overview of ECREEE, UNIDO and participants presentation
10:00 – 11:00	Overview of the training course: critical concepts, approach and specific needs from the users
11:00 – 11:30	Tea / coffee break
11:30 – 12:30	General introduction: Overview of design and simulation tools
12:30 – 13:15	PROS & CONS about Homer simulation tool
13:15 – 14:30	Lunch Break
14:30 – 15:30	What you can do (and what you cannot do) with HOMER: Examples, outputs, results and data processing
15:30 – 17:00	HANDS on HOMER: practical session with the user interface
17:00	End of Day 1
<b>DAY 2: SYSTEM DIMENSIONING</b>	
<b>TIMES</b>	<b>ACTIVITIES</b>
09:00 - 10:30	Introduction to Exercise 1
10:30 – 11:00	Correction of Exercise 1
11:00 – 11:30	Tea / coffee break
11:30 – 12:45	Introduction to hybrid systems
12:45 – 14:00	HANDS on HOMER: Simulating and dimensioning and Stand-alone Hybrid System <i>THE INPUTS</i> <ul style="list-style-type: none"> <li>• Energy Demand: the load profile INPUT</li> <li>• Energy Resource INPUT</li> <li>• Technical equipment and costs INPUT</li> <li>• Restrictions INPUT</li> </ul>
14:00 – 15:30	Lunch Break
15:30 – 17:00	<i>THE OUTPUTS</i> <ul style="list-style-type: none"> <li>• Outcome of the simulation: List of possible systems</li> <li>• Interpretation of the economical results</li> <li>• Analysing the simulated performance of the system</li> <li>• Exporting data for further uses</li> </ul>
17:00 – 18:00	Wrap up, evaluation of the training course