

CONCEPT NOTE

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

Dates: 17th – 18th June 2014

Location: NAWEC Venezuela Project Office, Jimpex Road Kanifing,
The Gambia.

Organized by:



National Water and Electricity Company (NAWEC)

Supported by:



ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

I. Introduction and Context

A. Brief Description

The National Water and Electricity Company and The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) are organizing a three-day Training Workshop on the use of HOMER as a tool for renewable energy (RE) project design from June 03th – 04th, 2014 in Banjul, The Gambia.

The training workshop will use theoretical concepts, simulations and practical exercises to prepare participants on the use of HOMER. This training is part of NAWEC's objective in building high level manpower in energy efficiency and conservation and in disseminating information on energy efficiency and conservation concepts through public awareness programs such as seminars, workshops and publications. This training is also 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 users in different RE project tools.

The training workshop addresses key barriers to the deployment of RE&EE technologies and services in The Gambia and the entire ECOWAS region.

B. Background

About NAWEC

Introduction

The National Water and Electricity Company Limited is a limited liability company incorporated in 1996 and operates under the full responsibility of the Government of The Gambia. The Board of Directors oversees the overall direction of the company and delegates

the day-to-day management to the Managing Director and the Management of NAWEC. NAWEC has the mandate to provide electricity, water and sewerage services in The Gambia. The company operates a thermal power station that runs mainly on heavy fuel oil for the provision of the power supply to the Greater Banjul Area (GBA) and Diesel Power Stations in the Provinces (Rural). Since 2006, NAWEC purchases electric energy from the Independent Power Producer, Global Electric Gambia (GEG). Likewise, the company operates water wells and treatments plant in order to satisfy the water and sewerage needs in the GBA. NAWEC also operates water services in the Provinces.

NAWEC's mission statement:

To ensure the safe, effective provision of affordable nationwide electricity, water and sewerage services to satisfy consumer requirements, generate reasonable rates of return on investments and contribute to the socio-economic development of The Gambia.

PROJECT OBJECTIVES

NAWEC aim is to contribute to reducing The Gambia's dependence on imported petroleum for power generation in order to improve energy security and to reduce the GHG emissions from diesel fuel use for grid electricity supply in The Gambia. The Gambia has depended on 100% fossil fuel with nearly zero % coming from renewable in the rural Gambia.

Currently, the geographic coverage provided by NAWEC, The national power utility, for electric power supply is less than 20% and is limited within the Greater Banjul Area and six provincial centers in the rural areas served with isolated small diesel generation sets. The electricity supply is characterized by high operational cost, unreliability, inefficiency and relative high fuel cost by using light diesel fuel cost, there are other cost such as break down maintenance as well as replacement of generating set and the costly logistics to get the fuel to the power stations.

The objectives we seek to maximize include both economics as well as environmental issues for long-term sustainability. Sustainability ensures the availability of energy and a liveable environment for the future.

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, and operates with a small multi-national team of full time staff. 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 HOMER

HOMER stands for **H**ybrid **O**ptimization **M**odel for **E**lectric **R**enewable. The HOMER energy modelling 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 non professionals alike 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>

II. Activity Objectives and Key Results

A. Primary objectives

To increase the knowledge on simulation and dimensioning tools for the energy system in The Gambia.

B. Key outcomes being sought

The workshop aims at achieving the following specific objectives:

☐☐ To empower an expert pool from relevant RE & EE, Energy and Power institutions in The Gambia on the use of the HOMER Software.

☐☐ To understand the complexity of hybrid systems and the need for simulation and dimensioning tools.

III. Activity Description (Tasks and outputs)

A. Outputs and Benefits

HOMER can be used to determine how various resources can be integrated to provide an optimal hybrid system. This can be used for feasibility studies and to estimate the financial capacity of a proposed hybrid power system. Besides direct training benefits, the workshop will also facilitate synergies and cooperation between relevant RE & EE, Energy and Power institutions in Gambia.

B. Expected Results

By the end of the workshop, it is expected that the participants will be able to:

??Complete a HOMER software based exercise for within The Gambia.

IV. Participants and Requirements

The direct beneficiaries of the workshops are RE & EE, Ministry of energy, PURA, project developers, relevant Energy institutions in GAMBIA.

A maximum of 30 participants will be selected according to criteria to ensure the broad presence of relevant institutions.

Requirements from the candidate

??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.

The participant is required to bring his/her own laptop.

V. BASIC INFORMATION FOR PARTICIPANTS

A. REGISTRATION PROCESS

Candidates are required to submit their applications on <http://www.ecreee.org/homer-online-questionnaire> before June 06. Further information on the training, including reading material, is available on <http://www.ecreee.org/event/national-training-workshop-use-homer-software-banjul-gambia>.

B. ENQUIRIES AND CORRESPONDENCE

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

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Praia, Cabo Verde

C. INDICATIVE TRAINING SCHEDULE

TIME	ACTIVITY
DAY ONE	INTRODUCTION
8:00 - 9:00	Registration
9:00 – 10:00	Opening, Overview of NAWEC, ECREEE 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	Introduction to homer as a modelling software
12:30 - 13:15	PROS & CONS about Homer simulation tool
13:15 – 14:30	Lunch
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
DAY TWO	SYSTEM DIMENSIONING
9:00 – 10:30	Introduction to Exercise 1 load dimensioning
10:30 – 11:00	Correction of Exercise 1
11:00 – 11:30	Tea/ coffee break
11:30 – 12:45	Introduction of Hybrid systems
12:45 – 14:00	How to design evaluate for small power system
14:00 – 15:30	Lunch

15:30 – 16:45	<p><i>THE OUTPUTS</i></p> <ul style="list-style-type: none"> • <i>Outcome of the simulation: List of possible systems</i> • <i>Interpretation of the economical results</i> • <i>Analysing the simulated performance of the system</i> • <i>Exporting data for further uses</i>
16:45 – 17:00	<i>Evaluation and Conclusion of training</i>
17:00	<i>End of Day 2</i>