Concept Note/Aid Memoire

ECOWAS Regional Workshop on Wind Power Development
November 4 – 8, 2013, Praia, Cape Verde

Website: http://www.ecreee.org/event/wind-energy-workshop

Jointly organized by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), the United Nations Industrial Development Organization (UNIDO), the Ministry of Tourism, Industry and Energy of Cape Verde, and CABEOLICA

Introduction

The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), in collaboration with the United Nations Industrial Development Organization (UNIDO), the Ministry of Tourism, Industry and Energy of Cape Verde and CABEOLICA are jointly organizing a five-day workshop on wind power development from 4 to 8 of November 2013, in Praia, Cape Verde. The workshop is undertaken under the umbrella of the knowledge management and capacity development component of the GEF Strategic Programme for West Africa. The event will feature a two-day technical forum on the status of on-grid and off-grid wind power technologies and potential market opportunities in the ECOWAS region. Moreover, a three-day training on wind power project development will introduce technical experts in the software tools WindPRO and WAsP. The training course includes lessons on wind measurement, site assessment, calculation of power curves, project design, as well as environmental and social impact assessment. It is expected that more than one hundred participants from ECOWAS and international organizations will attend the workshop, including policy makers, utilities, rural electrification agencies, regional authorities, practitioners, equipment manufacturers, as well as financiers and bankers. The workshop is a contribution of ECOWAS to the UN Goal on Universal Access to Sustainable Energy Services by 2030.

Background

Energy Challenges in the ECOWAS region

The ECOWAS region is facing interrelated challenges of energy access, energy security and climate change mitigation simultaneously. The lack of access to modern, affordable and reliable energy services is interrelated with a variety of economic, social, environmental and political development in West Africa.

In "business as usual" scenarios – without considerable additional investment – energy poverty and its consequences for the economy and society will continue to be a predominant challenge in the ECOWAS region. West Africa, with around 300 million inhabitants equivalent to roughly one third of Africa's total population, has one of the lowest modern energy consumption rates in the world. Access to electricity across the region is about 20% but wide gaps exist between the access rates in urban areas that average at 40% and in rural areas at 6% to 8%.The electricity networks serve mainly the urban centres and suburbs.The urban and rural poor in West Africa spend more of their income on poor quality energy services.

The electricity system in the region is facing challenges due to the growing gap between predicted demand, existing supply capacities and limited investment capital. Despite the growing gap and lack of investment capital, the energy intensity in the countries remain high and energy is used in inefficient ways throughout all sectors. The estimated technical and commercial electricity losses in the electricity systems lie between 20% and 40% throughout the West African region. Increasing fossil fuel import dependency, shortages and fluctuating fossil fuel prices are major concerns of countries and therefore require diversification of sources. Over 60% of the Community's electricity generation capacity is running on oil. In some countries even more than 90% of the electricity generation is dependent on diesel and heavy fuel oil generation plants. As a result, the steadily increasing and fluctuating oil prices have had a devastating effect on the economies in the region.

With climate change, another concern was added to the heavy energy agenda of the ECOWAS region. West Africa is so far responsible for only a fraction of global energy related GHG emissions. However, the energy sector will be highly impacted by mitigation and adaptation costs of climate change in the forthcoming decades. Climate change risks and the need for reliable and affordable energy supply to ensure energy security and energy access create a dilemma. On the one hand urgent investments are required. On the

other hand, the expansion of energy supply based on inefficient low-cost fossil fuel combustion technologies will increase GHG emissions and interrelated negative climate change impacts which harm Sub Sahara Africa greatly. New energy infrastructure investments have a long life-time and determine the GHG emissions for the next 20 to 30 years. Climate change impacts (temperature rise, extreme weather events, and droughts) will challenge the energy security of ECOWAS countries and have to be mainstreamed into energy policy planning (e.g. change of water flows).

Renewable Energy and Energy Efficiency Potentials in the ECOWAS region

Apart from other low-carbon solutions, renewable energy technologies are appropriate tools to address the described challenges simultaneously and in a sustainable manner. Apart from significant fossil fuel resources the ECOWAS countries can rely on a wide range of untapped renewable energy and energy efficiency potentials in various sectors. The West African region has huge hydro potential estimated at a total of 23,000 MW, good potential for bioenergy, solar and wind energy. On both the supply and demand side, there are significant potentials to improve energy efficiency in various sectors (e.g. appliances, buildings, industry and power generation and transmission).

Status of wind energy power development in the ECOWAS region

Wind energy can contribute significantly to meet the electricity needs of urban areas as well as isolated rural areas. Wind energy is one of the most advanced and cost-effective renewable energy technologies. It is considered reliable, the cost of installed KW is decreasing and is independent of the energy price volatility associated with plants using fossil fuels. Wind farms have usually a life time of more than twenty years without major maintenance. Grid-connected large wind farms can improve energy security through the reduction of fossil fuel import dependency, diversification of the energy mix and reduction of electricity shortages. It can help to meet the rapid growth of electricity demand in urban centers and industry. Small scale wind turbines (of some KW) combined in a hybrid solution with another renewable energy technologies (solar, small hydro, etc) can also contribute significantly to meet the electricity needs for isolated rural communities in ECOWAS Region. In addition to provision of electricity to rural and isolated communities, low wind speeds can also be exploited to provide water pumping to increase access to clean water. The wind power assessment executed by ECREEE identified attractive wind sites in Cape Verde, Cote d'Ivoire, Senegal, Gambia, Guinea, Guinea Bissau, Liberia, Ghana, Mali, Niger, Togo, Benin and Burkina Faso. The GIS based wind assessment is available at the ECOWAS Observatory for Renewable Energy and Energy Efficiency (www.ecowrex.org), It gives investors an overview on the wind power market potential and attractive sites near to transmission lines and highly populated settlements.

So far only Cape Verde is taking advantage of its technical and economic feasible grid-connected wind power potential. In 2012, with the installation of five wind farms in different islands with a total installed capacity of 26 MW, Cape Verde reached 25% of wind energy penetration on the electricity mix production, with strong impact in the economy of the energy sector, totally dependent on the imported fuel. This fact demonstrates that wind energy is technically and economically feasible and could play an important role on the energy development process in West Africa. Major wind power projects are also under development in Senegal and Ghana. In Cape Verde and Gambia first medium-scale wind power IPPs are in operation. The off-grid wind power market is apart from some wind power water pumping projects very weakly developed.

The challenges that wind energy developers are facing are many and most of them are part of the larger picture of general barriers for the uptake of renewable energy. The main constraints for wind energy

development in the ECOWAS region can be summarized as follows:

- Policy and institutional barriers: There is lack of coherent clear-cut energy policies and regulations and most ECOWAS countries do not put a special focus on wind energy in their energy policies and rural electrification strategies. There are no particular support policies and incentives for wind projects in place and there is a real risk that low quality equipment will enter the market due to the absence of defined quality standards and certification.

- Financial barriers: There is lack of long-term financing mechanisms tailored for wind energy projects which usually have high initial investment costs and low operation and maintenance costs. Associated technical, market and political risks impact the financial viability of wind projects in most of the ECOWAS countries. Carbon financing schemes such as CDM, are difficult to apply and risk capital for feasibility studies is scarce.

- Technical barriers: The location of a wind farm is very much dependent of the local wind conditions. As most good sites are located in remote areas, infrastructure constraints such as access to roads and transmission lines and lack of equipment for erecting the towers make these good sites difficult to develop. Technical risks are also linked to the availability of reliable long term wind data. For location of a wind farm at least one entire year reliable wind measurements is mandatory.

- Capacity barriers: Public institutions such as ministries, regulatory authorities and district administrations often possess only minimal capacity to design, implement and revise wind energy supportive policies and regulations. At technical level the capacities to plan, build and run wind energy projects are very low. Most of the countries lack specialization to undertake quality feasibility studies (e.g. detailed design and financial cost benefit analysis).

- Knowledge and awareness barriers: Another serious challenge is the missing knowledge and awareness on wind energy costs, potentials and benefits for electricity sector in general and for rural electrification in particular. The lack of basic data (e.g. long term wind measurements, meteorological data, etc), poses a major barrier for private investors in the sector.

Justification for the proposed Wind Power Workshop

In previous decades, the utilities of the ECOWAS region mainly focused on large energy systems namely large diesel engines and large hydropower. Also international financiers (e.g. development banks, trust funds) targeted mainly large scale projects in the context of regional power trade such as the West African Power Pool (WAPP). With the adoption of the ECOWAS White Paper on access to energy services for peri-urban and rural areas in 2005, renewable energy sources such as wind energy are getting more attention. The White Paper recommended that at least 20% of new energy investments in rural and peri-urban areas should originate from renewable energy sources.

Despite its potential mainly in all West African sea coasts, the contribution of wind energy to the energy mix in the region remains very low. The case of Cape Verde, where wind energy penetration reached more than 20% of total electricity production in 2012, indicates an opportunity for the region to establish strong commitment to implementation of a Wind Energy Program for the ECOWAS Region.

The ECOWAS Renewable Energy Policy (EREP) approved by the 43rd Ordinary Summit of the ECOWAS Heads of State and Government in Abuja, Nigeria in July 2013 established the following targets for grid connected wind power development by 2020 and 2030:

- Installed capacity: 318 MW by 2020; 993 MW by 2030
- Energy production: 836 GWh by 2020; 2,314 GWh by 2030
- Investments: 541 million Euros up to 2020; 1,540 million Euros up to 2030.

Apart from the grid connected targets, the EREP established also targets for off-grid and standalone renewable energy projects to support rural electrification and water pumping for more than 71.4 million inhabitants living in rural communities by 2020 and 104 million by 2030. The contribution of wind energy to this process is expected to be very significant. To achieve these very ambitious targets, ECREEE is formulating a strategy for promoting and developing wind energy technology in the region that would be the focus of the workshop.

Objectives

The objectives of the workshop are to:

- formulate a strategic framework for wind power development in the ECOWAS region;
- update participants on the state of the art of on-grid and off-grid windpower technologies; and
- elaborate a realistic regional action plan to address the existing barriers.

Expected Outputs

It is expected that the workshop will produce the following **practical results and deliverables:**

- A Strategic framework for the development of the ECOWAS wind power market;
- An overview on the state of the art of on-grid and off-grid wind power technolgies;
- A regional action plan to address the existing barriers for wind power development;

Participants

It is expected that more than hundred participants from ECOWAS and international organizations will attend the workshop, including policy makers, utilities, rural electrification agencies, regional authorities, practitioners, equipment manufacturers, as well as financiers and bankers. For the training seminar on Wind Energy Project Development, ECREEE will invite experienced resource persons from the ECOWAS region and internationally.

Tentative Agenda

See Annex A

Organization

The workshop is organized by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), in collaboration with the United Nations Industrial Development Organization (UNIDO), the Ministry of

Tourism, Industry and Energy of Cape Verde and CABEOLICA (a wind power generation company based in Cape Verde).

PARTICIPANTS

It is expected that around one hundred participants from ECOWAS and international organizations will attend the workshop, including policy makers, utilities, rural electrification agencies, regional authorities, practitioners, equipment manufacturers, as well as financiers and bankers. The workshop is a contribution of ECOWAS to the UN Goal on Universal Access to Sustainable Energy Services by 2030.

DOCUMENTS

Participants will be provided with the detailed forum and training documents prior to the meeting. The wind power training software will be provided during the training. Further information and the presentations will be available at: http://www.ecreee.org/event/wind-energy-workshop.

DATE AND VENUE

The five-day workshop will be held from 4 to 8 of November 2013, in Praia, Cape Verde. The event will feature a two-day technical forum on the status of on-grid and off-grid wind power technologies and potential market opportunities in the ECOWAS region. The forum will take place in the National Assembly of Cape Verde. The three-day training on wind power project development will take place at the Praia Mar Hotel.

Indicative BUDGET

A detailed budget overview is included in Annex B. ECREEE will cover the costs for the invited participants (travel and hotel). UNIDO will cover the costs of the event organizer, the trainers, the venue, coffee breaks and lunches (see budget overview in the annex).

Financial and administrative arrangements

Financial and administrative arrangements for the sponsored participant will be made in accordance with the ECOWAS rules and regulations. UNIDO will not sponsor travelling costs. ECREEE will inform invited participants on the travel and accommodation arrangements individually.

VISA ARRANGEMENTS

Before leaving the home country, participants should complete all formalities regarding entry and transit visas, which they may require for the journey to Praia, Cape Verde. Participants are asked to contact the nearest Embassy of Cape Verde as soon as possible. The visa process will require at least three weeks. In the absence of an Embassy in the home country, participants are advised to contact ECREEE to make arrangements of obtaining a visa on arrival.

HOTEL RESERVATION:

The participants will be informed on possible hotel reservations and the agenda activities in due course.

ENQUIRIES AND CORRESPONDENCE

All enquiries and correspondence prior to the Workshop should be addressed to the following contacts:

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ANNEX A: Draft Agenda

Draft Program – Monday 4 November 2013

Venue: Salao de Banquetes da Assembleia Nacional
Moderator: Mr Toby D. Couture, Independent Renewable Energy Consultant

08:30	**Registration of participants**
09:00	**Opening session** • ***Mahama Kappiah**, Executive Director of ECREEE* • ***NN,** ECOWAS Commission (TBC)* • ***UNIDO*** • ***Antero Veiga**, Minister of Environment, Housing and Land of Cape Verde*
10:00	***Group Photo*** ***Tea/coffee/cocoa break***
STATE OF THE ART OF WIND ENERGY TECHNOLOGY **Chairperson: António Baptista, General Director of Energy, Cape Verde**	
10:30	**Introduction of workshop program and objectives**
10:45	**The wind energy situation in the ECOWAS region: current situation and trends** **Mr. Mahama Kappiah, Executive Director ECREEE**
11:15	**Wind energy research and trends - an international outlook seen from Denmark** **Mr. Carsten Hansen, Head of Wind Energy Systems Manager of Risø WindConsult**
11:45	**State of the art of small wind energy technology – the use on rural electrification** **Mr. Debajit Pallit, TERI (tbc)**
12:15	**Wind Projects: Optimizing Site Selection** **Dr. Babul Patel, Mr. Alain Rosier, Nexant**
12:45	**Questions and answers**
13:15	***Lunch break***
STATE OF THE ART OF WIND ENERGY TECHNOLOGY **Chairperson: Sakariyou MAHMAN, General Director of Energy, Benin**	
14:30	**Electrical grid stability with high wind energy penetration** **Mr. Fernando Castellano Hernández, Instituto Tecnológico de Canárias (ITC)**
15:00	**Wind farm planning and development – some thoughts and recommendations** **Mr. Carsten Hansen, Head of Wind Energy Systems Manager of Risø WindConsult**
15:30	**Wind farm planning and development – the case of Cape Verde** **Mr. Carlos Gueifão, GESTO Energy**
16:00	**Questions and answers**
16:30	***Tea/coffee/cocoa break***
17:00	***Vestas Presentation***
17:30	***GOLDWIND Presentation***
18:00	***UPTHEWORLD Presentation***
18:30	**Questions and answers**
19:00	***End of Day 1***

Draft Program – Wednesday 5 November 2013

Venue: Salao de Banquetes da Assembleia Nacional
Moderator: Mr Toby D. Couture, Independent Renewable Energy Consultant

PRESENTATION OF CASE STUDIES- THE EXAMPLE OF CAPE VERDE **Chairperson: TBD**	
08:30	**Cape Verde 100% RE Project** **Mr. José Brito, General Project Coordinator, Cape Verde**
09:00	**Experience of a Private Wind Energy Project Promoter** **Mr. Daniel Graça, Electric Wind, Cape Verde**
09:30	**Showcasing a best practice example of a public private partnership model for Wind Energy Projects** **Mr. Antão Fortes, CEO Cabeólica, Cape Verde**
10:30	***Tea/coffee/cocoa break***
PRESENTATION OF CASE STUDIES **EXAMPLES FROM THE ECOWAS REGION AND INTERNATIONAL** **Chairperson: ISSA MAIDAGI, General Director of Energy, Niger (TBC)**	
11.00	**Ghana Wind Project** **NN**
11:30	**Senegal Wind Project** **NN**
12:00	**El Hierro wind / pumping system** **Mr. Fernando Castellano Hernández, Instituto Tecnológico de Canárias (ITC)**
12:30	**Questions and answers**
13:15	**Lunch break**
WIND PROJECT FINANCING and REGULATION **Chairperson: TBD**	
14:30	**Financing opportunities for Wind Energy Projects - Risk management and risk guarantee products of the African Development Bank** **NN, TBD**
14:50	**Financing models and best practice for Wind Energy Projects – opportunities for project promoters in the ECOWAS region of the European Investment Bank** **NN, TBD**
15:10	**CDM opportunities for Wind Energy Projects** **Mr. Chunyu Liang, Regional Collaboration Centre UNFCCC**
15:30	**RE Regulation: the Case of Cape Verde** **Mr. Rito Evora, Agencia de Regulacao Economica de Cabo Verde**
15:50	**Questions and answers**
16:15	***Tea/coffee/cocoa break***
Feedback on the Regional Action Plan for Wind Energy Development **Chairperson: Mahama Kappiah, Executive Director of ECREEE**	
16:45	**Presentation of the framework of the ECOWAS Wind Energy Action Plan and the Methodology** **Mr Toby D. Couture, Independent Renewable Energy Consultant**
17:30	**Discussion and feedback from participants**
18:30	**Closing session** • ***Mahama Kappiah****, Executive Director of ECREEE* • ***Antonio Baptista,*** *Director of Energy, Ministry of Tourism, Industry and Energy of Cape Verde (TBC)*
18:45	**End of Day 2**
19:30 Dinner	

Draft WindPRO 3-Day Training Course In-House Training ECOWAS Centre for Renewable Energy and Energy Efficiency Cape Verde, 6 to 8 November 2013, Description

Day 1: BASIC and Analysing Wind Data

The purpose of the first course day is to give a basic understanding of WindPRO. For the participants this day is a unique opportunity to explore the "state of the art" software in wind projects design.
The BASIS module is the platform on which all WindPRO modules operate. No matter which modules of WindPRO the participants plan to use, they will need to get familiar with the BASIS facilities.

Basic Information and Exercises:

- **Installation of software**
- **Course introduction** – Best practice for wind energy project design.
- **Project development with WindPRO** - The basic ingredients for a WTG project and a demonstration of how WindPRO can be used throughout the process to calculate and document the project.

- **Introduction to WindPRO** – System overview, possibilities and limitations.
- **Coordinate systems and maps**
- **Printing and reports.**
- **The WTG Catalogue (WindCat) -** With detailed technical data provided by the manufacturers for over 800 types of turbines, including the latest on the market.
- **Practice exercises using the WindPRO Basis module, including**:
- Creation of a new project
- Attachment of scanned maps
- Import of digital height contour lines
- Working with layer structure and different layout support features
- Establishment of a wind farm, get familiar with the many design auxiliary tools
- Obtain Z-coordinates from Digital Height Model (DHM)
- Calculation / setup
- Preview / print of reports
- Export / import facilities (on more levels)

Analysing Wind Data:

- **Wind energy** – A theoretical introduction to the field of wind energy calculation.
- **Measuring the wind** – Import and analysis of wind measurements in the METEO object. Here measured wind data can be validated (screened), analysed and prepared for use in energy calculations. Methods for validation of the measurements will be presented and best practices for measuring campaigns discussed.
- **Practical exercise in importing and analysing measured wind data (logger data).**

Day 2: Energy Calculations

On Day 2 we will start by making energy yield calculations based directly on the measured wind data imported and analysed on Day 1. Later, we will introduce the use of WAsP, which is currently the best-documented and most used calculation engine for wind energy calculations. We will prepare the background data to be used in the WindPRO / WAsP calculation, like roughness, obstacles and a height model and we will look into advantages and pitfalls of using WAsP.

Finally, we will look at more advanced facilities like correlation, wind resource maps and optimisations.
Park Calculations on measured Wind Data:
 PARK calculation 1 – We will demonstrate how you can make energy yield calculations based directly on the measurements.
 Exercise
 Calculation and report possibilities – Presentation of the different calculation possibilities, especially the PARK calculation, and the reports they generate to make an extensive documentation of the calculation.
 Exercise

Using the WAsP Flow and Roughness Model (Wind Atlas model) in combination with WindPRO:
 The wind atlas model – A presentation of the theory behind the WAsP model. What kind of input data is necessary and how well does it operate
 The site assessment – How to describe the site so that WAsP handles it correctly. Tools exists in WindPRO to make the description of roughness and height contours manually, but also a number of digital formats are supported so that roughness and the height model can be read from e.g. GIS files
 Wind statistics and PARK calculation 2 – We apply WAsP to our site description and show how we first calculate a wind statistic (a Wind Atlas) for the region based on terrain and wind data, then perform a more precise energy calculation based on the wind statistic that takes into account the terrain around each wind turbine.
 Exercise
 WAsP pitfalls – A brief introduction to the pitfalls in the wind atlas model. The difference between a good and a poor calculation.
 Correlation and correction – Most measurements are made only for a limited amount of time. It may therefore be necessary to include other long-term data in the analysis. We present some of the most common and usable ways to correlate wind measurements including the MCP module in order to perform long-term corrections (MCP).
 Wind resource maps and Optimisation – Wind resource maps are very useful to identify areas with high wind energy and therefore an excellent help to make site layouts. Based on such wind resource maps WindPRO can create optimised high-yield layouts taking into account array losses, spacing demands and distance to protected areas.
 Exercise

Day 3: Environmental Impact Assessment
The third day is aimed at getting familiar with the kind of environmental documentation the local authorities usually request in order to give the needed permissions. This day's programme will alternate between theoretical explanations of the various environmental impacts and practical exercises in how to calculate and document them with WindPRO. Environmental Calculations:

 Noise impact – How to make noise impact calculations with the DECIBEL module. Establishment of noise sensitive areas. Noise regulations and different methods of calculating the noise from WTGs are presented.
 Shadow flickering impact – Assessment of the flickering impact using the SHADOW module. Calculations for both individual neighbours and the surrounding area in general are demonstrated.
 Zones of Visual Influence (ZVI) – a short introduction on how to make maps showing how many WTGs are visible from each individual calculation point.
 Exercises

Visualisations:

- **Photomontage** – which will cover aspects like:
  - o How to take the photos.
  - o How to import the photos to the software in a proper way.
  - o How to calibrate the camera model to make sure that the WTGs are rendered at the correct positions and in the right proportions on the background photo – how to use as well control marks as digital height model for calibration is demonstrated.
  - o It will also be shown how the visualisation tool can be used to give a presentation of the WTG project, where several options are available, like rubber tool for removing rendered WTG parts that should be behind e.g. trees, and how to include other elements than WTGs in rendering, e.g transformer stations.
- **Exercise**
- **Animations** - We will use the photomontages to create simple 2D-animations for use for animated presentation on computers, web pages etc.
- **The 3D ANIMATOR** – we will demonstrate and the participants will work with our virtual reality module, where you can drive or fly through an artificial rendered landscape with animated WTGs. This can be used at presentations for investors or for local authorities and neighbours to give a very impressive presentation of the project. It also offers a unique inspection of the whole data set the energy calculation is based on, especially the digital height information.

ANNEX B: Draft Budget and Cost Sharing

Indicative Budget Regional Workshop on Wind Energy, PRAIA, CAPE VERDE, 4 to 8 November 2013

Item	Designation	Qty	No. of Days	unit cost (€)	Total cost (€)	Co-funded by
1	**Participants workshop:**	**115**				
	ECOWAS member States	45				
	Cape Verde	40				
	ECREEE	10				
	International Participants	20				
2	**Participants ECOWAS Member States:**					
	Air Tickets (Return)	42		1,100	46,200	**ECREEE**
	Perdiems to Participants (2 day traveling)	42	2	205	17,220	**ECREEE**
	Perdiems to Participants (50 USD/day)	42	5	39	8,085	**ECREEE**
	Hotel	42	7	52	15,288	**ECREEE**
	Sub Total 2				**71,505**	**ECREEE**
3	**International Participants:**					
	Tickets air plan (Go & Return)	10		1,200	12,000	**GEF-SPWA**
	Perdiems (2 day traveling)	10	2	205	4,100	**GEF-SPWA**

	Perdiems (25% daily rate)	10	2	51	1,025	**GEF-SPWA**
	Hotel	10	3	56	1,680	**GEF-SPWA**
	International Consultant for preparation of Strategic Framework and Action Plan for WE in ECOWAS	1			10,000	**GEF-SPWA**
	WindPro Training (1 trainner for 2 days, including traveling, hotels, etc)				11,000	**UNIDO**
	Sub Total 3				**39,505**	
4	**Restoration:**					
	Tea breaks (Conference)	230	2	5	2,300	**UNIDO**
	Lunch (Conference)	115	2	20	4,600	**UNIDO**
	Tea breaks (Training)	90	2	5	900	**UNIDO**
	Lunch (Training)	45	2	20	1,800	**UNIDO**
	Sub Total 4				**9,600**	**UNIDO**
5	**Logistics:**					
	Venue (Overhead projector, PA System)	1	5	600	3,000	**UNIDO**
	Facilities for translation	1	5	685	3,425	**UNIDO**
	Internet	1	5	20	100	**UNIDO**
	Reproduction documents	110		0	0	**ECREEE/GEF -SPWA**
	Stationary (Folders, pens, etc)	110		0	0	**ECREEE/GEF -SPWA**
	Transportation (participants of ECOWAS, International Experts: airport - hotel - room conference - hotel)	2	8	150	2,400	**ECREEE/GEF -SPWA**
	Sub Total 5				**8,925**	
6	**Media coverage&Streamers:**					
	Streamers	0	0	0	0	
	television	0	0	0	0	
	Radio	0	0	0	0	
	Sub Total 6				**0**	
7	**Assistance to the workshop:**					
	Event Orgnizer for the technical forum	1	2	1,150	10,000	**UNIDO**
	Interpretation (English - French - Portuguese)	4	5	435	9,000	**UNIDO**
	Workshop moderation	1	1	200	200	**UNIDO**
	Sub Total 7				**19,200**	
9	**Contingency**			5%	**7,437**	
General Total					**156,172**	

ECOWAS Regional Centre for Renewable Energy and Energy Efficiency

Centre Régional pour les Energies Renouvelables et l'Efficacité Energétique de la CEDEAO

Centro Regional para Energias Renováveis e Eficiência Energética da CEDEAO

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