



AIDE-MÉMOIRE

Training on Small and Medium Scale Hydropower Project Development and Knowledge Exchange for ECOWAS Experts

***To be held at
Vienna International Centre***

***Vienna, Austria
on
May, 22 – 30, 2013***

Organized by

The United Nations Industrial Development Organization (UNIDO)

in cooperation with

The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE)

Supported by the Austrian Development Agency (ADA) and Austrian Energy Agency (AEA)

 Austrian
Development Agency


AUSTRIAN ENERGY AGENCY

BACKGROUND

The United Nations Industrial Development Organization (UNIDO) and the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) are organizing a training on small to medium scale hydropower development for experts from the ECOWAS region and other parts of Sub Saharan Africa. The training will combine theoretical lessons, hydro site visits, as well as meetings with plant operators and owners, consultants, hydro power generation associations, manufacturers and financiers. The training is supported by the Austrian Development Agency (ADA) and the Austrian Energy Agency (AEA).

The training will take place from 22 to 27 May 2013 and will also include participation in the Vienna Energy Forum (VEF) scheduled to take place from 28 to 30 May 2013. This activity is undertaken under the capacity building component of the ECOWAS Small Scale Hydropower Program. It is initiated due to the lack of technical capacities on SSHP that is acting as a major barrier to the dissemination and successful transfer of feasible SSHP technologies within the West African states. The training is a follow-up to the workshop on the ECOWAS Scale-Up Programme for Small Hydropower, organized by ECREEE, UNIDO and the Energy Sector Management Assistance Programme (ESMAP), which held April 2012 in Monrovia, Liberia.

The SSHP program was adopted by the ECOWAS Ministers of Energy in October 2012 and will be implemented between 2013 and 2018. The SSHP Program aims to contribute towards increased access to modern, affordable and reliable energy services, energy security and mitigation of negative externalities of the energy system (e.g. GHG emissions, local pollution) by establishing an enabling environment for small-scale hydro power investments and markets in the ECOWAS region. The SSHP Program contributes to the objectives of the ECOWAS Renewable Energy Policy (EREP) to increase the share of renewable energy (excl. large hydro) in the overall electricity mix to around 10% in 2020 and 19% in 2030. Further information on the ECOWAS Small Scale Hydropower Program is available at: <http://www.ecreee.org/node/3943>.

JUSTIFICATION

The training holds within the framework of the ECOWAS Small Scale Hydro Power Program and will facilitate north-south cooperation and knowledge exchange in the field of hydro power development, a request made by the ECOWAS participants at the regional workshop organized on small-scale hydropower in Monrovia, Liberia, from 16 to 20 April 2012.

The ECOWAS region offers vast untapped investment and business opportunities. However, the ECOWAS countries are yet to take advantage of their technically and economically feasible small hydro potential. It is estimated that the SSHP potential (up to 30 MW as defined by ECOWAS definition) ranges between 1.900

MW to 5.700 MW. Only a very small fraction of the potential has been exploited so far.

On the other hand, Austria is one of the global leaders in hydro power development of all sizes. Around 60% of the installed electric capacity in Austria is generated from hydro power resources. In 2010, hydropower plants with an installed total output of 12.9 GW were operated. Approximately 150 large hydropower and 3,000 small hydropower facilities (up to 10 MW according to the Austrian definition) generate around 38 TWh of electricity annually. In 2010, the Austrian hydropower industry generated sales of approximately 1.2 billion euros. In 2010, the hydropower industry had 7,570 employees (full-time equivalents) on its payroll. The country has various incentive schemes in place to support small hydro development (e.g. investment grants, feed-in tariff and consultancy programs). Moreover, there exists a wide range of operator models and on- and off-grid solutions in place. Austrian companies occupy a leading position in the manufacture, , installation and servicing of hydro systems' components.

The training will contribute to the mitigation of existing barriers for SSHP in ECOWAS and other African regions. The challenges that SSHP developers are facing are manifold and most of them are part of the larger picture of general barriers for the uptake of renewable energy. The main constraints for SSHP development can be summarized as follows:

- **Policy and institutional barriers:** There is a lack of coherent clear-cut energy policies, regulations and associated budgetary allocations to create an enabling environment for SSHP investments and business. Most ECOWAS countries do not put a special focus on SSHP in their energy policies and rural electrification strategies. In some of the countries SSHP is not included in the regulatory arrangement for hydropower. The monopolistic role of national power utilities and the uncertainties for IPPs are other known constraints. There are no particular support policies and incentives for SSHP in place and low quality equipment enters the market due to the absence of defined quality standards and certification.
- **Financial barriers:** There is a lack of long-term financing mechanisms tailored for SSHP projects which usually have high initial investment costs and low operation and maintenance costs. Another constraint for SSHP investments is the low willingness and ability to pay of the population in rural areas. Even the smallest of the SSHP schemes possibly costing only few thousand Euros becomes a major project for the poor. Due to the complex nature of SSHP, experience in planning and implementation is required to avoid time and cost over-run in the construction phase. Associated technical, market and political risks impact the financial viability of SSHP projects. Local lending agencies and development banks normally do not provide long term loans and in addition, require high collaterals (project finance where the SSHP project as such is considered as collateral is still very rare). Large hydropower systems which feed electricity into the grid and which often have lower specific investment costs have fewer

difficulties to attract investment capital. For SSHP systems, carbon mechanisms (e.g. CDM) are difficult to apply for and risk capital for feasibility studies is scarce.

- **Technical barriers:** As most good sites are located in remote areas, infrastructure constraints such as access to roads and transmission lines make these good sites difficult to develop. There are also technical risks such as hydrological and geological uncertainties and unpredictable long-term climate change impacts. A technical challenge for off-grid SSHP schemes is also the low electricity demand in rural areas (load factor). Finally, the ECOWAS countries have difficulties accessing appropriate quality technologies particularly in the mini, micro and pico hydro categories. There is a need for technology transfer.
- **Capacity barriers:** Public institutions such as ministries, regulatory authorities and district administrations often possess only minimal capacity to design, implement and revise SSHP supportive policies and regulations. At the technical level, the capacities to plan, build and run SSHP projects are very low. Most of the countries lack specialization to undertake quality feasibility studies (e.g. detailed design and financial cost benefit analysis). Most ECOWAS countries do not have any facility to manufacture even the most rudimentary turbines or parts that might be critical in maintenance of the schemes. Local lending agencies and investors are reluctant as they do not know how to appraise SSHP projects.
- **Knowledge and awareness barriers:** Another serious challenge is the missing knowledge and awareness on SSHP costs, potentials and benefits for rural electrification. Utilities are focused on large hydropower rather than the more costly small-scale hydro schemes. Public data on SSHP resources and project sites is often not available. Such a lack of sound basic data (e.g. hydrological, geographic, geologic data, seasonal and long-term river flow data), poses a major barrier for private investors in the sector. Detailed GIS based maps are in most cases not available and there is a lack of gauging stations. Increasing climate variability, deforestation, increasing erosion and decreasing storage capacity of catchment areas are making investment in hydropower systems risky.

OBJECTIVES

The objectives of the training are (...)

- To strengthen capacities and skills of African experts on different SSHP aspects (e.g. policy, economics, financing, planning);
- To showcase the technical feasibility, economic viability and reliability of different on-grid and off-grid SSHP solutions in the Austrian and African context;
- To showcase different operator models with the potential to be applied in the African context (e.g. utility, IPPs, industrial plant operators, private owners);

- To promote knowledge transfer and create business to business partnerships between experts from the African region and Austrian SSHP experts and companies; to promote investment;
- To establish a network for the implementation of the ECOWAS SSHP Program.
- To enhance knowledge on the Sustainable Energy For All Initiative (SE4ALL) through the participation in the Vienna Energy Forum.

EXPECTED OUTPUTS

Detailed curricula will be developed prior to the training. The training will feature:

- Theoretical training sessions with group discussions;
- Site visits to on- and off-grid SSHP plants in operation;
- Meetings with relevant institutions involved in SSHP regulation, financing and policy setting;
- Business-to-Business (B2B) meeting with local manufacturers of SSHP components and project developers (particularly companies involved in turn-key solutions); north-south know-how exchange;
- Presentations on the SSHP status and planning in various African countries;
- UNIDO/ECREEE presentation on the results of the tour at the Vienna Energy Forum;
- Report on the SSHP training in the Vienna Energy Forum

TENTATIVE AGENDA

Date	Location	Activity
Day 1 May 22, 2013 (We)	Vienna	<ul style="list-style-type: none"> • Get-together • Introduction <ul style="list-style-type: none"> • ECREEE/UNIDO Welcome and introduction to the training and expected outcomes • AEA introduction to training methodology and agenda • ADA welcome remarks Workshop Session: <ul style="list-style-type: none"> • Small-, medium and large scale hydro power in Austria • UNIDO SSHP activities in Africa • The role of refurbishment of existing and the construction of new SSHP • Incentives measures for HPP (political framework, financing information) • Aspects of electricity market and regulation
Day 2 May 23, 2013 (Th)	Lower Austria and/or Upper Austria and/or Styria	Field trip I:

- The field trips will include run-of-the river and hydro-storage plants, small and possibly one big plant, community (cooperative-) and private owned plants.
- The field trips will focus und site visits in Lower and/or Upper Austria and/or Styria.
- The participants will get information regarding different concepts and technologies for hydro power plants as well as regarding Austrian experiences in the operation of the plants.
- Concrete sites for the field-trip will be identified and contacted according to an in-depth analysis of the demand of the participants during the phase of preparation.

Day 3
May 24, 2013 (Fr) Lower Austria
and/or
Upper Austria

Field trip II

Day 4
May 25, 2013 (Sa) Vienna

- Theoretical training sessions with group discussions and training material:
 - The second theoretical day is planned at the end of the field trip to be able to flexibly refer to questions which might have appeared during the field-trip.
 - It will include some basics on hydrology (e.g. flow-prediction)
 - contact to interest groups (e.g. Small Hydro Austria) and Universities (Technical University and/or University of Agriculture and Forestry to present the academic training).
 - If appropriate, days 3 and 4 could also be changed. It is possible to placing the second theoretical day after the first day of field trip. However, one day of field trip should anyway precede the second theoretical day.

Day 5
May 26, 2013 (Su) Vienna

Sunday Program

Day 6
May 27, 2013 (Mo) Vienna

- Business to business meeting:
 - Information on the ECOWAS Small Scale Hydro Power Program, ECREEE/UNIDO
 - Presentations of ECOWAS countries on SSHP status and investment opportunities
 - Contact with Austrian technology providers for HPP as e.g. Andritz AG , Voith-Siemens or Kössler.
 - Contact with Austrian project developers and consultants (e.g. IC, Poyry).
 - Contact with financiers in Austria (e.g. Austrian Development Bank, OeKB, ADA, VA Tech Finance, WKO Go International)
 - The companies should present their

view of successful project development and construction of HPP-projects.

- A special focus will be on the experience of Austrian companies with hydro power projects in African and Asian countries.
 - The contacts to Austrian companies shall be used as a base for further development of projects in the home-countries of the participants
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May 28, 2013 to
May 30 2013

Participation in the Vienna Energy Forum

ORGANIZATION

The training is organized by UNIDO in cooperation with ECREEE. An external organizer to conduct the trainings and organize the site visits will be hired by UNIDO.

PARTICIPANTS

Selected technical experts working in the renewable energy sector from the ECOWAS region and other parts of sub-Sahara Africa will participate in the training.

DOCUMENTS

Participants will be provided with the detailed training schedule prior to the meeting. The participants are required to prepare a presentation on the status and perspectives of their small hydro sector in their respective countries. Further instructions will be sent with the invitation letters.

DATE AND VENUE

The training will be held in Vienna, Austria, from 22 to 30 May 2013. At the Vienna International Centre, Wagramer Str. 5, A-1400, Vienna -Austria.

FINANCIAL AND ADMINISTRATIVE ARRANGEMENTS

Financial and administrative arrangements for the sponsored participant will be made in accordance with UNIDO's rules and regulations. UNIDO will provide the participant with the following:

a) Travel

Round trip, economy class air transportation for the most direct and economical route from the closest airport of the participants' hometown and Vienna, in accordance with UNIDO's Financial Regulations.

The procedure is as follows and needs to be strictly adhered to by the participant:

1. UNIDO will make the appropriate travel arrangements for issuance of an electronic ticket by UNIDO's travel agent in Vienna - Carlson Wagonlit, and will communicate the changes to you.

Please note that no tickets should be purchased. The participants shall cover any additional costs incurred upon deviations from the authorized route.

b) Daily Subsistence Allowance (DSA)

A Daily Subsistence Allowance (DSA) at the current United Nations rate for Austria (Vienna and locations of site visits) will be paid, to cover the board & lodging for the period of attendance at the training, number of nights s/he is staying in Vienna based on the air ticket approved by UNIDO's Travel Unit. The total amount of DSA will be paid in USD to the participant. This DSA is expected to cover all accommodation, food, local transport and other expenses of participants.

An additional DSA (1 night) will be paid as UNIDO's contribution toward the expenses incidental to travel abroad, such as expenditure for passport, visa, medical examination, inoculations and other such miscellaneous items, as well as travel to and from the airports.

Participants are requested to leave their home countries in time to arrive in Vienna, Austria, no later than the evening of 21 May 2013, and to depart no later than the evening of 30 May 2013, or as close to that date as airline schedule permits. UNIDO cannot assume financial responsibilities for earlier arrivals / later departures for personal reasons.

UNIDO will not assume responsibility for the following expenditures:

- a) Cost incurred by the participants with respect to travel insurance, accidental insurance, medical bills and hospitalization fees in connection with their attendance of the meeting.
- b) Compensation in the event of death, disability or illness of the participants in connection with their attendance of the meeting.
- c) Loss or damage of personal property of the participants while attending the meeting.

d) Purchase of personal belongings and compensations in the event of damage caused by them by climatic or other conditions;

e) Travel and any other costs incurred by dependents who might accompany the participants.

f) Incidental costs incurred in home country in connection with travel abroad, such as costs of passport, visas, inoculations or travel to and from the airport in the home country.

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 Vienna, Austria. **Participants are asked to contact the nearest Austrian Embassy as soon as possible. The visa process will require at least three weeks.** In the absence of an Austrian Embassy in the home country, participants are advised to contact a partnering EU embassy (if possible). No provision can be made for participants to obtain such visas on arrival at the Vienna Airport.

HOTEL RESERVATION:

The participants will be informed on possible hotel reservations and the agenda activities in due time (Vienna and field trips). The participants will be informed on the Agenda activities in due time (Vienna and field trips).

ENQUIRIES AND CORRESPONDENCE

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

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