Regional Centre for Renewable Energy and Energy Efficiency
Centre Régional pour les Energies Renouvelables et l'Efficacité Energétique
Centro Regional para Energias Renováveis e Eficiência Energética
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2012 INTERNATIONAL YEAR OF SUSTAINABLE ENERGY FOR ALL

The ECOWAS Small-Scale Hydropower Program

First Phase: 2013 to 2018

jointly developed and executed by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) and the United Nations Industrial Development Organization (UNIDO)

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ECOWAS Small-Scale Hydropower Programme
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2 ABBREVIATIONS

ADA	Austrian Development Agency
CDM	Clean Development Mechanism
EBID	ECOWAS Bank for Investment and Development
ECOWAS	Economic Community of West African States
ECREEE	ECOWAS Centre for Renewable Energy and Energy Efficiency
ERERA	ECOWAS Regional Electricity Regulatory Authority
GEF	Global Environment Facility
IC-SHP	International Centre on Small Hydropower, China
IN-SHP	International Network on Small Hydro Power
IPP	Independent Power Producers
MDG	Millennium Development Goals
MoU	Memorandum of Understanding
NFIs	National Focal Institutions
O&M	Operation and Management
OMVG	Organisation pour la Mise en Valeur du Fleuve Gambie
OMVS	Organisation pour la Mise en Valeur du Fleuve Sénégal
PPA	Power Purchase Agreement
SSHP	in the ECOWAS context defined as “small-scale” hydropower, < 30 MW
MSHP	in the ECOWAS context defined as medium-scale hydro power, 30 to 100 MW
AECID	Spanish International Development Agency
UEMOA	West African Economic and Monetary Union
UNIDO	United Nations Industrial Development Organization
URC-SHP	UNIDO Regional Centre for Small Hydropower in Africa (Abuja, Nigeria)
USAID	United States Agency for International Development

3 EXECUTIVE SUMMARY

The ECOWAS 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 program is a **priority action under the regional SE4ALL Framework for West Africa** and will seek synergies to the Strategic Program for West Africa of the Global Environment Facility.

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. These targets translate to the installation of additional 2.425 MW renewable electricity capacity by 2020 and 7.606 MW by 2030. It is estimated that **SSHP could contribute with 787 MW (33%) by 2020 and 2449 MW (32%) by 2030 to this additional capacity**. The SSHP program also contributes to the objectives of the ECOWAS White Paper on Energy Access in Peri-Urban and Rural areas. It is expected that in 2030 **around 25% of the rural population will be served either fully or partly through renewable energy powered mini-grids**. The SSHP program complements the WAPP Master Plan which is mainly focused on the expansion of transmission lines and generation from large hydro power and natural gas.

The ECOWAS SSHP Program aims at **four major outcomes**:

a. Policy and regulatory SSHP frameworks are strengthened
b. Capacities of different SSHP market enablers are strengthened and applied
c. Knowledge management and awareness raising on SSHP is strengthened
d. SSHP investments and businesses are promoted

The program will generate the following **key results** by 2018:

a. By 2018, **at least 35 projects** (new projects or rehabilitations) in different ranges of capacity up to 30 MW are **developed to feasibility stage** and at least **5 are brought to financial closure**. The projects will be identified through annual calls of the ECOWAS Renewable Energy Facility.

b. At **least 5 SSHP projects (< 100 kW) are operating** and - during their planning and implementation - have served as demonstration projects for capacity building.

c. At least **2 refurbishment/rehabilitation projects** (< 200 kW) are identified and realised.

d. At least **10 companies started to provide various SSHP related services** (planning, operation, repair etc.).

e. **Bottlenecks of SSHP project implementation and operation**, of current policies and legal frameworks and roles and shortcomings of relevant stakeholders **are understood** and recommendations for improvement are elaborated and discussed.

f. ECOWAS countries obviously **improved their legal framework** (poverty reduction impact of SSHP in evidence in the legal framework, feed-in tariff defined, transparent licensing procedure etc.) and SSHP has become integral part of ECOWAS/WAPP planning documents.

g. A **capacity development strategy is elaborated** and SSHP initiatives and projects increasingly rely on local expertise from public and private sector (with limited international support).

h. **Quality guidelines are introduced during trainings and are generally applied** for development and implementation of SSHP projects.

i. Facilitate **open knowledge sharing on SSHP aspects** through the ECOWAS Observatory for Renewable Energy and Energy Efficiency (ECOWREX) and the provided tools and contents are utilised.

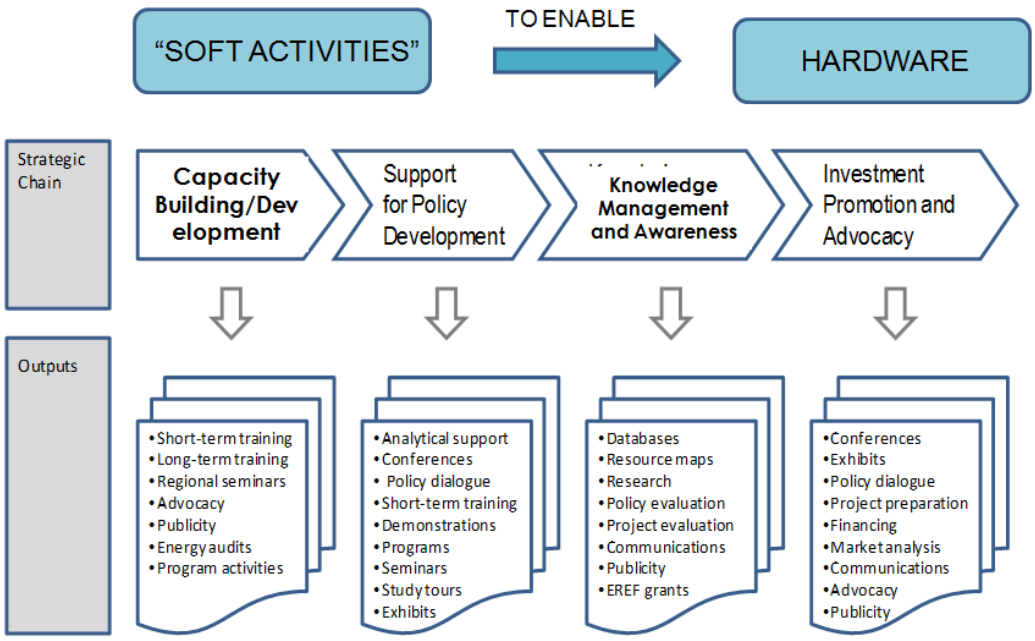
j. An **information base on relevant SSHP resources and sites is created** and helps to facilitate the development and implementation of SHP programmes and projects.

k. A **communication strategy disseminating achieved progress** and raising awareness about SSHP opportunities is developed and implemented.

l. **ECREEE is established as centre of excellence** in the SSHP sector.

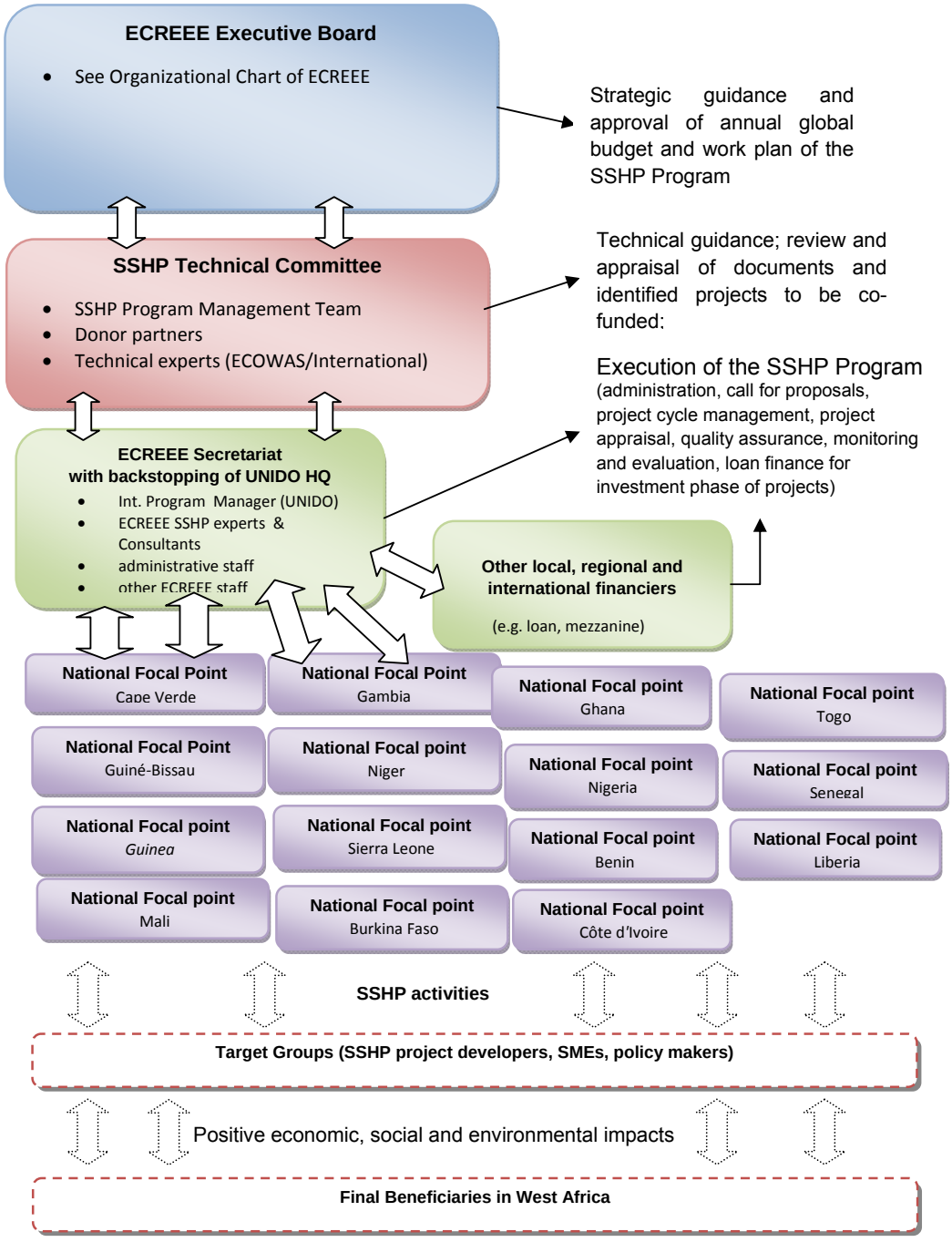
The SSHP Program will be managed by the ECREEE Secretariat in close partnership with the United Nations Industrial Development Organization (UNIDO). UNIDO will create synergies to the SSHP mini-grid projects of the GEF Strategic Program for West Africa (SPWA). Other partners are invited to join. The partners will be responsible for the administration of the program (e.g. project cycle management, appraisal and quality assurance of supported projects, financial accountability). An international program manager oversees the implementation of the program. At least two local SSHP experts and two administrative assistants, will be based at ECREEE Secretariat in Praia, Cape Verde. The program management team will implement the activities according to the project document and annual work plans. To stimulate the market **most of the activities will be executed by private implementers contracted through competitive tenders or call for proposals**.

Figure 1: Outcomes and outputs of the ECOWAS SSHP Program



The SSHP Program **is governed by the ECREEE Executive Board (EB) and a special Technical Committee (TC) formed by local and international SSHP experts**. The bodies will review and approve the annual work plans, budgets progress and financial reports of the program. Moreover, strategic steering and technical assistance for supported projects will be provided. The SSHP program will benefit fully from the established ECREEE network of National Focal Institutions (NFIs) in all ECOWAS countries and the UNIDO Regional Centre for Small Hydropower in Africa (URC-SHP), based in Abuja, Nigeria. **The budget requirement to implement the envisaged first phase of the ECOWAS SSHP Program amounts to around 15,5 million Euro for the period 2013 to 2018.**

Figure 1: Implementation Structure of the SSHP Program



4 INTRODUCTION

The ECOWAS Small-Scale Hydro Power Program is implemented at the background of and in line with the Sustainable Energy for All (SE4ALL) Initiative, launched by the UN Secretary-General. The Secretary-General is urging all stakeholders, including at the highest level and in private and public sectors, academia and civil society to take concrete action and commitments towards three critical objectives – all to be achieved by 2030: (1) ensuring universal access to modern energy services; (2) doubling the share of renewable energy in the global energy mix, and (3) doubling the global rate of improvement in energy efficiency.

At Rio+20, tangible commitments have been mobilized through the Secretary-General's High-level Group on Sustainable Energy for All (SE4All). Rio+20 concluded with more than US$500 billion mobilized with over 700 commitments made, most of them in sustainable energy. **The SSHP Program provides a powerful response to transform the SE4ALL commitments into concrete action in the ECOWAS region.** In close coordination with national and regional partners, the program support governments' efforts to address energy access, security, and sustainability.

The SSHP Program is a product of the **regional workshop on small-scale hydropower which was held from 16th to 20th of April 2012**, **in Monrovia, Liberia**. It was organized by the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) in cooperation with the United Nations Industrial Development Organization (UNIDO), the Energy Sector Management Assistance Programme (ESMAP), and the Government of Liberia. The workshop was supported by the Austrian Development Cooperation (ADC) and the Spanish Agency for International Cooperation (AECID).

The event featured a two-day SSHP capacity building seminar and a three-day technical meeting to report on the progress in the ECOWAS countries and **to validate the draft project document for the ECOWAS-SSHP program**. The project document was prepared by ECREEE in partnership with UNIDO. The workshop was attended by 65 participants from ECOWAS and international levels, including policy makers, utilities, rural electrification agencies, practitioners, as well as financiers, banks and academics. Thirteen ECOWAS Ministries of Energy were represented. Specifically, the regional workshop aimed at the following outcomes:

a. to determine the progress regarding SSHP development in the ECOWAS region and to assess the individual support needs of the fifteen countries.
b. to provide SSHP training to empower the ECOWAS representatives to discuss the SSHP project document on a common knowledge base.
c. to validate the draft ECREEE/UNIDO project document for the ECOWAS Program for Small-Scale Hydropower and to receive valuable comments and inputs from the countries and donor partners. The workshop was an important step to ensure that the Program is demand driven and its content and activities respond to the requirements of the ECOWAS countries.
d. to gather country information on resources, institutional set-ups, capacities and policies for the planned regional SSHP resource assessment/atlas of ECOWAS.
e. to compile an inventory of SSHP investment projects to be presented to financiers and investors.
f. to initiate a regional information network of national SSHP focal points and experts.
g. to create awareness among invited policy makers that SSHP is a tool for poverty reduction and sustainable development in peri-urban and rural areas.
h. to provide training on key aspects of SSHP project development (e.g. project management, planning, design, financing, implementation, maintenance, policy frameworks, sustainability assessment) and
i. to facilitate cross-border exchange of experiences and lessons learned.

The workshop was expected to produce the following results and deliverables:

a. A validated project document for the ECOWAS Scale-Up Program for Small-Scale Hydropower
b. An inventory on SSHP resource data and other information from the countries to be used for the GIS based regional SSHP Resource Assessment/Atlas
c. An inventory of potential beneficiary investment projects to be compiled and discussed with local and international financiers
d. An inventory list of key SSHP experts and businesses in the ECOWAS region
e. An inventory for capacity building needs and relevant institutions in the ECOWAS
f. Contact list of national SSHP focal points and web based information network established

During the workshop the representatives of **the ECOWAS Ministries of Energy expressed their strong support and interest for the proposed regional program**. As follow-up to the workshop a comprehensive SSHP baseline report was prepared and received comments and suggestions were worked into the project document. The regional SSHP Program was **adopted by the ECOWAS Energy Ministers during the ECOWAS High Level Energy Forum** which took place from 29 to 31 October 2012, in Accra, Ghana. The program is a **priority action under the regional SE4ALL Framework for West Africa** and will seek synergies to the Strategic Program for West Africa of the Global Environment Facility (GEF). The SSHP workshop report, the presentations and the baseline report are available at: http://small-hydro.ecreee.org or http://www.ecreee.org.

5 BACKGROUND INFORMATION

5.1 Energy Challenges in the ECOWAS region

A severe energy crisis hampers the social and economic development of the ECOWAS countries. They are facing the 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 problems.

a. In "business as usual" scenarios – without considerable additional investments – **energy poverty** and its consequences for economy and society will continue to be a predominant challenge in the ECOWAS region in 2030. 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. Household 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 urban centres and suburbs. The urban and rural poor in West Africa spend more of their income for poor quality energy services than the better-off for better quality services.

b. The electricity systems in West Africa are facing challenges due to the **growing gap between predicted demand, existing supply capacities and limited capital to invest**. Despite the growing gap and lack of investment capital the energy intensity in the countries remain high and energy is used in an inefficient way 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 West African countries and require a diversification of sources. Over 60% of the community's electricity generation capacity is running on diesel and heavy fuel. In some countries even more than 90% of the electricity generation is satisfied by these sources. As a result, the steadily increasing and fluctuating oil prices have had a devastating effect on the economies in the region.

c. With climate change another concern was added to the heavy energy agenda of the ECOWAS region. West Africa is so far only responsible for 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 at most. 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, droughts) will challenge the energy security of ECOWAS countries and have to be mainstreamed into energy policy planning. This is particularly important with regard to hydro power due to the **possible changes in the rain patterns and river flows**.

5.2 ECOWAS Definition of SSHP

Apart from other low-carbon solutions hydropower is an **appropriate tool to address the challenges of energy security, energy access and climate change mitigation** in the ECOWAS region simultaneously and in a sustainable manner. Hydropower of all sizes can contribute significantly to meet the electricity needs of urban and peri-urban areas as well as isolated rural areas. It can be fed into the main grids or as off-grid systems supply one or several villages including productive uses in remote areas. The different sizes of hydro power in the ECOWAS region are defined as follows:

Table 1: ECOWAS Hydro Power Definitions

Terms		Power output
Pico hydropower	**"Small-scale" Hydro-power "SSHP"**	*< 5 kW*
Micro hydropower		*5 - 100 kW*
Mini hydropower (MHP)		*100 – 1 000 kW (=1 MW)*
Small hydropower (normally "SHP")		*1 MW - 30 MW (!)*
Medium hydropower		*30 MW - 100 MW*
Large hydropower "LHP"		*> 100 MW*

Usually the upper limit of "small hydro" is defined at 10 MW. The present Program explicitly applies an upper limit of **about 30 MW**, because it intends to include all "**SSHP projects in the region which require assistance**". Many potential sites in West Africa of more than 10 MW are not developed because of various reasons (e.g. lacking access to finance) and consequently need assistance. Due to economies of scale, **large hydropower projects are often anyway profitable** and can thus easily attract private investment capital. Smaller hydropower projects (without reservoir) have the advantage to normally result in significantly less negative environmental and social impacts but on the other hand, require more promotion and support in order to overcome disadvantages like higher specific investment cost. Hence, the "Small-scale" Hydropower Programme primarily but not exclusively focuses on projects with capacities of less than about 30 MW. However, if required also support to medium-scale projects (MSHP) up to 100 MW will be included. While talking about "small-scale hydropower" and setting a limit of 30 MW, it has to be taken into account that this wide range covers very different types of systems:

- **"Purely" grid connected systems** (normally in the range **> about 100 kW** and more **often in the MW-range**) which feed all produced electricity in a larger (national) grid, normally based on a power purchase agreement which guarantees that all produced electricity can be sold at a well-defined feed-in tariff. This fact which leads to a high load factors generally allows operating such plants in a profitable way. Nevertheless, given political, technical and other risks, such projects still often do not get access to finance (loan and equity) and therefore need support for their successful implementation. Since such plants normally feed electricity into the existing national grid, they mainly improve electricity supply of households who are already connected. Except in cases where the national grid is really extended to new customers due to the increased generation capacity. However, this is often not self-evident.

- **"Isolated" SSHP systems** which **only feed a surplus to the national grid.** Normally this case happens if an originally isolated SSHP system which supplied a number of households connected to an isolated grid, later on is connected to the national grid in order to feed in the part of electricity which is NOT consumed locally. Or, the owner of the system agreed from the very beginning to supply the rural households in the surroundings FIRST before selling any surplus. Whether this works or not depends on the tariff level paid by the local households compared to the feed-in tariff. A very special but **extremely efficient form when considering poverty alleviation is a community owned grid-connected system** where the profit gained from the feeding in of electricity flows back to the community.

- **(Really) isolated systems (often in the range < 100 kW)** which supply an isolated mini-grid with electricity. Such systems often suffer from a relatively low load factor since the rural households mainly consume electricity during evening hours. Consequently, as measured by the high investment cost such isolated plants do not pay back the investment in an "attractive" time-span, if at all. The load factor can be significantly improved if productive use of electricity of

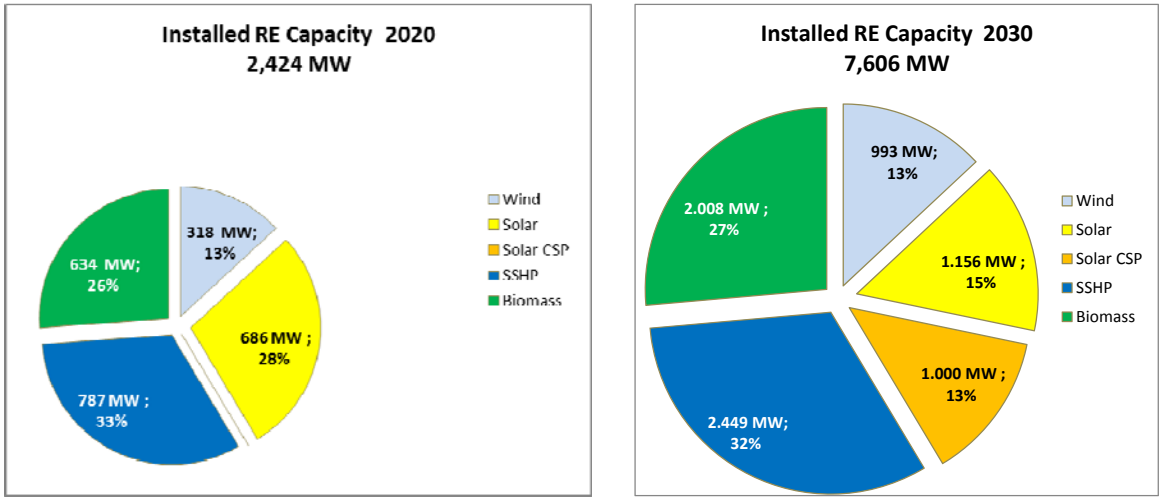
small-scale industries etc. is possible. Given the fact that such systems are built to **supply additional (rural) households** and probably also **small and medium industries** making them (both) independent from often exorbitant high fuel costs for diesel gensets, such systems normally have a significant impact on poverty alleviation.

5.3 Perspectives for SSHP development

In previous decades the **utilities in ECOWAS were mainly focused on large hydropower** rather than small or medium scale hydro power development. Therefore, the capacities in these sectors are unequally developed. The project pipeline of the WAPP Master Plan focuses exclusively on the more competitive large hydro power and SSHP is not included in the scenario projections. The WAPP intends to implement a project pipeline of **21 large hydro power projects with an overall capacity of 7 GW by 2020**. Also on national levels, countries such as Ghana or Guinea concentrated more on the development of larger sites. International financiers (e.g. development banks, trust funds) are targeting mainly large scale projects. Their required minimum level of investment excludes in many cases SSHP projects**. SSHP got more attention in the context of the endeavour to boost universal access to energy services in peri-urban and rural areas.** The ECOWAS White Paper on energy access in peri-urban and rural areas and the ECOWAS Renewable Energy Policy (EREP) include the use of grid-connected and decentralized renewable energy solutions into their scenarios. Specifically, the ECOWAS Renewable Energy Policy aims at the following objectives:

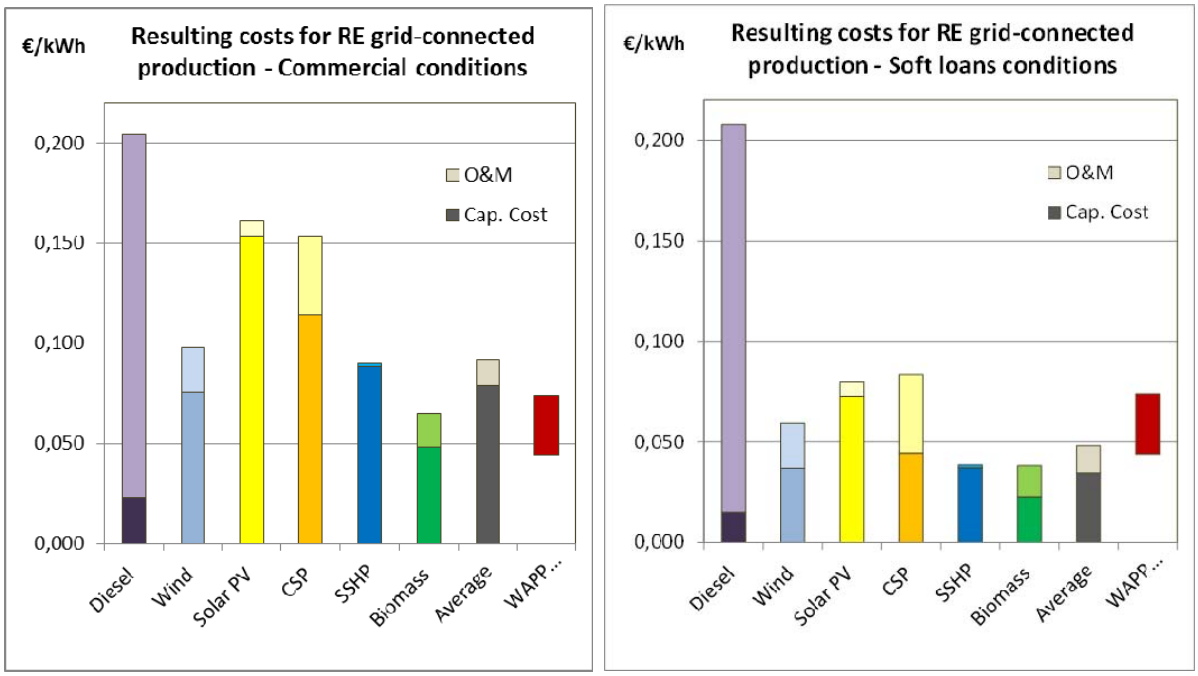
- The share of renewable energy (incl. large hydro) in the overall electricity mix of the ECOWAS region will increase to 35% in 2020 and 48% by 2030.
- The share of "new renewable energy" such as wind, solar, small scale hydro and bioelectricity (excl. large hydro) will increase to around 10% in 2020 and 19% by 2030. These targets translate to an additional 2.425 MW renewable electricity capacity by 2020 and 7.606 MW by 2030. It is estimated that SSHP could contribute with 787 MW (33%) by 2020 and 2449 MW (32%) by 2030 to this additional capacity.
- To provide universal access to energy services it is envisaged that around 75% of the rural population will be served through grid extensions and around 25% by renewable energy powered by mini-grids and stand-alone hybrid systems by 2030.
- By 2020, the whole ECOWAS population will have access to improved cooking facilities either through improved stoves or fuel switching to other modern forms of energy such as LPG.
- By 2030, around 50% of all health centers, 25% of all hotels and agro-food industries with hot water requirements will be equipped with solar thermal systems.

Figure 2: SSHP and the grid-connected ECOWAS Renewable Energy Policy targets



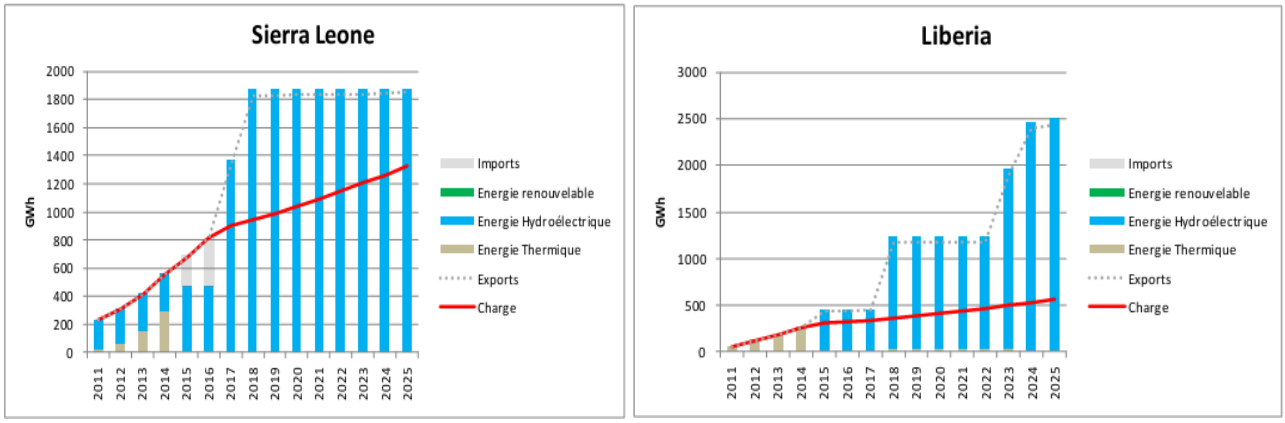
A **least costs assessment** undertaken for the EREP Scenario has **demonstrated that SSHP continues to stay one of the most cost-effective renewable energy solutions**. Moreover, the technology is proven, reliable and is able to provide base load capacities under certain circumstances. SSHP can play a significant role particularly in countries depending on expensive diesel generation. It can increase the national energy security of countries and complement imports through the regional WAPP power market under establishment. Under soft loan ODA financing conditions (long repayment periods 25 to 40 years, low interest rates of typically 1.5 to 2% and 5 to 10 years grace period), SSHP tends to be even more competitive than electricity imported through the WAPP system.

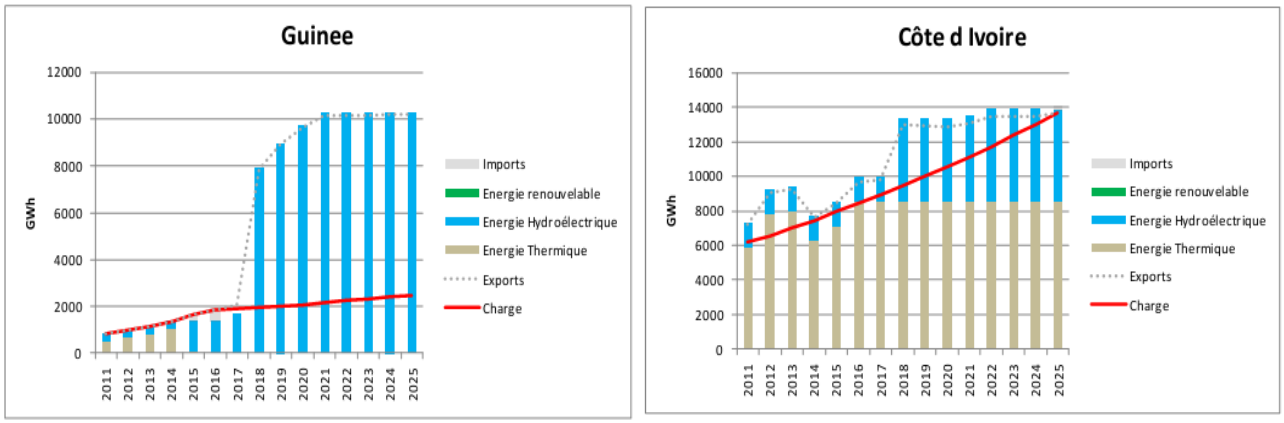
Figure 3: LCOE for different renewable energy technologies in 2020 under different financing conditions



Some of the ECOWAS countries, such as Liberia and Sierra Leone, have the potential to become electricity exporter through further development of their medium and small scale hydropower resources.

Figure 4: Possible hydro power exporters in the ECOWAS region in 2025





SSHP can play an important role to achieve the energy access targets in remote areas. The EREP aims at serving 25% of the rural population by decentralised renewable energy solutions in 2030 (mini-grids and stand-alone systems). The policy foresees the installation of 60,000 mini-grid systems by 2020 and 68,000 from 2020 to 2030. Parts of the mini-grids could be powered by SSHP systems in a cost-effective manner (compared to diesel generators and other renewable options).

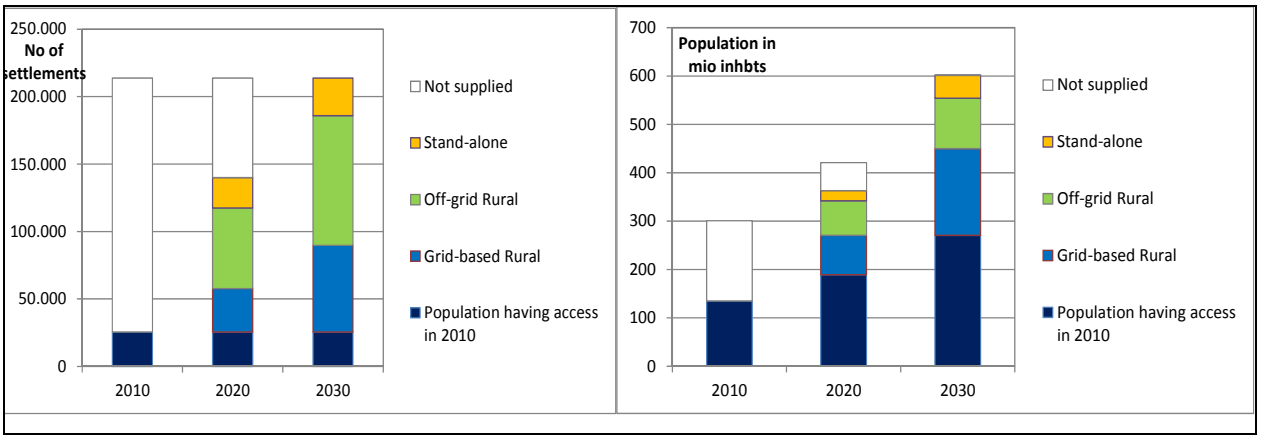


Figure 5 : Scenario for centralized and decentralized electricity supply in the ECOWAS region

5.4 National and Regional Institutional Framework

In most ECOWAS countries the mandate and institutional framework for SSHP is not very well defined. Many problems arouse due to overlapping mandates and conflicting responsibilities of different Ministries and other stakeholder (see country presentations and reports). At regional levels the mandate of the West African Power Pool (WAPP) covers the development of large hydro power resources (>100 MW) in the context of regional power trade. During the previous years, two regional institutions were created which incorporate at least partially the area of SSHP in their mandates:

- In 2006 the UNIDO Centre for Small Hydropower Development in Abuja, Nigeria, was launched.
- In 2010 the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) was created by the ECOWAS Commission with support of the Austrian and Spanish Governments and technical support of UNIDO.

ECREEE in cooperation with UNIDO is expected to take the lead for the implementation of the ECOWAS SSHP Program. The UNIDO Centre for SSHP, located in Abuja, is currently in a

transformation process to a private hydro service provider which could provide technical assistance for the implementation of the SSHP Program. With regard to the SSHP potential assessment it is planned to cooperate with ESMAP.

5.5 Barriers for SSHP development in the ECOWAS region

So far the **ECOWAS countries do not take full advantage of their technically and economically feasible hydro potential**. This is particularly true in the case of small-scale hydropower. 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 in the ECOWAS region 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 ask for 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. Technical risks are also the 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 to access 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 posses only minimal capacity to design, implement and revise SSHP supportive policies and regulations. At 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.

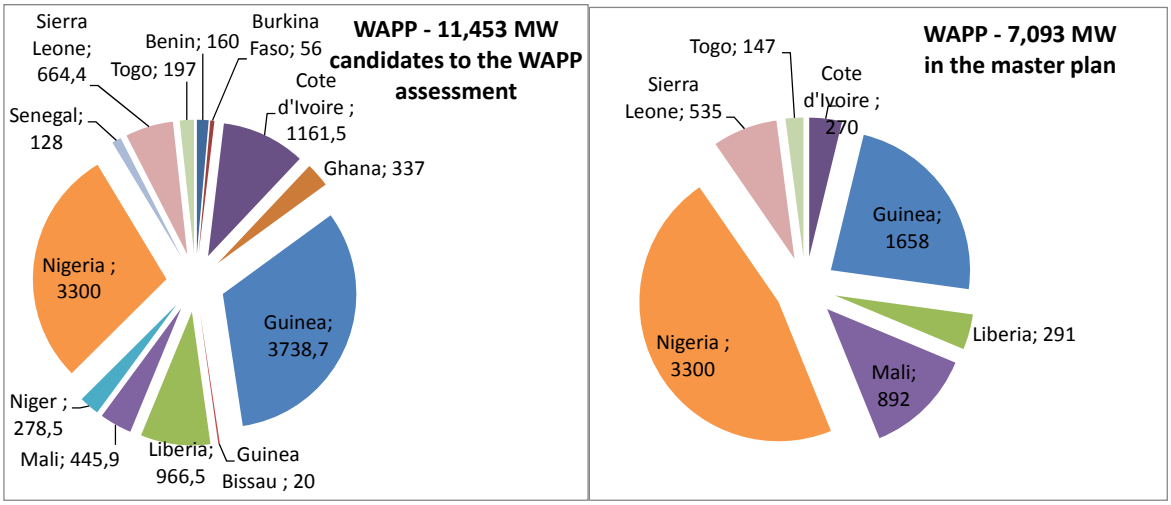
5.6 SSHP Potentials in the ECOWAS countries

Apart from significant fossil fuel resources (e.g. oil and gas) the ECOWAS countries can rely on a wide range of untapped renewable energy and energy efficiency potentials in various sectors:

- There is also a **good potential for all forms of bioenergy** in the ECOWAS region. Traditional biomass is already the main source of energy for the poor majority and accounts for 80% of total energy consumed for domestic purposes.
- There are also **considerable wind, tidal, ocean thermal and wave energy resources** available in some ECOWAS countries.
- The region has **vast solar energy potential** with very high radiation averages of 5 to 6 kWh/m2 throughout the year.
- There is **significant potential to improve demand side and supply side energy efficiency** in various sectors (e.g. appliances, buildings, industry and power generation and transmission). In the power sector the technical and commercial energy losses (e.g. theft, illegal operators) lie in the range of 20 to 40% (in comparison to 7% to 10% in Northern America and Western Europe). It is estimated that in West Africa around 30% of the total electricity supply is consumed in the building sector.

The **overall hydroelectric potential** (small, medium and large scale) located in the fifteen ECOWAS countries is estimated at around 25,000 MW. It is estimated that only around 16% has been exploited. Around **half of the existing large potential (around 11,5 GW) has been assessed technically and economically** in the course of the elaboration of the 2011 Master Plan of the West African Power Pool (WAPP). Finally, a project pipeline of 21 large hydro power projects with an overall capacity of 7 GW has been approved for execution by the WAPP. It is projected that **large hydropower will satisfy 25% of the overall installed electric capacity in the ECOWAS region by 2025 and 29% by 2030**. The implementation of the WAPP project pipeline and attached transmission lines will allow regional power trade and will lower the generation costs and consumer tariffs particularly in countries highly dependent on expensive diesel generation today.

Figure 6: WAPP Large Hydropower Project Pipeline



The estimations for the SSHP potential (up to 30 MW) in the ECOWAS region differ widely and lack of reliability. They range from 1.900 MW to 5.700 MW of feasible potential. The lower end was estimated by taking into account the provided site data by the ECOWAS countries to the ECREEE inventory during the workshop. The following table gives an overview on the "small-scale" (≤ 30 MW) and the overall hydropower potential in the ECOWAS countries. For the range ≤ 30 MW only those sites are counted which were found to be listed in the various studies and country reports.

	sites <= 30 MW	
	no of sites	capacity [MW]
Togo	39	206
Benin	99	305
Burkina Faso	< 70	52-138
Niger	4	5
Mali	16	117
Nigeria	97	414
Ghana	85	110
Sierra Leone	17	330
Gambia	?	?
Côte d'Ivoire	5	59
Guinea Bissau	2-4	about 48
Guinea	18	107
Senegal	-	-
Liberia	30	86
TOTAL	**483**	**1'882**

Table 2 : potential of SSHP sites in the ECOWAS countries

Due to the **lack of available hydrological data** in the countries it remains difficult to give a comprehensive updated overview. In many countries the inventories established some decades ago have never been updated and gauging stations do not exist anymore. Many resource assessments have been carried out during the 70ies, 80ies and 90ies by foreign consultants (e.g. EDF for the French speaking countries) and the regional expertise in hydro resources assessment is poor, if any.

Many ECOWAS countries dispose of a reasonable SSHP potential which is used to an extremely limited extent. The SSHP Programme should focus on concrete measures to make use of this widely untapped resource for rural electrification with the final objective of poverty alleviation. To achieve this, any activity should be appraised against its contribution to a local added value: to increase local competences and capacities, to electrification of additional rural households and small industries, to the possibility of planning, implementation and operation of SSHP by local experts etc. In the following chapters, the specific situation of each ECOWAS country with regard to SSHP is described more in detail.

5.7 Lessons learned

The following conclusions and lessons learned were drawn from the discussion in the validation workshop, held from 16 to 20 April 2012 in Monrovia, Liberia, and the SSHP baseline report. The were incorporated into the design of the program.

1. Successful SSHP development requires a reliable water source. In order to start SSHP development at the most promising sites (with year round reliable runoff), a good hydrological

database is required. For this purpose, a **sufficient number of well-trained "hydro scouts" with good measuring equipment and know how on data processing and evaluation** should be prepared to be "on duty" as soon as possible. The analysis of the various documents and discussions during the SSHP workshop in Monrovia, have clearly shown that many identified sites will have to be reassessed. For this purpose a comprehensive field survey campaign for data collection combined with intensive capacity building (hands-on training on how to measure runoff and head) will be required.

2. Awareness creation on **catchment area protection** is a crucial issue to avoid further deterioration of runoff patterns and desertification.
3. Access to finance is often considered as a shortfall for planning and implementation of hydropower systems. However, access to loan and equity as well as access to grants requires **convincing project proposals presenting the crucial, concisely formulated project information**. Many project descriptions analysed for the current report are lacking very important information. A standard for site assessment / pre-feasibility but also for feasibility studies should be set (depending on the order of magnitude of the project) and explained and distributed during training sessions.
4. Except Nigeria and to some extent Ghana, most of the studies which are available had been elaborated by international organisations / companies. Similarly, most of the existing hydropower plants have been implemented by foreign companies. This **lack of indigenous planning and implementation capacity** is one of the main barriers for SSHP development in the ECOWAS region and has to be addressed by the Programme. The best way to convey knowledge on planning, implementation and operation of SSHP systems is the **common realisation of some pilot plants** facilitating real **"object-teaching"**.
5. The analysis has shown that many hydropower plants are in bad repair and need rehabilitation. **For sustainable operation, capacity building on technical and management issues** is of highest importance and should be part of the SSHP Programme. Another problem is the provision of spare parts and access to professional repair services. A **regional network of professional workshops** well trained e.g. on turbine production, repair and spare part production should be established by **training staff of existing mechanical workshops**.
6. Trainings and capacity building should be linked to the development of **appropriate guidelines and manuals**, fitting to the local conditions and the level of understanding of the respective target groups (which most probably varies from country to country).
7. A **capacity needs assessment**, implemented on behalf of ECREEE in 2012 revealed that in many countries, educational institutions already included renewables in their curricula. It was stressed by many interviewed stakeholders that any kind of trainings, workshops etc. should **integrate especially vocational schools** in the ECOWAS countries and that the principle of **"training of trainers"** should be followed. With regard to capacity building, the UNIDO Regional Centre for SHP in Abuja and other national training centres (e.g. KNUST, 2ie) could play an important role. The URC-SHP could work as service provider closely with ECREEE in this context.
8. Given the prevalent lack of know-how and experience on SSHP, it is important to set **realistic targets** for the SSHP Programme. With regard to competences on **technical planning and implementation**, capacity building should be limited to systems **below about 500 kW** and should make a clear difference between isolated and grid connected plants (since the two require relatively different technical standards). As far as capacity building on **legal and regulatory aspects** like requirements for concessions, contracts and PPA-formulation are concerned the capacity building should also cover SSHP systems in the range beyond 500 kW **up to about 30 MW**.
9. It is imperative that for any activities under the SHPP Programme the **linguistic barriers** have to be taken into account.
10. **Exchange of experience** between ECOWAS countries shall be a clear added value of the "regional approach". Although a specific country might not have the critical number of hydropower systems which justifies the starting up of a turbine workshop, this country could benefit from the availability of competences in neighbouring ECOWAS countries. The SHPP Programme should facilitate the exchange of experience not only on **technical, legal and policy issues** but also on **failure and success of different management systems** (e.g. village community cooperatives in

Burkina Faso). The specialised agencies for rural electrification which already exist in several countries (AMADER / Mali, ABERME / Benin etc.) could become focal points for exchange of information. In several cases, hydropower systems failed due to political difficulties on national level. In such situations, decentralised operation and management of SSHP systems by local staff is the more “robust” solution because it guarantees a certain independence.

11. In most of the countries the energy sector is already liberalised but the lack of **clear responsibilities, a strong regulatory agency and streamlined procedures for SSHP development** are still not fully established. Especially, the definition of capacity limits below which **simplified procedures** can be applied is crucial for the development of very small isolated systems. The legal and regulatory framework has to be suitable for SSHP development in different orders of magnitude.
12. The analysis has shown that the **frame conditions are very different in the various ECOWAS countries** (identification of sites, experience with hydropower, average level of education, legal and regulatory conditions, development of the private sector, access to finance, etc.). All activities planned in the context of the SSHP Programme should take these differences as far as possible into account.
13. Although in some countries the legal and regulatory framework is (theoretically) already well established, the political will to enforce its implementation is still lacking. Therefore, **awareness raising on different political levels** is an important activity to be included.
14. Especially for **isolated SSHP systems** which normally have a relatively low load factor and are consequently NOT profitable, full **subsidisation of investment cost** is indispensible. As a general rule the tariff system applied (in isolated systems) should at least cover the operation and management cost (O&M). Even if investment is subsidised, O&M should NOT be subsidised in order to allow for a sustainable and independent operation. The SSHP Programme should take such subsidisation of investment cost into account.
15. The **ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) in partnership with UNIDO can play a key role in the implementation of the ECOWAS SSHP Program.** The small hydro activities of UNIDO implemented under the GEF Strategic Programme for West Africa (SPWA) create an enabling environment (e.g. Nigeria, Sierra Leone, Liberia, Guinea).

6 THE ECOWAS SSHP PROGRAM

The Small-Scale Hydropower Program establishes an operational framework to guide ECREEE's and UNIDO's work in the field of SSHP in West Africa between 2013 and 2018. It provides an overview of planned activities within the next five years and is meant to be subject to refinement throughout the process. **Many of the activities mentioned in this program influence and affect each other.** Such activities are therefore expected to be adjusted according to the respective findings in order to supplement each other in the most effective way. **The specific objectives of the small-scale hydropower programme are aligned to ECREEEs priority areas of intervention.**

This program is expected to be complemented by yearly work plans, describing immediately upcoming actions including deadlines and clearly assigning tasks and responsibilities within ECREEE. **The steering of the program will be provided by the Executive Board of ECREEE and a specialised Technical Committee of international and local SSHP experts.** The program will be coordinated and implemented in close cooperation with ECREEE's regional partners, whereby the so-called National Focal Institutions (NFI) shall play an important coordinating role. North-south and south-south knowledge and technology transfer will be promoted.

6.1 Overall Objective

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.** In 2018, small-scale hydropower will be well integrated in the overall electricity mix and aligned with country strategies. Based on careful assessments of all renewable energy options, this program will lead to small-scale hydropower installations in cases where they prove to be the technically, economically, environmentally and socially best choice. ECREEE will be established as centre of excellence in the field of small-scale hydropower policies and strategies.

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. These targets translate to the installation of additional 2.425 MW renewable electricity capacity by 2020 and 7.606 MW by 2030. It is estimated that **SSHP could contribute with 787 MW (33%) by 2020 and 2449 MW (32%) by 2030 to this additional capacity**. The SSHP program also contributes to the objectives of the ECOWAS White Paper on Energy Access in Peri-Urban and Rural areas. In 2030 **around 25% of the rural population is expected to be served either fully or partly through renewable energy powered mini-grids**. The SSHP program complements the WAPP Master Plan which is mainly focused on the expansion of transmission line and generation from large hydro power and natural gas.

6.2 Specific Objectives (Outcomes)

The ECOWAS SSHP Program aims at the following outcomes:

a. Policy and regulatory SSHP frameworks are strengthened
b. Capacities of different SSHP market enablers are strengthened and applied
c. Knowledge management and awareness raising on SSHP is strengthened
d. SSHP investments and businesses are promoted

Specific objective 1: Policy and Legal Framework

- To strengthen national and regional policy[1], regulatory, legal and institutional framework in support of the development of markets by ensuring adequate coverage of SSHP, complementary to other renewable energy options.

Specific objective 2: Capacity Development and Quality Assurance

This specific objective will have different foci depending on the respective range of capacity as presented in particularly in the areas of capacity development:

Table 3

	up to a capacity of max. about 500 kW	**for the range of about 500 kW to 30 MW**
Specific objective 1:	Contribute to conducive policy and legal framework	
Specific objective 2:	Capacity development and quality assurance with strong focus on: • Resource assessment • planning and design • manufacturing of equipment • implementation • management, operation and maintenance & safety and protection but also covering financing, policy and other aspects	Capacity development and quality insurance with main focus on: • resource assessment • financing and policy aspects
Specific objective 3:	Awareness Raising and Knowledge Management	
Specific objective 4:	Investment and business promotion activities	

- The general approach is to build human, institutional and corporate capacities at regional, national and local level to foster the development and implementation of SSHP projects in the region. Relevant stakeholders will include, but not be limited to
  - Policy makers and Government institutions
  - Utilities
  - Academia
  - Financial institutions
  - Project developers (NGOs, national/international organisations, community organisations, private individuals etc.)
  - Private Sector companies (equipment producers, consultants, construction companies etc.)
  - Hydropower plant operators

[1] To adopt the regional RE policy document of ECOWAS accordingly

- Capacity building will be linked to the introduction of guidelines and standards in order to ensure adequate quality of SSHP initiatives

Activities related to capacity building and quality assurance will be developed in cooperation with the URC-SHP as well as other local and international partners and will be integrated into ECREEE's capacity building program (currently under elaboration). Objective 2 will profit from the knowledge management activities described under objective 3, and vice-versa.

Specific objective 3: Knowledge Management and Awareness Raising

The specific objectives in the field of knowledge management and communication are:

- To ensure a vivid regional exchange of knowledge on best practices and worst case examples
- To help create knowledge to facilitate the development, implementation and sustainable operation and management of SSHP projects
- To communicate progress made in scaling up access to energy services and raise awareness about the opportunities for and benefits of SSHP developments.

Knowledge management can be defined as the systematic processes, or range of practices, used by organizations to identify, capture, store, create, update, represent, and distribute knowledge for use, awareness and learning across the organization (Larrabure 2007). Based on this broad definition, Objective 3 constitutes a major component of ECREEE's SSHP Program, as it either builds the basis for or supports all other objectives and their activities.

Specific objective 4: Investment and business promotion activities

- To facilitate the wide dissemination of SHP technologies and services through the identification of funding opportunities and support in programme and project preparation for funding.
- To prioritise the development and implementation of SSHP programmes and projects, which have a role model character with regard to:
  - Integration of capacity building and training (during planning and implementation)
  - Strong impact on rural electrification
  - Integration of productive uses
  - Promising ownership, management and operation models
  - Flagship projects paving the way to feed-in rules and regulations
  - Other strategically important or "pioneering" projects

Being well aware of the fact that **different ranges of system sizes in the field SSHP require extremely different assistance** with regard to technical, financing, policy and other aspects. Therefore the program foresees different interventions tailored to the needs of the different sizes of the systems particularly in the areas of capacity development:

Table 3 – Specific objectives of the SHP Programme

	up to a capacity of max. about 500 kW	**for the range of about 500 kW to 30 MW**
Specific objective 1:	Contribute to conducive policy and legal framework	
Specific objective 2:	Capacity development and quality assurance with strong focus on: • Resource assessment • planning and design • manufacturing of equipment • implementation • management, operation and maintenance & safety and protection but also covering financing, policy and other aspects	Capacity development and quality insurance with main focus on: • resource assessment • financing and policy aspects
Specific objective 3:	Awareness Raising and Knowledge Management	
Specific objective 4:	Investment and business promotion activities	

The boundary between the two ranges of intervention as presented in the table is not absolutely strict and can slightly vary depending on the specific requirements. **To build up local capacity for planning, implementation, equipment manufacturing etc. in the range above the limit of about 500 kW is considered to be not realistic.** Planning and implementation of such complex systems will in the medium term still depend on foreign technical assistance. Given the fact that such projects (nevertheless) significantly contribute to improve electricity supply and to reduce CO_2 mitigation the SHP Programme aims at facilitating the accelerated implementation of such systems, mainly via support to the assessment of hydropower resources (e.g. collection of hydrological data), facilitation of financing and a reasonable policy framework. On the other hand, **comprehensive capacity building for micro and mini hydropower technology, meaning in the lower kW range is realistic** and is of highest priority in order to significantly increase the local added value and long-term sustainability of the systems (better operation and management, availability of spare parts etc.).

6.3 Beneficiaries of the Program

The direct (target) beneficiaries of the program include all main SSHP players in the ECOWAS region. More specifically, the following stakeholders will benefit:

- Policy makers, institutions, and utilities will have a better capacity to develop and implement policies and strategies that are conducive to the deployment of SSHP in the ECOWAS region.
- Project developers will be better equipped to successfully design and identify funding for SSHP initiatives. They will further benefit from clear policy, institutional, legal and regulatory frameworks, and the general increased support to SSHP initiatives.
- The private sector such as consultants, planners, equipment manufacturers and other interested organisations like NGOs etc. will profit from targeted capacity building and knowledge sharing initiatives to successfully assess hydropower potential, plan, design, implement, operate and manage SSHP systems.
- Financing institutions will have better capacity to assess the viability of SSHP projects (due diligence, risk assessment).

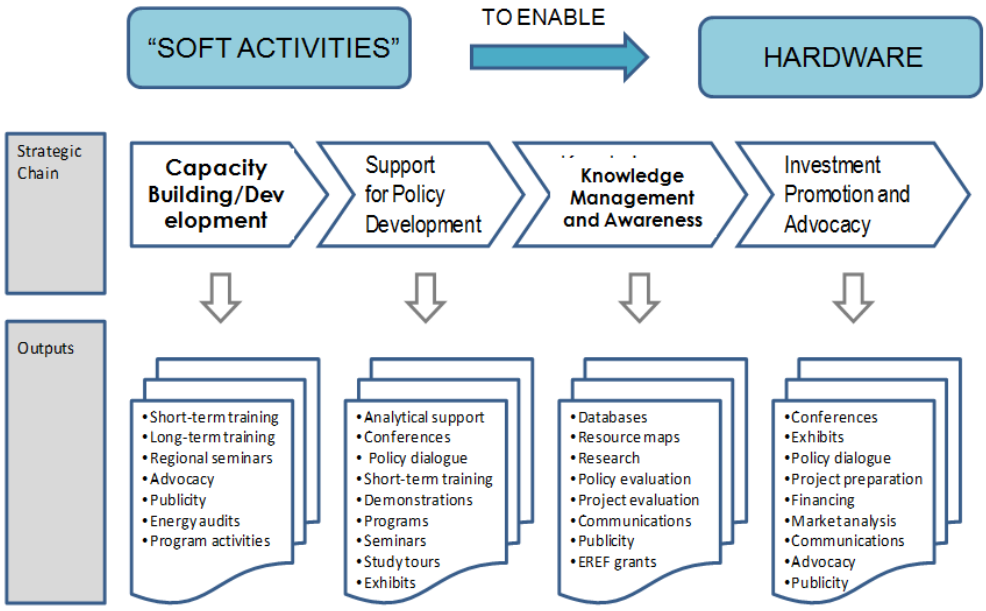
- The region in general will profit from having a core of experts trained in developing and financing national and regional SSHP programmes and projects. This will include NFIs.
- All stakeholders, in general, will benefit from having easy access to information and tools on SSHP, including policies, guidelines, and databases of experts.

The **final beneficiaries** are the energy end-users particularly in peri-urban and rural areas benefiting from modern, reliable and affordable energy services and finally also the global community through the reduction of GHG emissions.

6.4 Outputs and Activities

The following section provides an **overview of planned outputs and activities within the next five years** and is meant to be subject to refinement throughout the process. The partners of the program will **agree on the concrete activities on the basis of annual work plans** which are subject to approval by the relevant bodies of the ECREEE SSHP Program (see chapter on governance structure). Many of the mentioned activities influence and affect each other. Such activities are expected to be adjusted according to the respective findings in order to supplement each other in the most effective way.

Figure 7: Specific Objectives of the ECOWAS SSHP Program



SPECIFIC OBJECTIVE 1 – Conducive policies and legal frameworks are elaborated for the various countries and their adoption is supported

Output 1a: bottlenecks of SSHP project implementation and operation, of current policies and legal frameworks and roles and shortcomings of relevant stakeholders are understood and recommendations for improvement are elaborated and discussed

Activity 1.1 – Identification of three successful and three failed SSHP projects, analyses of lessons learned and success factors and publication of the results

- Identify projects - preferably in different ranges of capacity: micro, mini, small hydro and isolated as well as grid-connected systems - which could serve as case studies to analyse barriers and opportunities.
- Assess at least one successful and one unsuccessful SHP project in each of three ECOWAS countries. Identify the main technical, financial, economic and operational characteristics of the projects; deficiencies in design and electro-technical equipment (e.g. turbine, generator and transformer); the framework the projects operate in, including tariff regimes and operating arrangements, provision of capacity building for qualified O&M; ownership structure; the involved stakeholders and their role; and the impact of the project, including types of beneficiaries (during planning, implementation and operation), customers' ability to pay, number of electrified households and productive uses of electricity.
- While taking into account the range of capacity and the type of project (isolated or grid-connected), analyse the reasons for their success or failure, the applied approval procedure and quality assurance and the compliance of the implemented project with the approved design.
- Draw lessons for improving the widespread deployment of SHP developments, their implementation in general and the approval procedure in particular. Analyse the question of legal ownership of the SHP system and the impact on failure / success of management. Assess as well the impact of such projects on development and productive uses and the ability of consumers to pay for energy services (including appliances).
- Elaborate on background paper based on findings of the above described analysis. Compile all findings in a study and publish it on the ECREEE website.

Activity 1.2 – In all ECOWAS countries with significant SSHP potential: assessment of SSHP relevant policies, legal frameworks, main stakeholders, their roles/ and responsibilities, analysis of ownership issues, potential poverty reduction impact of SSHP projects and elaboration of country-specific recommendations

- Assess existing country policies and strategies which affect SHP developments and their impact on poverty reduction. Compare the policies with successful models in other countries[2]. Analyse in how far the locally available hydropower resources can contribute to the benefit of the area / region (e.g. through a licensing procedure or royalty payment which guarantees monetary benefit or other added-value in the area, monetary shareholding models for local communities, "split PPA" which guarantees that grid-connected SSHP systems supply the area with affordable electricity etc.). This assessment is considered to be of great importance as it leads the way to ECREEE's future initiatives in this regard and will also be useful to related initiatives by other actors within the region. It is therefore essential that this activity attracts sufficient priority and resources.
- Assess existing institutional, legal and regulatory frameworks in different ECOWAS countries, analyse their strengths and weakness and provide recommendations. Part of this

[2] An excellent example is the "Swiss Model" where the cantons as conferrer of concessions were in a very favourable position and understood to take advantage of their power for the wealth of the communities. The legal and political frame conditions must give the rights of disposal on natural resources, like hydropower, to a legal body which safeguards and attends to the general public's interest and has the capacity to **capitalise on these rights** for the wellbeing of the population

analysis should be the question of "ownership of the hydropower resource" and ownership of a publicly subsidised SSHP system (e.g. if it is financed by grant).

- Identify a menu of elements of successful policy, institutional, legal and regulatory frameworks to support renewable energy in general and SSHP in particular in a way which facilitates maximum benefit for the local population.
- Formulate recommendations for the improvement of policies, legal and institutional framework for each country
- Summarise findings in form of a report, potentially combined with case studies and specific findings of detailed capacity assessment (refer to Activity 2.1 – Detailed capacity assessment).

Activity 1.3 – Presentation and discussion of the results of the case study analysis, of the legal and policy assessment and the recommendations in an ECOWAS-wide workshop and lobbying for adoption of recommendations

- Organise an ECOWAS-wide workshop in order to present the results of the analysis of case studies, of the country-specific analysis of policies and legal framework and the respective recommendations
- Discuss the recommendations and lobby for improvements of policy and legal framework
- Draw conclusions and formulate follow-up activities

Activity 1.4 – Publication on the analysis and the final conclusions

- Elaborate a publication on the case study analysis, on the assessment of the various country frameworks and the final conclusions drawn from workshop discussions
- Identify fora to officially launch this publication and ensure high visibility from outside the ECOWAS region.

Output 1b: Adoption of policies and legal frameworks with regard to SSHP-conduciveness is supported and SSHP has become integral part of ECOWAS/WAPP planning documents

Activity 1.5 – Lobbying for adoption of recommendations, integration into legal frameworks and policies of the respective countries and consideration of investment subsidies

- Lobby for the integration of recommendations into the existing country frameworks: e.g. definition of minimum renewable energy (including SSHP) penetration quotas into country policies, strategies (including poverty reduction strategy papers) and into the legal and regulatory framework and all this with regard to the requirements of different capacity ranges i.e. micro, mini, small hydropower and of isolated and grid-connected SHP plants.
- Lobby for the introduction of appropriate incentives for micro, mini and small hydropower development, like exemption from taxes and duties, granting of subsidies (especially isolated systems in the range of micro and mini hydro which in general are not profitable), support for approval procedures (e.g. one-stop-shop for licences, permits etc., clear responsibilities of ministries and regulatory agencies).
- Foster harmonisation of policy frameworks between ECOWAS countries to enhance cooperation and integration and promote regional exchange (consulting and construction services, trade with equipment etc.). This will be a continuing process.

Activity 1.6 – Organise a workshop for discussion and lobbying

- Invite relevant stakeholders to a workshop in order to discuss and lobby adoptions required for SSHP-conducive frameworks
- Remain up to date on changes in policies and strategies and assess their implications.

Activity 1.7 – Concrete country-specific assistance to implement the recommendations

- Give additional country-specific support for the concrete implementation of recommendations (e.g. improvement of licensing procedures, options for incentive schemes)
- Provide "good practice" examples, templates for PPA's, technical guidelines for feed-in standards etc. in order to facilitate concrete changes and improvements

Activity 1.8 – Support to ECOWAS/WAPP to integrate SSHP into their RE policy, their scenarios, planning documents / master plans and in particular into their budget allocations

- Based on the country assessments, facilitate the integration of SSHP-specific aspects and objectives into the regional renewable energy policy aligned with the White Paper on energy access in close cooperation with ECOWAS, including renewable energy penetration quotas, appropriate representation of SSHP in master plans and budget allocations. Closely engage with ECOWAS as well as WAPP and ERERA, as appropriate.
- Preparation of a short paper which compares the status quo (as per activity 1.2) with the situation after adoption of the revised policies and frameworks in the countries and on regional level.

SPECIFIC OBJECTIVE 2 – Priority target groups have improved their SSHP know-how through capacity development and quality guidelines are introduced

Please note that specific capacity building initiatives which are directly related to sub-activities under the specific objectives 1, 3 or 4 may be mentioned under the related heading and are not repeated in this section. This is meant to increase the readability of the document. As mentioned under paragraph 0 capacity building has different foci depending on the capacity range:

up to a capacity of max. about **500 kW**	**for the range of about** **500 kW to 30 MW**
Capacity building and quality assurance with strong focus on: • Resource assessment • planning and design • manufacturing of equipment • implementation • management, operation and maintenance, safety and protection • etc. but also covering financing, policy and other aspects	Capacity building and quality assurance with main focus on: • resource assessment • financing and policy aspects

Output 2a: A capacity development strategy is elaborated and activity planning is "harmonised" with objective 4

Activity 2.1 – Detailed capacity assessment: Interviews with priority target groups to assess their capacity and identify their knowledge needs

- Make interviews with the following target groups:

  i) consultants, construction companies, equipment manufacturers, utilities etc. with regard to resource assessment, planning, implementation and operation of SSHP projects
  ii) trainers at educational institutes (vocational schools, universities, training centres, Regional Centre for SHP Abuja etc.)
  iii) policy makers, administrative staff, project developers, banks, NGOs etc. with regard to regulatory, legal, institutional and financial issues

- Assess the capacity and identify the knowledge needs of specific stakeholder groups with regard to micro, mini and small hydropower. Identify perceived barriers (including misconceptions and other reasons for reluctance) for hydropower developments, including policy, regulatory, institutional, legal, financial and technical issues. Combine a desk research of available literature and information with (online) questionnaires, calls and, to a very limited degree, personal meetings. This assessment is considered to be of great importance as it leads the way to ECREEE's future initiatives in this regard. It is therefore essential that this activity attracts sufficient priority.
- Explore potential, opportunities and business case for local manufacturing and maintenance of turbines and other equipment. Liaise with UNIDO and analyse findings from existing projects under the GEF SPWA program in Nigeria. Identify other ongoing related initiatives.

Activity 2.2 – Formulate a capacity development strategy

- Formulate strategy to address the knowledge needs and the identified barriers according to the findings of the assessment. Prioritise target groups, topics and approaches based on urgency and effectiveness with regard to addressing their knowledge needs and with regard

to the target group's role in facilitating projects on the ground. The prioritisation will support the aim to maximise the number of SSHP sites in the medium term.

- Define type, number and duration of class room, hands-on trainings in the field and workshops; all capacity building activities shall be based on "reality trainings" meaning that they are **directly implicated** in activities under specific objective 4 (site assessment, planning, implementation etc.)
- Align ECREEE's and UNIDO's activities accordingly, including workshops, trainings, support to Communities of Practice and publications. Modify SHP Programme to better address strategy as necessary.
- Present a short summary on findings of the assessment and detailed conclusions on required capacity building strategies and planned activities in form of a report, published on the web-page. Specific findings of this capacity assessment may as well feed into the publication on policies and case studies.
- Update capacity building strategy as appropriate, but at least on a yearly basis.

Output 2b: Local capacity, in the public as well as in the private sector, is strengthened and SSHP related know-how has increased

Activity 2.3 – Elaboration of training modules including practical examples, exercises etc. for the technical training and e.g. best practice examples for legal, institutional etc. issues

- Develop training modules in line with capacity building strategy to best address knowledge needs. Prepare background material on different topics, which, after adjusting them to each specific audience, will serve as basis for workshops. Modules will likely include topics like resource and site assessment (practices in the field), SHP planning and design (civil works and electro-mechanical equipment), project implementation and supervision of construction, operation and management of SHP systems, tariff systems, etc. In addition best practice examples will be made available on energy policies, regulatory, legal and institutional issues, power purchase agreements (PPA) etc.. Furthermore, information and didactical tools will be elaborated on project finance, on RETScreen, Homer, COMFAR software, CDM and funding applications, e.g., for the ACP-EU Energy Facility etc. The modules are expected to be developed first whenever the need arises for a concrete training or workshop and be reused and updated for future events. All relevant workshop material will be shared via the web page.

Activity 2.4 – Based on available handbooks and guidelines, elaboration of a trilingual handbook on SSHP, appropriate for W-African conditions and dissemination of the new handbook

- Based on the various available SSHP manuals, an "ECOWAS-specific" handbook will be elaborated, taking into account the specific challenges in the region; this handbook will be translated into the relevant languages in the region.
- The handbook will be disseminated to interested planners, educational institutions, SSHP developers etc.

Activity 2.5 – Preparation and implementation of 2 regional SSHP train-the-trainers workshops covering all ECOWAS countries with SSHP potential

- Depending on the results of the capacity needs assessment and especially on the availability of potential future SSHP-trainers at interested educational institutions (e.g.

URC-SHP Centre in Abuja, 2iE in Ouagadougou, KNUST in Kumasi, vocational schools etc.) a specific training session for such future trainers will be held in English and French

Activity 2.6 - Field survey of at least 6 most promising sites in each of 5 selected ECOWAS countries and on-the-job training of surveying staff

- A comprehensive field survey of 6 sites in 5 ECOWAS countries, resulting in 30 site surveys will be implemented as "hands-on training". This field survey will serve as contribution to the establishment of the "hydropower observatory" (objective 3) and simultaneously allow to train a significant number of participants in the basics of SSHP site assessment. Depending on the requirements e.g. three English and three French trainings can be held.

Activity 2.7 - Preparation and implementation of various types of trainings on technical and financial aspects for engineers, technicians, etc.

- Link training activities to Activity 4.1 to Activity 4.5 (demonstration and rehabilitation projects) in order to facilitate hands-on practical training with a sustainable impact on participants' know-how. Time schedules of both, meaning trainings and planning and implementation of demonstration projects, have to be strictly synchronised to draw maximum benefit. Training sessions should be planned according to the project cycle of demonstration / rehabilitation projects. Pure classroom training is in no case sufficient.
- Develop and conduct each year at least six 2-weeks technical trainings, each with 15-25 participants, in different ECOWAS countries. Participants' satisfaction is continuously monitored. Trainings are held on selected topics for specific stakeholder groups maximising the impact and addressing the most urgent knowledge gaps (in line with capacity building strategy). Capacity building may focus on trainings for:
  - technical experts, e.g., from private sector companies, on resource and site assessment, planning and design, development (incl. project preparation and management, negotiation of PPAs, etc.), manufacturing, and business models for efficient operation and maintenance, safety and protection, training on financial structuring of projects and financial appraisal (e.g. RETScreen).
  - operators of SHP plants on (technical) operation, maintenance and safety and requirements, and management staff on managing of isolated and grid-connected systems, metering and tariff systems, management of revenues and expenditures etc.
  - utilities on advantages and potential of SHP within their country but also the integration of non-grid connected SSHP plants into the grid (once the grid arrives);
- Select participants from public and private sector: training and educational institutions, utilities, technical services, consultants, construction companies etc.; all trainings are implemented for the different language groups.
- Consider a training-of-trainers approach where appropriate, develop a corresponding programme and provide support to trainers in the course of their action. Closely collaborate with URC-SHP and other training institutions.
- Consider charging fees for specific trainings after first workshops were held successfully.

Activity 2.8 – Preparation and implementation of (high level) workshops (*Activity 2.8 could include Activity 1.6 and Activity 1.7, depending on the actual demand*)

- Prepare and implement each year at least three 3-day workshops in different ECOWAS countries; each workshop should allow for 25-35 participants; workshop subjects are policy, legal and institutional issues for policy makers and project developers (isolated and grid-connected systems, rights and obligations of IPPs, PPA, feed-in tariff, legal and regulatory

situation regarding access to energy resources, poverty reduction impact, creation of added value for local population, strategies for decentralised power generation, etc.). Policy makers shall be enabled to develop and implement policies, regulations and laws. This will also target representatives from non-energy sectors to help them integrate energy relevant elements into their strategies and programmes. Workshop programmes will be adjusted to respond to needs of representatives from non-energy sectors (e.g. irrigation specialists). Participants will also include, representatives from ECOWAS departments like WAPP and ERERA, but also national governments and institutions.

- At least one of the workshops mentioned above is held for financial (and insurance) institutions and SSHP project developers on specifics of SHP financing, risk management and collateralisation (mainly relevant for commercial SSHP systems in the MW-range). Offering technical, financial and economic due diligence services for financial institutions will be considered. Clear difference has to be made between development banks and commercial banks. E.g. profitable grid-connected plants could be attractive for commercial banks whereas isolated systems mostly need investment subsidies / grants because of their limited number of customers which also limits profitability
- Consider charging fees for specific workshops for "high-level participants" after first workshops were held successfully.

Activity 2.9 – Continuous monitoring of participants' satisfaction and further training needs

- Identify the need for (further) specific trainings based on the evaluation of implemented trainings and during workshop discussions.

Output 2c: Quality guidelines are introduced during trainings and are generally applied for development and implementation of SSHP projects

Activity 2.10 – Develop minimum quality guidelines (site assessment, feasibility study, tendering, implementation rules, rules for SSHP operation, standards for equipment)

- Develop and establish guidelines on minimum planning requirements for small-scale hydropower projects, differentiating between micro, mini and small hydro systems which require different standards each. While touching upon all stages of the project cycle, from identification to implementation, the main focus will be on the approval of projects. This is seen as the phase, where national bodies have the opportunity to align the project with national priorities and enforce minimum requirements with regard to design, quality of electro-mechanical equipment, environmental impact etc.. The findings of the previous activities will significantly influence the direction of these guidelines
- Among others quality guidelines should cover e.g. procurement procedures, quality of design and scope of site supervision, operation, maintenance, as well as safety and protection practices

Activity 2.11 – Include quality guidelines into the various trainings and continuously adopt them according to requirements

- Make guidelines available through ECREEE's SSHP webpage and present and explain them during capacity building activities (e.g. a training on site assessment should introduce a checklist / guideline with minimum criteria for a proper site assessment)
- Where required adopt the guidelines according to the local/regional requirements

Activity 2.12 – Analyse possibilities for "certification" of project proposals

- Assess the approval procedures for micro, mini and small hydropower projects by national authorities in at least three countries, including the requirements for establishment of feasibility studies and detailed design, compliance with technical standards for equipment, environmental impact assessments. Identify best practices and deficiencies. Compare with requirements outside ECOWAS region.
- Assess criteria for evaluation and approval of submitted proposals including applied quality standards.
- Develop a checklist for national authorities and institutions as well as planners in order to easily comply with the guidelines which should become the basis for "certification" and approval.
- Explore what type of support ECOWAS member States would appreciate during the project approval process. Explore possibility to allow project applicants, NFIs or other national bodies to request a designated certification centre to check the project design. While ECREEE in partnership with URC-SHP (for technical issues) would most likely be the first certification centre, others within the region may follow, once trained and approved by ECREEE. Once such a certification centre approves a project, a streamlined and simplified registration process applies, as ECOWAS member States will not be required to check any technical specifications but only the project's alignment with national strategies. This procedure will only apply within those ECOWAS countries which approve this process. This registration process would closely involve NFIs and the URC-SHP.

SPECIFIC OBJECTIVE 3 – Knowledge management and awareness raising improve accessibility to crucial information for SSHP development

The specific objective 3 focuses on the management of knowledge and data which facilitates exchange of experience, identification of success factors and reasons for failure of SHP plants. At the regional and national levels, this covers policies in support of enabling environments including regulatory, legal and institutional framework. At the programme and project level, this covers the whole project cycle[3]. Many of the activities mentioned within this area could apply generally to the work of ECREEE and UNIDO. Therefore, it is understood that some of these activities could easily be expanded to cover ECREEE's work on renewable energy in general. Should this be the case and some of these activities be integrated within a broader renewable energy approach, it will be essential to place significant emphasis on the hydropower element within such an overall approach.

Output 3a: Structures are established which facilitate open knowledge sharing and the provided tools and contents are utilised

Activity 3.1 – Elaboration of relevant SSHP related contents, tools, handbooks, templates etc. (see specific objectives 1, 2 and 4) and establishment of a continuously developing webpage

- Establish a new well-structured web-page (integrated in the ECREEE webpage) making available tools and contents as elaborated during the SSHP Programme; caption and sharing of knowledge on various SSHP related subjects and planning tools available from other projects.

[3] The project cycle includes: Identification, usually based on pre-feasibility studies; Formulation, usually based on feasibility studies; Implementation, including its design, procurement, and quality assurance through site-supervision; Operation and Maintenance; Evaluation, throughout the process.

- Ensure all relevant knowledge created throughout all activities within this programme is captured and available online in a logically structured and easily accessible form. Consider other forms of sharing knowledge, like media releases, newsletters and policy briefs. Enforce an open knowledge sharing policy, with restricted access to information only when the information is irrelevant to external stakeholders, when the quality of the information is too low, or when the information refers to confidential internal issues.
- Collect, process and share information from member States' focal institutions and counterpart agencies, as well as from other international bodies.
- Expand ECREEE's website to include a designated section on hydropower providing relevant tools, projects, literature (e.g. on best practices), contact information of relevant stakeholders, shared databases of, e.g., experts or technology suppliers, and links. This website would need to be designed flexibly in order to allow easy adjustments to future needs. Analyse information on existing websites of actors in the field of hydropower as a starting point for this activity.
- Regularly update website and its documents and databases on, at least, a monthly basis.
- Ensure sufficient priority by the management is attributed to this overarching task. This includes adequate allocation of resources, mostly in terms of human capacities. The quality of the implementation of this task will directly affect the reputation of ECREEE, especially outside their active networks and outside the ECOWAS region.
- The various activities (under different specific objectives) are used to get feedback and to exchange on strengths and weaknesses of the knowledge management concept

Activity 3.2 – Establishment of an online forum ("question and answer service")

- Identify need for online knowledge exchange and discussions, and consider to establish a **"question and answer service"** on small-scale (or eventually exclusively for micro and mini) hydropower. Such an expert-supported qualified SHP-service would attract sufficient interested parties to join the SHP-platform. The service should provide qualified technical support on all small-scale hydro aspects, meaning assigned experts answer users' questions. Providing such a service during the Programme period would attract also other interested and qualified users so that the (external) support from assigned experts could be fading out, giving more space to mutual responding of questions among the users.

Activity 3.3 – Development of liaison programmes

- Liaise and build a sound network with local and international SSHP associations and institutions. For example, liaise on a regular basis, but at least quarterly, with URC-SHP and at least biannually with the UNIDO International Centre on Small Hydropower, China (IC-SHP). Develop or elaborate reporting mechanisms for the collaboration with the partners institutions, specifying the level of knowledge exchange, e.g., what information is relevant; when and in what form will information be exchanged. Update the reporting mechanism as necessary.
- Develop a liaison strategy with key stakeholders, both from within and from outside the ECOWAS region (e.g. http://www.hycom.info/, http://unidorc.org/emc_act.htm, European Small Hydro Association - http://www.esha.be, Austrian Small Hydro Association - www.keinwasserkraft.at, Practical Action, GNESD, Club-ER, ARE etc.). This will include the signing of Memoranda of Understanding, e.g., with centres of excellence.
- Develop regional networks and Communities of Practice among SSHP stakeholders in close cooperation with the URC-SHP and other local institutions. A network could specifically address training participants (i.e. consultants, plant operators, construction companies, NGOs, equipment manufacturer, public organisations, universities) or workshop participants, thus keeping them exchanging experience. Offering a qualified question-and-

answer service as described under Activity 3.2 would be a strong link to establish a network. Such a network should be kept open for members from outside the ECOWAS region and proactively seek to involve external stakeholders involved within the region, e.g., GIZ.

Output 3b: An information base on relevant SSHP resources is created and helps to facilitate the development and implementation of SHP programmes and projects

Activity 3.4 – Regional assessment of SSHP resources for the establishment of an (interactive) "hydropower observatory" which is made available online

- Initiate a **small-scale hydropower resource assessment** through a) analysis of available studies, runoff data, maps etc. and b) resource mapping services for satelite based modelling and spatial planning study and c) field investigations (among others planned field survey mentioned under output 2b). To ensure sustainability and ownership of data management the main responsibility to collect and provide data will stay with the National Focal Institutions (NFIs). ECREEE can facilitate that participatory process..
- Develop a **"hydropower observatory"** in the ECOWREX (ECOWAS Observatory for Renewable Energy and Energy Efficiency) including information on existing and potential sites known so far (location, gross head, design discharge, available runoff database, development status etc.) in order to serve as a basis for the specific objective 4. Provide map with information on existing, planned and promising sites for future SHP plants, supplemented by country background information. Explore linkages with GIS tools, e.g., showcasing all precipitation and discharge measurement stations on map with access to up to date measurement data. The hydro-atlas for Rwanda produced by the Belgian cooperation might serve as precedent.
- Design of an interactive webpage which allows users to download and complement additional (hydrological, topographical, GIS based etc.) information
- Where useful, collect information on SHP potential in irrigation systems and drinking water systems.

Output 3c: A communication strategy disseminating achieved progress and raising awareness about SSHP opportunities is developed and implemented

Activity 3.5 – Communication Strategy

- Make the benefits of SHP and ECREEE's related work known to all stakeholders. To develop a successful communication strategy, it will be important to address misconceptions and reasons for reluctance to get engaged in SHP initiatives. The communication strategy will clearly elaborate how to tackle and overcome any knowledge deficits. The strategy will as well identify how to best market ECREEE's added value in the field of SHP and identify channels for marketing activities like local media, newsletters, etc.
- Review and adjust the strategy throughout the progress, but at least on a yearly basis

Activity 3.6 – Collection of relevant information and develop flagship publication

- Collect information on activities of other donor agencies, government organisations, NGOs etc.
- Identify current major publications in the field of hydropower and renewable energy which are relevant for the ECOWAS region or which might serve as a basis for ECREEE/UNIDO's flagship publication. Liaise with institutions who launched relevant publications to learn from their methodology, define a niche for ECREEE's publication and assess the relevance for such a publication. Define its structure and scope.
- Identify partners for the development of first issue, define methodology, gather data and draft first issue. For example, ECREEE could link up with GIZ to redefine the scope of its recent publication on renewable energy markets in West-Africa and provide an updated version thereof.

Activity 3.7 – SSHP conference

- Hold a final SSHP-conference by the end of the Programme term to present and discuss results; invite different SHP stakeholders from public and private sector, in order to facilitate exchange of experience and information. Besides updating participants on achievements and possible follow-up activities, this event allows to get a feed-back from ECOWAS country representatives and to verify visibility of the activities.

SPECIFIC OBJECTIVE 4 – Investment and business promotion activities lead to planning, implementation and sustainable operation of SSHP projects and the development of a local industry

Activities within this section address support to the assessment, design and implementation of programmes and projects. Capacity building is an integral part of these activities and knowledge transfer to the stakeholders has to be ensured and facilitated by ECREEE/UNIDO. Ownership and responsibility for the programmes and projects should remain to the extent possible with the regional, national and local actors and private sector engagement should actively be sought. Accordingly, ECREEE will ensure that it does not develop or implement initiatives on behalf of ECOWAS stakeholders, but rather provides support to those stakeholders to help them successfully develop their initiatives. At the same time, ECREEE will ensure to extract findings from national and local initiatives and share them at a regional level. Lessons learned will be drawn from the SSHP projects currently implemented by UNIDO under the GEF Strategic Program for West Africa (SPWA).

ECREEE will only be directly involved in the implementation of programmes and projects where there is a clear benefit to pursue a regional approach or where national bodies would not have the capacity to do so. In order to ensure the relevance of ECREEE's involvement, the focus will be on regional programmes and regional mechanisms to facilitate projects and not on single projects in individual countries, selected on an ad-hoc basis (refer as well to ***Error! Reference source not found. Error! Reference source not found.***). Clear preference should be given to SHP programmes and projects which have a role model character with regard to:

- Integration of capacity building and training (during planning, implementation and operation)
- Strong impact on rural electrification
- Integration of productive uses
- Promising ownership, management and operation models

- Flagship projects paving the way to feed-in rules and regulations
- Other strategically important or "pioneering" projects

In support of ECREEE's objective to ensure affordable access to energy, emphasis needs to be placed on ensuring rural customers' ability to pay, especially through linking electricity supply with productive uses. According to UNIDO rural electrification does not, by itself, trigger industrial growth or regional development. Additional revenues and thus regional development can be fostered e.g. by "community-owned hydro systems", meaning the local community itself (commune, municipality or district) owns a hydropower plant and sells surplus electricity to the national grid. This means, in order to achieve significant impact on poverty reduction either financial participation in the benefits from hydro-electricity has to be facilitated and/or productive use has to be promoted. For both options, rural electrification needs to be accompanied by dedicated activities (e.g. programmes to foster income generating activities). Priority will be given to SHP projects which form part of such comprehensive programmes.

All activities under output 4a and 4b as listed in the following are integral part of capacity building (specific objective 2). This means that the offered training content corresponds to the respective phase of the project cycle, starting from resource assessment, planning, detailed design, implementation up to operation and management. In addition, the "demonstration projects" will be implemented according to the quality guidelines.

Output 4a: At least 5 SSHP projects (< 100 kW) are operating and - during their planning and implementation - have served as demonstration projects for capacity building

Activity 4.1 – Compilation of relevant information and realisation of site surveys to select at least 5 SSHP projects

- Compile all available relevant information and realise site surveys (*can be combined with Activity 2.6*) in order to select at least 5 SSHP projects to be implemented in the following
- Prioritise sites according to transparent selection criteria

Activity 4.2 - Preparation of "demonstration projects" for implementation with parallel capacity building

- Prepare feasibility studies, detailed design and tender docs
- During planning and implementation: Establish an institutional set-up for management and operation (community participation); develop sustainable O&M structures, provide training on tariff setting, book keeping etc.
- Link all activities with hands-on training of planners, engineers, community developers etc.

Activity 4.3 - Construction of 5 SSHP systems with parallel capacity building

- After successful bid appraisal, implement the project including site supervision and commissioning

Output 4b: At least 2 refurbishment / rehabilitation projects (< 200 kW) are identified and realised and have served as demonstration projects for capacity building

Activity 4.4 – Collection of relevant information on projects potentially interesting for rehabilitation

- Identify existing SHP plants which have been in operation for years but are not operational any longer. Assess reasons why they are out of service. Assess their efficiency. Identify deficiencies (e.g., turbines not serviced) or possibilities to adjust the design (e.g., increasing intake water levels) in order to improve the overall efficiency of the plants. Based on cost-benefit analysis, identify and facilitate measures to refurbish them.

Activity 4.5 - Preparation and implementation of "demo-rehabilitation projects" with parallel capacity building

- Preparation of feasibility studies for rehabilitations / refurbishments, detailed design and tender docs; establishment of an institutional set-up for management and operation (community participation) and implementation of rehabilitation
- Include these rehabilitations into training measures. Draw and publish general conclusions and, if appropriate, develop mechanisms and guidelines to assist other existing hydropower sites with such assessments.

Output 4b: Over 5 years, at least 35 additional projects (new projects or rehabilitations) in different ranges of capacity (< 30 MW) are developed under the ECOWAS Renewable Energy Facility (EREF) and at least 5 are brought to financial closure (funding opportunities for realisation identified); in parallel 10 SSHP related service companies are developing

Activity 4.6 – Annual SSHP Call for proposals of the ECOWAS Renewable Energy Facility (EREF) with focus on SSHP

- Adopt the ECOWAS Renewable Energy Facility EREF to SSHP requirements
- elaborate guidelines and standards for application
- realisation of yearly calls for proposals

Activity 4.7 – Financing and quality control of pre-investment activities

- Finance through the EREF or other identified funding options the various pre-investment activities like: site assessments, feasibility studies or revision / improvement of existing FS, financial structuring etc.
- Control the quality of project proposals

Activity 4.8 - Identification of funding opportunities for implementation

- Identify potentially interesting SSHP sites and present elaborated project proposals (based on quality guidelines / "certified" projects) to interested stakeholders (donor agencies, NGOs, private investors, other SSHP developers) for realisation
- Identify national and international funding opportunities for projects and programmes, through close engagement with international stakeholders and own research. Share information within region, e.g., via web-sites and via regional stakeholder networks.
- Identify additional special funding for hydropower resource assessment, mainly for micro and mini hydropower in order to further contribute to the "hydropower observatory". Teams (trained through activities under specific objective 2) shall continue site verification, meaning measurement of runoff and head, install gauging stations at interesting sites, evaluate collected hydrological data etc.. Provided with the required measurement equipment these teams should implement "site screening" in the most promising areas in ECOWAS countries and at sites with potential for rehabilitation. The teams should be supported by local competent staff. Basis for the screening is the available information in the new "hydropower

observatory" and more detailed information from NFIs and project proposals. The screening is an important basis for identification of further interesting projects (can also be considered as part of Activity 4.7).

- Once funding opportunities are seized help to facilitate and coordinate programme implementation
- Help develop regional and national SSHP programmes for the implementation of micro, mini and small hydropower systems. Seek close relations with key stakeholders, especially ECOWAS departments like WAPP and ERERA. Project / programme preparation should include the financial and/or technical support for the elaboration of pre-feasibility studies and feasibility studies thus making the projects interesting for implementation.
- For projects in the MW-range, ECREEE/UNIDO will explore the benefits of setting up Calls for Proposals as a regional approach to identify and help implement projects, as opposed to funding specific projects in single countries. To promote micro and mini hydropower projects ECREEE/UNIDO will explore the option to provide guidelines / criteria for project proposals, so that projects in different countries can be bundled as regional programme with a common structure and strategy, e.g. with a clear focus on support of productive use.
- Help stakeholders in preparation for projects for funding, e.g., for ACP – EU Energy Facility or the Global Environment Facility (GEF). ECREEE can either directly contribute to the formulation of specific projects or indirectly through targeted capacity building initiatives or the development of guidelines

Activity 4.9 – Support development of local SSHP service companies

- Preferentially award contracts for feasibility studies, planning activities, construction works and other services to **local** companies; promote cooperation with international companies under the condition that additional training requirements are covered by the SSHP Programme

7 INDICATIVE BUDGET (2013-2018)

The budget need to implement the first phase of the ECOWAS SSHP Program amounts to around EUR 15,5 million Euro between 2013 and 2018. This would allow to undertake the activities as described in the logical framework matrix of this project document. For administration purposes, the budget of the SSHP Program is divided into three main areas: (a) Costs of Project Operations (e.g. call for proposals, trainings, forums), (b) Costs for Monitoring and Evaluation (e.g. SSHP TC meetings, evaluation, audits, travels), as well as (c) Costs of Staff and Administration. The costs for staff and administration would be around 13% of the operational budget.

Indicative Budget for the ECOWAS Small-Scale Hydro Power Program (2013 to 2018)

	OUTPUTS		ACTIVITIES	BUDGET (in EUR)
1a	bottlenecks of SSHP project implementation and operation, of current policies and legal frameworks and roles and shortcomings of relevant stakeholders are understood and recommendations for improvement are elaborated and discussed	1	formulate a capacity development strategy defining type, number and duration of class room, hands-on trainings in the field and workshops; all capacity building activities shall be based on "reality trainings" meaning that they are directly implicated in	€ 60,000.00
		2	• In all ECOWAS countries with significant SSHP potential: assessment of SSHP relevant policies, legal frameworks, main stakeholders, their roles / responsibilities, analysis of ownership issues and associated potential poverty reduction impact of SSHP projects within current frameworks; elaboration of country-specific recommendations	€ 80,000.00
		3	• Presentation and discussion of the case study analysis, the legal and policy assessment results and the recommendations in an ECOWAS-wide workshop and lobbying for the adoption of the recommendations	€ 70,000.00
		4	• Publication on the analysis and the final conclusions drawn from workshop discussions	€ 10,000.00
			SUBTOTAL	€ 220,000.00
1b	Adoption of conducive policies and legal frameworks is supported and SSHP has become integral part of ECOWAS/WAPP planning documents	1	Lobbying for adoption of recommendations, for integration into legal frameworks and policies of the respective countries and consideration of investment subsidies (especially isolated systems in the range of micro and mini hydro (which in general are not profitable)	€ 30,000.00
		2	Discussion and lobbying during a workshop	€ 10,000.00
		3	Concrete assistance to implement the recommendations (e.g. improvement of licensing procedures, templates for power purchase agreement, options for incentive schemes)	€ 60,000.00
		4	Support to ECOWAS/WAPP to integrate SSHP into their RE policy, their scenarios, planning documents / master plans and in particular into their budget allocations; short paper which compares the status quo with the situation after adoption of the revised policies	€ 10,000.00
			SUBTOTAL	€ 110,000.00
			SUBTOTAL Output 1 Policy Support	€ 330,000.00
2a	A capacity development strategy is elaborated and activity planning is "harmonised" with objective 4	1	Interviews with priority target groups to assess their capacity and identify their knowledge needs: i) consultants, construction companies, equipment manufacturers, utilities etc. with regard to resource assessment, planning, implementation and operation of SSHP projects ii) trainers at educational institutes (vocational schools, universities, training centres, Regional Centre for SHP Abuja etc.) ii) policy makers, administrative staff, project developers, NGOs etc. with regard to regulatory, legal, institutional and financial issues	€ 30,000.00
		2	Formulate a capacity development strategy defining type, number and duration of class room, hands-on trainings in the field and workshops; all capacity building activities shall be based on "reality trainings" meaning that they are directly implicated in activities under specific objective 4 (site assessment, planning, implementation etc.)	€ 10,000.00
			SUBTOTAL	€ 40,000.00
2b	In the public as well as in the private sector, local capacity is strengthened and SSHP related know-how has increased	1	Elaboration of training modules including practical examples, exercises etc. for the technical training and e.g. best practice examples for legal, institutional etc. issues	€ 30,000.00
		2	Based on available handbooks and guidelines, elaboration of a trilingual handbook on SSHP appropriate for W-African conditions and dissemination of the new handbook	€ 40,000.00
		3	Preparation and implementation of 2 regional SSHP train-the trainers workshops covering all ECOWAS countries with SSHP potential	€ 100,000.00
		4	Field survey of at least 6 most promising sites in each of 5 selected ECOWAS countries and on-the-job training of surveying staff → contribution to establishment of "hydropower observatory" (objective 3)	€ 400,000.00
	At least six 2-weeks technical trainings each with 15-25 participants are implemented each year in different ECOWAS countries and participants' satisfaction is continuously monitored	6	Preparation and implementation of various types of trainings on technical and financial aspects for engineers, technicians etc.; participants are selected from public and private sector: training and educational institutions, utilities, technical services, consultants, construction companies etc.); subject to the capacity development strategy apply the "train-the-trainers" approach wherever possible and useful; all trainings are implemented for the different language groups	€ 2,870,000.00
	At least three 3-day (high level) workshops on legal, institutional and financial aspects each with 25-35 participants are implemented each year in different ECOWAS countries and participants' satisfaction is continuously monitored	7	Preparation and implementation of (high level) workshops on a) policy, legal and institutional issues for policy makers and project developers (isolated and grid-connected systems, PPA, feed-in tariff, legal situation regarding access to energy resources → poverty reduction impact, etc.) and b) specific workshops for the banking / insurance sector and project developers on financing, risk management and collateralisation	€ 900,000.00

		8	Continuous monitoring of participants' satisfaction and further training needs	€	25,000.00
			SUBTOTAL	€	4,365,000.00
2c	Quality guidelines are introduced during trainings and are generally applied for development and implementation of hydropower projects	1	Develop minimum quality guidelines (site assessment, feasibility study, tendering, implementation rules, rules for SSHP operation, standards for equipment)	€	20,000.00
		2	Include quality guidelines into the various trainings and continuously adopt them according to requirements	€	30,000.00
		3	Analyse possibilities for "certification" of project proposals	€	20,000.00
			SUBTOTAL	€	70,000.00
			SUBTOTAL Output 2 Capacity Development	€	4,475,000.00
3a	Structures are established which facilitate open knowledge sharing and the provided tools and contents are utilised	1	Elaboration of relevant SSHP related contents, tools, handbooks, templates etc. (see specific objectives 1, 2 and 4)	€	50,000.00
		2	Establishment of a new well-structured web-page (integrated in the ECREEE webpage) making available tools and contents as elaborated during the SSHP Programme; caption and sharing of knowledge on various SSHP related subjects and planning tools available from other projects	€	50,000.00
		3	Establishment of an online forum ("question and answer service")	€	200,000.00
		4	Development of liaison programmes	€	20,000.00
		5	The various activities (under different specific objectives) are used to get feedback and to exchange on strengths and weaknesses of the knowledge management concept	€	30,000.00
			SUBTOTAL	€	350,000.00
3b	An information base on relevant SSHP resources is created and helps to facilitate the development and implementation of SHP programmes and projects	1	Regional assessment of SSHP resources through: a) analysis of available studies, runoff data, maps etc. and b) resource mapping services for satelite based modelling and spatial planning study and c) field investigations for data verification (among others planned field survey mentioned under output 2b); presentation of the results in the **"hydropower observatory"**	€	320,000.00
		2	Design of an interactive webpage which allows users to download and complement additional (hydrological, topographical, GIS based etc.) information	€	40,000.00
			SUBTOTAL	€	360,000.00
3c	A communication strategy disseminating achieved progress and raising awareness about SSHP opportunities is developed and implemented	1	Elaboration of strategies on how to tackle and overcome knowledge deficits, misconceptions and reasons for reluctance to get engaged in SSHP initiatives	€	30,000.00
		2	Collect information on activities of other donor agencies, government organisations, NGOs etc. with regard to potential cooperation to develop a flagship publication	€	30,000.00
		3	Implementation of a SSHP conference by the end of the Programme to present relevant results	€	70,000.00
			SUBTOTAL	€	130,000.00
			SUBTOTAL Output 3 Kowledge Management	€	840,000.00
4a	At least 5 SSHP projects (< 100 kW) are operating and - during their planning and implementation - have served as demonstration projects for capacity building	1	*All activities in the project cycle as listed in the following are integral part of capacity building (specific objective 2) and will be implemented according to the quality guidelines:* 1) Compilation of relevant information and realisation of site surveys in order to select at least 5 SSHP projects to be implemented in the following; prioritisation according to transparent selection criteria	€	20,000.00
		2	2) Preparation of feasibility studies, detailed design and tender docs; establishment of an institutional set-up for management and operation (community participation)	€	400,000.00
		3	3) After successful bid appraisal, project implementation, site supervision and commissioning	€	2,000,000.00
		4	4) during implementation: development of sustainable operation and management structures, training on tarif setting, book keeping etc.	€	60,000.00
			SUBTOTAL	€	2,480,000.00
4b	At least 2 refurbishment / rehabilitation projects (< 200 kW) are identified and realised	1	All activities in the project cycle as listed in the following are integral part of capacity building (specific objective 2) and will be implemented according to the quality guidelines: Preparation of feasibility studies for rehabilitations / refurbishments, detailed design and tender docs; establishment of an institutional set-up for management and operation (community participation) and implementation of rehabilitation;	€	360,000.00
			SUBTOTAL	€	360,000.00
4c	Over 5 years, at least 35 additional projects (new projects or rehabilitations) in different ranges of capacity up to 30 MW are developed under the ECOWAS Renewable Energy Facility (EREF) and at least 15 are brought to financial closure (funding opportunities for realisation identified); in parallel 10 SSHP related service companies are developing	1	Adoption of the ECOWAS Renewable Energy Facility EREF to SSHP requirements, elaboration of guidelines and standards for application; realisation of yearly calls for proposals	€	50,000.00
		2	Financing and quality control of pre-investment activities: e.g. site assessments, feasibility studies or revision/improvement of existing FS, financial structuring	€	3,500,000.00
		3	Identification of potentially interesting SSHP sites and presentation of the elaborated project proposals (based on quality guidelines / "certified" projects) to interested stakeholders (donor agencies, NGOs, private investors, other SSHP developers) for realisation	€	200,000.00
		4	Combination of the investment activities with hands-on training of SSHP planners, developers etc. (harmonisation with specific objective 2)	€	700,000.00

		5	Preferential awarding of contracts for feasibility studies, planning activities, construction works and other services to local companies; promotion of cooperation with international companies under the condition that additional training requirements are covered by the SSHP Programme; special call of EREF for business development activities;	€	500,000.00
			SUBTOTAL	€	4,950,000.00
			SUBTOTAL Output 4 Investment and Business Promotion	€	7,790,000.00
5a	**Monitoring and Evaluation**		External Mid-Term and Final Evaluation	€	60,000.00
			Annual external audit	€	50,000.00
			Travel Budget for program management and monitoring	€	125,000.00
			SUBTOTAL Monitoring and Evaluation	€	235,000.00
			TOTAL "output budget"	€	13,670,000.00
6a	**Staff and administration**		1 fulltime international RE program manager (senior)	€	650,000.00
	13%		2 fulltime ECREEE SSHP experts (senior and junior)	€	625,000.00
			2 administration staff (senior and junior staff)	€	250,000.00
			1 SSHP Consultant for project evaluation and quality assurance;	€	175,000.00
			other administrative costs (equipment, running costs, printing)	€	125,000.00
			TOTAL "staff and administrative costs"	€	1,825,000.00
			OVERALL TOTAL	€	15,495,000.00

8 IMPLEMENTATION STRATEGY

The SHP Program serves as a framework for ECREEE's related activities for the upcoming five years. For the implementation of the programme it will be important to refine and adjust it to the findings throughout the process and especially in the beginning. The initial SHPP workshop held in April 2012 in Monrovia, Liberia, was essential to ensure the programme's alignment with the regional and national priorities. From now on, the adjusted **SHP Programme will be revisited on a yearly basis and detailed work plans** with specific deadlines and a clear division of responsibilities will be developed for each year. At the end of each year, the implemented activities will be evaluated based on the yearly work plan and findings of the evaluation will feed into the work programme of the upcoming year.

The SSHP Program will be managed by the ECREEE Secretariat in close partnership with the United Nations Industrial Development Organization (UNIDO). ECREEE and UNIDO signed an preferred partnership agreement. UNIDO will create synergies to the SSHP mini-grid projects of the GEF Strategic Program for West Africa (SPWA). Other partners are invited to join. The partners will be responsible for the administration of the program (e.g. project cycle management, appraisal and quality assurance of supported projects, financial accountability). An international program manager oversees the implementation of the program. At least two local SSHP experts and two administrative assistants, will be based at ECREEE Secretariat in Praia, Cape Verde. The program management team implements the activities according to the project document and annual work plans. To stimulate the market **most of the activities will be executed by private implementers contracted through competitive tenders or call for proposals**.

8.1 Governance Structure

The SSHP Program **is governed by the ECREEE Executive Board (EB) and a special Technical Committee (TC) formed by local and international SSHP experts**. The bodies will review and approve the annual work plans, budgets progress and financial reports of the program. Moreover, strategic steering and technical assistance for supported projects will be provided. The SSHP program will benefit fully from the established ECREEE network of National Focal Institutions (NFIs) in all ECOWAS countries and the URC-SHP, based in Abuja, Nigeria. The undertaken calls for proposals, tenders and workshops will be promoted by the NFIs. **The governance bodies have the following composition and functions:**

- The **Executive Board (EB)** of ECREEE provides strategic guidance, releases the global annual budget to the SSHP program and ensures synergies to the other activities of ECREEE and UNIDO (e.g. small hydro GEF projects under the Strategic Program for West Africa). The funds released to the program are subject to the approval by the Executive Board and are part of the annual work plans of ECREEE. The Board also reviews the annual SSHP progress report, the annual work plan and financial statements of the program. The Executive Board of ECREEE meets usually twice a year. Further information on the composition and structure of the Board can be found in the ECREEE brochure. Specifically the EB undertakes the following activities in alignment with the recommendations of the SSHP Technical Committee:
    - Approve the annual SSHP work plan and global budget
    - Approve the annual SSHP progress report and financial report
    - Approve the audits (including selection of external auditors)
    - Agree on amendments to the Project Document
    - Approve the invitation of new donor partners to the SSHP program
    - Provide policy guidance and propose new approaches
    - Facilitate North-South and South-South partnerships

- The **SSHP Technical Committee (TC)** of ECREEE meets usually back to back to the Executive Board. The Committee reviews technical key documents. In case of SSHP call for proposals undertaken under the umbrella of the ECOWAS Renewable Energy Facility (EREF) the EC approves the grant funding to the individual projects on the basis of the recommendations of the program management team and adjusts the funding policy for the next call. The Committee consists of the SSHP program management team, donor partners and other international and local SSHP experts. Specifically, the Technical Committee has the following functions:
    - Discuss the SSHP annual progress report and wok plan (including budget) and give recommendations to the Executive Board;
    - Overseeing and monitoring of the performance of the SSHP management and the achievement of the program results;
    - Coordinate the activities of the SSHP program by giving guidance to the ECREEE secretariat to meet regional and national level priorities;
    - Participating in the selection of the Project Manager and other UNIDO related staff;
    - Guide and supervise the work of the ECREEE secretariat and SSHP program team;
    - Evaluate SSHP project proposals of the call for proposals according to the ECREEE/UNIDO quality and appraisal framework and select the best projects for co-funding; recommend adjustments to the criteria for project evaluation;
    - Approval of projects in accordance with the non-objection principle
    - Approval of funding guidelines for a call of proposals
    - Approve significant changes on activities, time schedule, budget allocation, expenses in projects under execution following a request by project implementers;
    - Discuss and decide on the themes for forums, capacity development workshops and other events;
    - Promote innovative approaches for building up north-south and south-south partnerships

- The specialized **SSHP program management team** is based at the ECREEE Secretariat in Praia, Cape Verde, and receives support from UNIDO HQ. An international program manager oversees the implementation of the program. At least two local SSHP experts and two administrative assistants, will be based at ECREEE Secretariat in Praia, Cape Verde. The program management team implements the activities according to the project document and annual work plans. To stimulate the market most of the activities will be executed by private implementers contracted through competitive tenders or call for proposals. The program management team implements the activities of the annual work plans and prepares the annual progress reports. It organises trainings, updates the SSHP site data on the ECOWREX and undertakes tenders, call for proposals in accordance with the ECREEE/ECOWAS and UNIDO procedures. The key functions of the ECREEE secretariat and the SSHP program management team are as follows:

  Administrative Tasks and Responsibilities

    - Organize and facilitate the meetings of the Executive Board and the SSHP Technical Committee.
    - Act as secretary in the EB and TC meetings.

  Management Tasks and Responsibilities

    - Implement the annual work plan activities in the areas of capacity building, investment promotion, knowledge management and policy support as agreed and in line with the approved budget
    - Plan and suggest to the TC studies and surveys that are considered necessary in order to achieve the SSHP program objectives as well as training activities. This includes hiring of the necessary consultancies, as well as monitoring, control and supervision of the results.

- Verify achievement of SSHP program goals
- Mediate problems among project partners in sharing work and/or budget items while preparing the project proposals
- Arrangement of long-term follow-up

Financial Tasks and Responsibilities

- Monitor the administrative and financing execution of the program.
- Manage additional financial resources, in order to increase the available resources to execute the program

Project management Tasks and Responsibilities

- Ensure effective project cycle management of co-funded projects and consultancies.
- Facilitate the drafting and signing of contracts for project execution.
- Monitor the implementation of projects and other activities financed by the program.

Reporting Tasks and Responsibilities

- Draft and implement SSHP information dissemination plan.
- Compile the information provided by the ECREEE national focal institutions about the progress of the program.
- Elaborate periodical reports about the progress of the SSHP program including an analysis of results achieved and proposals for modifications if necessary to achieve the objectives of the program.

General Tasks and Responsibilities

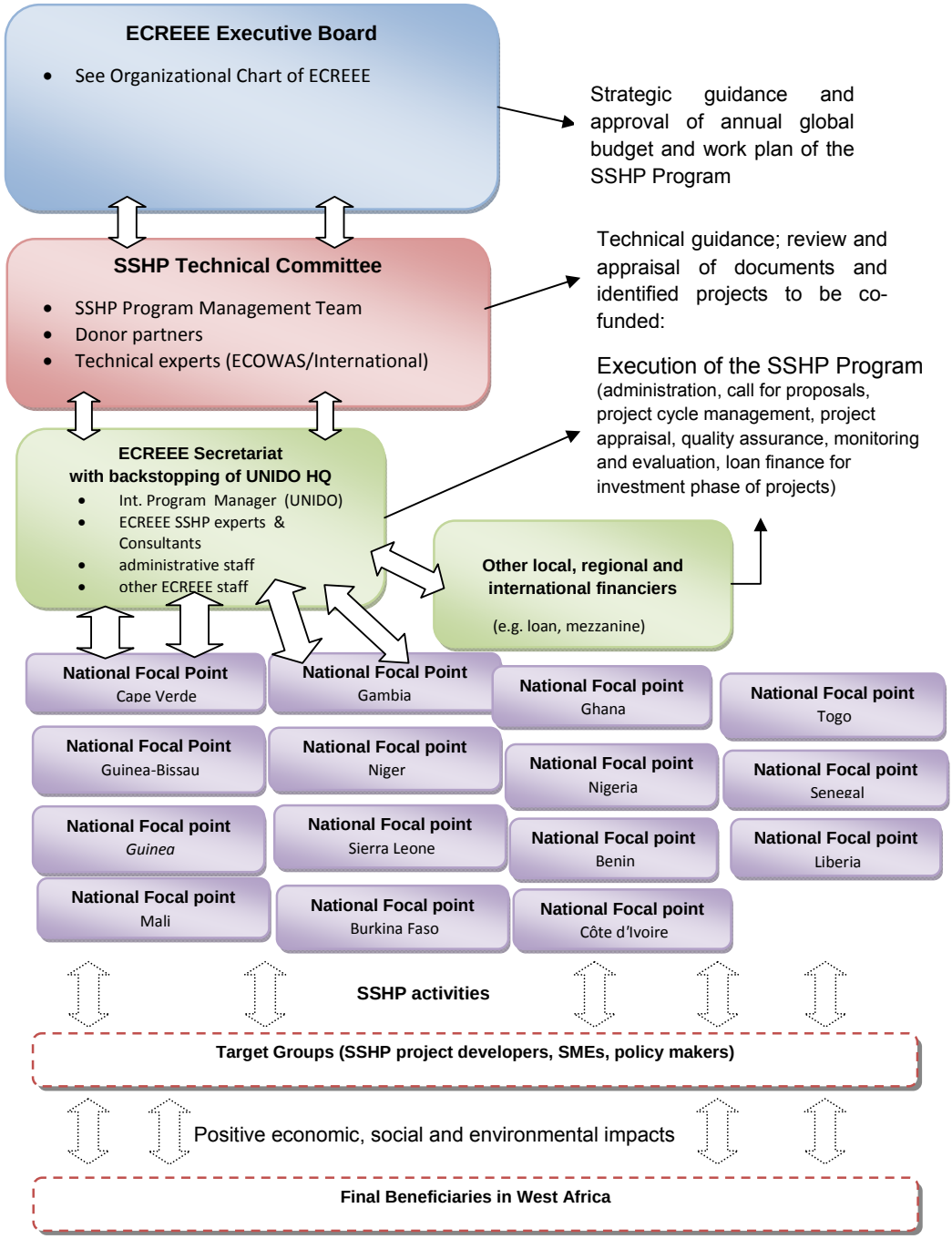
- Suggest improvements to enhance the quality of project appraisal, implementation and monitoring capacities of ECREEE and its NFIs;
- Support the NFIs;
- Update SSHP data and maintain SSHP network
- Provide information to the national focal institutions;
- Compile information about similar programs and projects that are being executed or proposed in the region;
- Develop and maintain a contact network with SSHP program members, collaborators and relevant stakeholders, in order to make public and to promote the achievements in the renewable energy field;
- Assure the optimal use of information technologies (website management, communication with others members of the Partnership, etc.);
- Oversee that cross cutting issues are taken into account in all program activities;
- Perform additional functions defined by the Executive Board.

- The role of the **ECREEE National Focal Institutions (NFIs)** is to guide the development and the activities of the SSHP program in their respective countries, according to the needs and requirements of the environmental and energy policies. **The NFIs are the link between project implementers in the different countries and the ECREEE Secretariat.** The SSHP program administrative and management budget includes some funds to be used to support the activities of the NFIs (meetings, travel costs) to ensure efficient operations and strengthening of their capacity. The NFIs have the following functions:

  - Facilitate national discussion on SSHP
  - Oversee coordination of SSHP activities in their respective countries.
  - Represent ECREEE at the national level.
  - Act as the national counterpart to the SSHP program team in the ECREEE secretariat
  - Inform the Executive Board about the necessities and the activities requirements
  - First quality appraisal of received project proposals of SSHP call for proposals; check whether they are in line with national development plans and policies and strategies, and legislation.

- Disseminate information on the SSHP activities in the country and encourage identification and development of projects with the support of the ECREEE secretariat.
- Supervise, with the support of the ECREEE secretariat, the progress of the SSHP projects in their countries;

Figure 1: Implementation Structure of the SSHP Program



9 MONITORING, REPORTING AND EVALUATION

This project document and its logical framework with its indicators will form the basis for all reporting, monitoring and evaluation tasks. Specific monitoring, reporting and evaluation requirements may be agreed on for individual activities through the steering mechanism.

9.1 Monitoring

In line with standard project management techniques, ECREEE/UNIDO will monitor activities on a continuous basis in order to ensure the quality and timely delivery of both inputs and outputs in line with the programme's objectives, the approved budget and the timeline of the work programme. Remedial steps are taken as necessary and upon prior approval by the steering mechanism in cases where the work programme needs to be altered. Monitoring activities can be categorised as follows:

- Output monitoring of the direct quantifiable achievements based on ECREEE's activities, e.g., number of users accessing web-page.
- Impact monitoring at the level of target groups, which will yield both quantitative and qualitative information, e.g., capacity of projects implemented which relied on support by the SSHP Program.
- Process monitoring to keep abreast of changes in the internal and external environment in order to refine strategies on a continual basis.

9.2 Reporting

The SSHP programmmanagement team will be responsible for the submission of programme progress reports to SSHP Technical Committee and ECREEE Executive Board. These reports present findings from the continuous monitoring and combine information on the status of the implementation with an assessment of the current situation. The programme results are assessed against the expected outcomes, outputs and objectives as a mean of continually improving project performance and productivity (results-based management). The reports will be prepared at the end of each year of the programme.

9.3 Evaluation

An external mid-term evaluation will ensure the relevance of this programme and its regional approach, its alignment with regional and national priorities and the effectiveness of its implementation. The SSHP programmes will then be adjusted taking the recommendations of the evaluation into account. In addition to this external review, the Centre will conduct several internal evaluations including one "ex-post" evaluation briefly before the end of this project. These internal evaluations will be based on questionnaires and interviews with key stakeholders. This evaluation will assess the coherence of ECREEE's services with the needs of its stakeholder and the evaluation report will form the basis for any subsequent activities.

10 JOB DESCRIPTIONS

10.1 International SSHP Program Manager

Post title: SSHP Program Manager
Duty station: UNIDO, with int. travel as required
Duration: One year (with the possibility for extension)

General Description

The Program Manager oversees the implementation of the ECOWAS SSHP Program in cooperation with the ECREEE Executive Director and the SSHP Regional Coordinator based at the ECREEE Secretariat in Praia, Cape Verde. The SSHP Program will be supervised by the ECREEE Executive Board and the SSHP Technical Committee. Together with the SSHP Regional Coordinator the program manager takes responsibility to implement the annual activities of the program and to provides technical back-stopping. The Manager will work closely with other ECREEE staff and the ECREEE National Focal Institutions (NFIs).

Duties and Responsibilities

The duties and responsibilities of the Manager are as follows:

Management, Steering and Reporting

- Oversee the implementation of the overall SSHP Program and co-ordination of the implementation of the activities in cooperation with the regional SSHP Coordinator and in alignment with the decisions of the ECREEE Executive Director
- Implement the decisions and recommendations of the Executive Board (EB) and Technical Committee (TC)
- Monitor the progress of the program and its administrative and financial execution;
- Organize the meetings of the TC and EB;
- Develop the annual work plans, progress reports and financial reports of the SSHP program in cooperation with the program staff and submit the documents to the TC and EB for approval;
- Elaborate periodical reports on the progress and achievements of the SSHP program in relation to its objectives, results and indicators (incl. analytical recommendations for adaptations and revision of activities etc.);
- Keep an overview on relevance, effectiveness, efficiency and sustainability of the SSHP Program (according to the project document); plan and suggest to the Executive Board studies and surveys that are considered necessary in order to achieve the program objectives;
- Compile the information provided by the National Focal Institutions (NFIs) about the progress of the execution of SSHP projects (e.g. feasibility studies, construction);
- Assist the ECREEE Executive Director in the recruitment of the technical and administrative personnel of the SSHP Program (e.g. elaboration of TORs);
- Strengthen the human resources, project cycle management skills of the SSHP staff;
- Strengthen the regional network of National Focal Institutions (NFIs) of ECREEE and contribute to the organization of coordination meetings;
- Undertake fund raising activities and contribute to preparation of project proposals to be co-funded by the European Union, the Global Environment Facility (GEF) or other partners.

Technical Supervision

- Supervise the SSHP staff on technical issues
- Contribute to quality assurance throughout the project cycle of a wide range of different SSHP activities (e.g. trainings, conferences, policy activities, co-funding of projects);

- o further develop the quality, appraisal and project cycle management framework for activities to be co-funded and/or implemented under the SSHP program;
- o Assure quality of approved projects according to donor requirements and ensure that pro-poor, environmental, and gender impacts have been assessed; participate actively in the evaluation of tender bids and project proposals;
- o Prepare and execute complex procurements and call for proposals;
- o Elaborate contracts for project execution;

Communication

- o Build collaborative partnerships between the Centre and other international centers, initiatives with a view to leverage know-how, resources, technologies (e.g. IRENA, REEEP, Africa-EU Energy Partnership, UN Energy, GEF, GFSE).
- o Ensure harmonization of SSHP program activities with other donor initiatives and alignment with local initiatives and support systems (local subsidy systems for renewable energy);
- o Establish strategic links to loan and equity finance institutions (such as development banks in donor countries, national or regional development banks, World Bank);
- o Establish policy dialogue with ECOWAS/WAPP/ERERA and national institutions on regional SSHP policy aspects (e.g. providing feed-back from project experiences etc.);
- o Network with national and regional chambers of commerce etc. in order to integrate representatives of the business community into the regional forums.
- o Engage relevant stakeholders in renewable energy policy dialogue including public institutions, civil society and private sector;
- o Create synergies to the other ECREEE and UNIDO activities (e.g. workshops, conferences, trainings, GEF SPWA, call for proposals); define work relations with the UNIDO International Centre for Small Hydropower based in Abuja, Nigeria;
- o Ensure effective public relations and publication of information on the SSHP Program to different target groups (communication strategy, forums);

Qualifications:

- o At least seven years practical experience in the international energy field and development cooperation
- o At least Master's degree in renewable energy technologies (a second degree in a non-technical field is an added value)
- o Extensive knowledge of the energy situation in the ECOWAS region and at least two years field experience in the energy sector in the ECOWAS region
- o Professional skills in English and another ECOWAS language (French or Portuguese)
- o Good skills in project cycle management and project budget administration;
- o Experience in energy project appraisal (technical, economic, financial, social, environmental criteria)
- o Experience in working with governmental institutions;
- o Ability and skills to plan, coordinate, manage and execute plans, programs (with a similar range), policies and actions aimed at the development and promotion of projects;
- o Awareness of business trends economic, technological, social, legal and political conditions and factors which could affect the viability of SSHP projects;
- o Have the capacities and attitudes in order to work with multidisciplinary groups
- o Proficiency in the use of software packages;
- o Analytical capacity and negotiation skills;
- o Capacity to work under pressure and availability to travel;

The electronic application contains the following documents:

- Detailed Personal History Form
- Track record of assignments of similar scope and focus (list of int. projects and descriptions)

- Scanned copy of highest university certificate and other technical certifications, licenses and quality standards related to the assignment
- Scanned copy of passport

10.2 Regional SSHP Program Coordinator

Post title: Regional SSHP Program Coordinator
Duty station: ECREEE, Praia, Cape Verde with int. travel as required
Duration: One year (with the possibility for extension)

General Description

Under the supervision of the ECREEE Executive Director the regional SSHP coordinator will assist the international SSHP program manager in executing the activities of the annual work plans in accordance with the agreed budget and time schedule. The regional SSHP Coordinator is based at the ECREEE Secretariat in Praia, Cape Verde, and will closely work with the National Focal Institutions (NFIs) and other SSHP stakeholders in the region. Moreover, he will coordinate the assignments with contracted consultants and project implementers.

Duties and Responsibilities

Management Assistance

- Assist the program manager in the implementation of the annual SSHP work plans in alignment with the project document and the decisions of the ECREEE Executive Director.
- Implement the decisions and recommendations of the Executive Board (EB) and Technical Committee (TC).
- Assist the program manager in monitoring the progress of the program and its administrative and financial execution;
- Assist in organizing the meetings of the TC and EB;
- Assist in developing the annual work plans, progress reports and financial reports of the SSHP program in cooperation with the program staff;
- Assist in elaborating periodical reports on the progress and achievements of the SSHP program in relation to its objectives, results and indicators (incl. analytical recommendations for adaptations and revision of activities etc.);
- Assist in keeping an overview on relevance, effectiveness, efficiency and sustainability of the SSHP Program (according to the project document); plan and suggest to the Executive Board studies and surveys that are considered necessary in order to achieve the program objectives;
- Assist in compiling the information provided by the National Focal Institutions (NFIs) about the progress of the execution of SSHP projects (e.g. feasibility studies, construction);
- Assist the ECREEE Executive Director in the recruitment of the technical and administrative personnel of the SSHP Program (e.g. elaboration of TORs);
- Strengthen the regional network of National Focal Institutions (NFIs) of ECREEE and contribute to the organization of coordination meetings;
- Assist in fund raising activities and contribute to preparation of project proposals to be co-funded by the European Union, the Global Environment Facility (GEF) or other partners.

Technical Tasks

- Coordinate with the other technical ECREEE experts and the NFIs
- Effectively coordinate and implement the assignments of contracted consultants and project implementers in cooperation with the int. program manager
- Contribute to quality assurance throughout the project cycle of a wide range of different SSHP activities (e.g. trainings, conferences, policy activities, co-funding of projects);
- further develop the quality, appraisal and project cycle management framework for activities to be co-funded and/or implemented under the SSHP program;

- Assure quality of approved projects according to donor requirements and ensure that pro-poor, environmental, and gender impacts have been assessed; participate actively in the evaluation of tender bids and project proposals;
- Prepare and execute complex procurements and call for proposals;
- Elaborate contracts for project execution;

Communication

- Build collaborative partnerships between the Centre and other international centers, initiatives with a view to leverage know-how, resources, technologies (e.g. IRENA, REEEP, Africa-EU Energy Partnership, UN Energy, GEF, GFSE).
- Ensure harmonization of SSHP program activities with other donor initiatives and alignment with local initiatives and support systems (local subsidy systems for renewable energy);
- Establish strategic links to loan and equity finance institutions (such as development banks in donor countries, national or regional development banks, World Bank);
- Establish policy dialogue with ECOWAS/WAPP/ERERA and national institutions on regional SSHP policy aspects (e.g. providing feed-back from project experiences etc.);
- Network with national and regional chambers of commerce etc. in order to integrate representatives of the business community into the regional forums.
- Engage relevant stakeholders in renewable energy policy dialogue including public institutions, civil society and private sector;
- Create synergies to the other ECREEE and UNIDO activities (e.g. workshops, conferences, trainings, GEF SPWA, call for proposals); define work relations with the UNIDO International Centre for Small Hydropower based in Abuja, Nigeria;
- Ensure effective public relations and publication of information on the SSHP Program to different target groups (communication strategy, forums);

Qualification:

- Candidate must be a Citizen of an ECOWAS Member State and must not be over fifty (50) years of age at the point of recruitment;
- At least Master's in engineering, hydrology or renewable energy technologies. In case of a candidate with extensive work experience in the SSHP sector, the academic requirements can be reduced;
- Minimum of five years of work experience in relevant fields of small scale hydropower in the private and/or public sector: engineering, project development, training and curricula development, SHP resource/potential assessment/atlas;
- Particular certification in SSHP is an added value
- Extensive knowledge of the energy situation in the ECOWAS region and extensive work experience in the ECOWAS region
- Professional skills in at least two ECOWAS languages (English, French or Portuguese)
- Good skills in project cycle management and project budget administration;
- Experience in energy project appraisal (technical, economic, financial, social, environmental criteria)
- Experience in working with private sector;
- Ability and skills to plan, coordinate, manage and execute plans, programs (with a similar range), policies and actions aimed at the development and promotion of projects;
- Awareness of business trends economic, technological, social, legal and political conditions and factors which could affect the viability of SSHP projects;
- Have the capacities and attitudes in order to work with multidisciplinary groups
- Proficiency in the use of software packages;
- Analytical capacity and negotiation skills;
- Capacity to work under pressure and availability to travel;
- Ability to organize, analyze and synthesize different types of information in a systematic manner

The electronic application contains the following documents:

- Detailed CV
- Track record of assignments of similar scope and focus (list of int. projects and descriptions)
- Scanned copy of highest university certificate and other technical certifications, licenses and quality standards related to the assignment
- Scanned copy of passport

10.3 ECOWAS SSHP Expert

Post title: ECOWAS SSHP Expert
Duty station: ECREEE, Praia, Cape Verde
(longer stays at one of the ECREEE NFIs and int. travel are required)
Duration: One year (with the possibility for extension)

General Description

Under the supervision of the SSHP coordinator the ECOWAS SSHP Expert will assist the international SSHP program manager in executing the activities of the annual work plans in accordance with the agreed budget and time schedule. The expert is based at the ECREEE Secretariat in Praia, Cape Verde, and will closely work with the National Focal Institutions (NFIs) and other SSHP stakeholders in the region. Longer stays at one of the ECREEE NFIs or the URC-SHP, might be required. Moreover, the expert will work with the contracted consultants and project implementers on implementing their assignments successfully.

Duties and Responsibilities

Management Tasks

- Assist in the implementation of the annual SSHP work plans in alignment with the project document and the decisions of the ECREEE Executive Director.
- Assist the program manager in monitoring the progress of the program and its administrative and financial execution;
- Assist in organizing the meetings of the TC and EB;
- Assist in developing the annual work plans, progress reports and financial reports of the SSHP program in cooperation with the program staff;
- Assist in elaborating periodical reports on the progress and achievements of the SSHP program in relation to its objectives, results and indicators (incl. analytical recommendations for adaptations and revision of activities etc.);
- Assist in compiling the information provided by the National Focal Institutions (NFIs) about the progress of the execution of SSHP projects (e.g. feasibility studies, construction);
- Assist in fund raising activities and contribute to preparation of project proposals to be co-funded by the European Union, the Global Environment Facility (GEF) or other partners.

Technical Tasks

- Coordinate with the other technical ECREEE experts and the NFIs
- Effectively implement and monitor the assignments of contracted consultants and project implementers in cooperation with the int. program manager
- Implement a wide range of different SSHP activities (e.g. trainings, conferences, policy activities, co-funding of projects)
- Assure quality of approved projects according to donor requirements and ensure that pro-poor, environmental, and gender impacts have been assessed;
- Prepare and execute complex procurements and call for proposals;
- Evaluate tender bids and project proposals;

- Elaborate contracts for project execution;
- Monitor co-funded SSHP projects in the field
- Organize trainings and conferences

Communication

- Build up a network of local SSHP experts from the public and private sector
- Build collaborative partnerships between the Centre and other international centers, initiatives with a view to leverage know-how, resources, technologies (e.g. IRENA, REEEP, Africa-EU Energy Partnership, UN Energy, GEF, GFSE).
- Ensure harmonization of SSHP program activities with other donor initiatives and alignment with local initiatives and support systems (local subsidy systems for renewable energy);
- Establish strategic links to loan and equity finance institutions (such as development banks in donor countries, national or regional development banks, World Bank);
- Establish policy dialogue with ECOWAS/WAPP/ERERA and national institutions on regional SSHP policy aspects (e.g. providing feed-back from project experiences etc.);
- Network with national and regional chambers of commerce etc. in order to integrate representatives of the business community into the regional forums.
- Engage relevant stakeholders in renewable energy policy dialogue including public institutions, civil society and private sector;
- Create synergies to the other ECREEE and UNIDO activities (e.g. workshops, conferences, trainings, GEF SPWA, call for proposals); define work relations with the UNIDO International Centre for Small Hydropower based in Abuja, Nigeria;
- Ensure effective public relations and publication of information on the SSHP Program to different target groups (communication strategy, forums);

Qualification:

- Candidate must be a Citizen of an ECOWAS Member State and must not be over fifty (50) years of age at the point of recruitment;
- At least Master's in engineering, hydrology or energy. In case of a candidate with extensive work experience in the SSHP sector, the academic requirements can be reduced;
- Minimum of three years of work experience in relevant fields of renewable energy in the private and/or public sector
- Particular certification in SSHP is an added value
- Extensive knowledge of the energy situation in the ECOWAS region and work experience in the ECOWAS region
- Professional skills in at least one ECOWAS language (English, French or Portuguese)
- Good skills in project cycle management and project budget administration;
- Experience in energy project appraisal (technical, economic, financial, social, environmental criteria)
- Experience in working with private sector;
- Ability and skills to plan, coordinate, manage and execute plans, programs (with a similar range), policies and actions aimed at the development and promotion of projects;
- Awareness of business trends economic, technological, social, legal and political conditions and factors which could affect the viability of SSHP projects;
- Have the capacities and attitudes in order to work with multidisciplinary groups
- Proficiency in the use of software packages;
- Analytical capacity and negotiation skills;
- Capacity to work under pressure and availability to travel;
- Ability to organize, analyze and synthesize different types of information in a systematic manner

The electronic application contains the following documents:

- Detailed CV
- Track record of assignments of similar scope and focus (list of int. projects and descriptions)

- Scanned copy of highest university certificate and other technical certifications, licenses and quality standards related to the assignment
- Scanned copy of passport

10.4 Chief SSHP Administrator

Post title: Chief Administrator
Duty station: ECREEE, Praia, Cape Verde int. travel is required
Duration: One year (with the possibility for extension)

Responsibilities and duties

This post is located in the Secretariat of the ECOWAS Centre on Renewable Energy and Energy Efficiency (ECREEE) based in Praia, Cape Verde. Under the supervision of the Executive Director the Chief SSHP Administrator is responsible for the following duties:

- Assists the international SSHP program manager and regional coordinator in all administrative and financial issues
- Management, organization and quality assurance (supervision) of all administrative and financial processes
- Ensure the maintenance of all fiduciary standards (financial, administrative, procurement, internal controls, project cycle management) required to manage international donor funding (e.g. European Commission, GEF, UN).
- Administration and management of the financial contributions directly managed by ECREEE
- Support actively the planning and preparation of the annual budget of the SSHP work plans. Give strategic inputs to the annual work plan and ensure budgetary long-term planning to avoid financial short-falls.
- Assist the technical experts in the administration and financial management of projects and give inputs to improve the project cycle management procedures (e.g. contract templates, monitoring and reporting requirements, quality requirements for project implementers, appraisal).
- Develop and maintain the SSHP contact network
- Support and organize recruitments in accordance with the internal rules of ECREEE
- Ensure quality of ECREEE contracts, appraise financial progress reports provided by project implementers and ensure timely financial disbursements and payments according to the established payment schedules. Prepare financial project reports for international donors.
- Support the procurement process in coordination with the other administrative staff of ECREEE;
- Support the ECREEE internal and external correspondences concerning the SSHP program;
- Prepare contracts with consultants and project implementers
- Assist in the evaluation process of projects
- Coordinate and support the documentation and respective archive related to administration;
- Support the planning and implementation of important SSHP events
- Support the collection and processing of statistical relevant data for the SSHP program;
- Support the management of the assets of the SSHP program;
- Assist in the initiation and implementation of policies in respect of general administration;
- Collaborate with external auditors on request;
- Prepare the annual financial statement in cooperation with the accountant and present it to the Executive Board of ECREEE.
- Support the preparation of the financial reports of the SSHP Program;
- Collaborate with external auditors.
- Manage the assets and inventory list of ECREEE.
- Organize the travels of the technical staff

Qualification

- Completion of University Degree in Economics, Business Administration or equivalent certificate/training in Finance, Office Management, Human Resources or other related field.
- Minimum 6 years of previous job experience relevant to the function; experience in a multi-cultural, international environment, coordinating the administration and personal management;
- Proficient use of processing tools (Word, Excel, PowerPoint and Access) Internet, electronic mail and financial/administrative systems. Experience with content management systems of websites is desirable;
- Good knowledge of Portuguese, English and French, the official languages of the ECOWAS Commission

The electronic application contains the following documents:

- Detailed CV
- Track record of assignments of similar scope and focus (list of int. projects and descriptions)
- Scanned copy of highest university certificate and other technical certifications, licenses and quality standards related to the assignment
- Scanned copy of passport

11 LOGICAL FRAMEWORK

Impact level	**Impact**	**(Objectively verifiable) impact indicators**	**Means of verification** **(data source)**	**External factors** **(assumptions; risks)**
	• 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.	<u>Contribution to the objectives of the ECOWAS Renewable Energy Policy (EREP):</u> • Increase installed SSHP capacity to 787 MW by 2020 and 2.449 MW by 2030. • Serve 25% of the ECOWAS population through mini-grids partly powered through SSHP by 2030		
Outcome level	**Specific objectives / outcomes**	**Outcome indicators**	**Means of verification**	**External factors**
	1. Conducive policies and legal frameworks are elaborated for the various countries and their adoption is supported	• At least 6 ECOWAS countries obviously improved their legal framework (poverty reduction impact of SSHP in evidence in the legal framework, feed-in tariff defined, transparent licensing procedure etc.) • ECOWAS/WAPP integrated SSHP into their scenarios, planning documents and budget allocations	• Suggestions for improvement of country policies and legal frameworks • WAPP/ECOWAS planning documents and budget allocations (e.g. Master Plan)	
	2. Priority target groups have improved their SSHP know-how through capacity development and quality guidelines are introduced	• National SSHP initiatives and projects increasingly rely on local expertise from public and private sector (with limited international support) • Quality guidelines are in use and quality of SSHP project proposals and feasibility studies has improved	• Number of available good quality / “certified” project proposals elaborated by national consultants	

	3. Knowledge management and awareness raising improve accessibility to crucial information for SSHP development	• The "hydropower observatory", planning tools and all other SHPP related publications of ECREEE are available online and utilised • ECREEE established as centre of excellence	• Information on web-page and related statistics on downloads • requests for cooperation, received by ECREEE	
	4. Investment and business promotion activities lead to planning, implementation and sustainable operation of SSHP projects and the development of a local industry	• At least five additional SSHP systems (< 100 kW) are installed and operational and produced electricity from SSHP plants has increased by at least 2,000 MWh • At least two SSHP systems (< 200 kW) are rehabilitated • Development of at least 7 additional SSHP projects per year (up to feasibility study level) is supported • At least 10 companies started to provide various SSHP related services (planning, operation, repair etc.)	• Monitoring of implemented SSHP projects and produced MWh • number of project developments per year • Monitoring of newly offered services	

Outputs / project results	Output indicators	Means of verification	External factors
SPECIFIC OBJECTIVE 1: Conducive policies and legal frameworks are elaborated for the various countries and their adoption is supported			

Outputs / project results	Output indicators	Means of verification	External factors
Output 1a) bottlenecks of SSHP project implementation and operation, of current policies and legal frameworks and roles and shortcomings of relevant stakeholders are understood and recommendations for improvement are elaborated and discussed	• 6 SSHP case studies are analysed in depth and a publication on the analysis is launched • Report on stakeholders, policy and legal frameworks and on country-specific recommendations for an SSHP-conducive legal and policy environment for the various ECOWAS countries is available • A workshop on results and recommendations is held • A publication on the outcomes is launched; media response	• Reports on case studies, on policy and legal assessment • List of country-specific recommendations • Workshop report • Publication	• Interesting case studies and respective information can be identified, support from local stakeholders • Information on current policy and legal framework is made available • Policy makers are open to discuss their policy and legal framework to become more SSHP-conducive
Activities under Output 1a): • Identification of three successful and three failed SSHP projects, analyses of lessons learned and success factors (with focus on technical, financial, operational, legal and institutional aspects) and publication of the results • In all ECOWAS countries with significant SSHP potential: assessment of SSHP relevant policies, legal frameworks, main stakeholders, their roles / responsibilities, analysis of ownership issues and associated potential poverty reduction impact of SSHP projects within current frameworks; elaboration of country-specific recommendations • Presentation and discussion of the case study analysis, the legal and policy assessment results and the recommendations in an ECOWAS-wide workshop and lobbying for the adoption of the recommendations • Publication on the analysis and the final conclusions drawn from workshop discussions			
Output 1b) Adoption of policies and legal frameworks with regard to SSHP-conduciveness is supported and SSHP has become integral part of ECOWAS/WAPP planning documents	• Concerned ministries, policy makers and other relevant stakeholders have received the various recommendations and concrete help for implementation • A “lobbying workshop” (on above mentioned proposals / recommendations) is held • ECOWAS/WAPP has integrated SSHP into their planning documents	• Regional policy paper • Communication with stakeholders • Workshop report • White paper publication	• Policy makers are open to discuss and adjust their policy and legal framework to become more SSHP-conducive and they are ready to take supportive action • ECOWAS supports development of specific SSHP targets and measures to support SSHP implementation

Outputs / project results	Output indicators	Means of verification	External factors
Activities under Output 1b): • Lobbying for adoption of recommendations, for integration into legal frameworks and policies of the respective countries and consideration of investment subsidies (especially isolated systems in the range of micro and mini hydro which in general are not profitable) • Discussion and lobbying during a workshop • Concrete assistance to implement the recommendations (e.g. improvement of licensing procedures, templates for power purchase agreement, options for incentive schemes) • Support to ECOWAS/WAPP to integrate SSHP into their RE policy, their scenarios, planning documents / master plans and in particular into their budget allocations • Short paper on the achievements made			
SPECIFIC OBJECTIVE 2: Priority target groups have improved their SSHP know-how through capacity development and quality guidelines are introduced			
Output 2a) A capacity development strategy is elaborated and activity planning is "harmonised" with objective 4	• A summary on the capacity needs assessment with respective conclusions is available • A draft strategy on capacity development is elaborated and continuously updated	• Time table and work plan for realisation of various types of trainings	• Assessment achieves adequate number of responses to questionnaires • Priority target groups with basic knowledge can be identified • Activities under specific objective 4 can be implemented in parallel with trainings
Activities under Output 2a): • Interviews with priority target groups to assess their capacity and identify their knowledge needs: i) consultants, construction companies, equipment manufacturers, utilities etc. with regard to resource assessment, planning, implementation and operation of SSHP projects ii) trainers at educational institutes (vocational schools, universities, training centres, Regional Centre for SHP Abuja etc.) iii) policy makers, administrative staff, project developers, NGOs etc. with regard to regulatory, legal, institutional and financial issues • Formulate a capacity development strategy defining type, number and duration of class room, hands-on trainings in the field and workshops; all capacity building activities shall be based on "reality trainings" meaning that they are directly implicated in activities under specific objective 4 (site assessment, planning, implementation etc.)			

Outputs / project results	Output indicators	Means of verification	External factors
Output 2b) In the public as well as in the private sector, local capacity is strengthened and SSHP related know-how has increased	• Trilingual learning modules on technical, financial, institutional and legal aspects and on project development are elaborated • A trilingual handbook on SSHP project planning, construction and operation is developed (based on available high quality handbooks by adapting them to W-African conditions) and disseminated • 2 regional train-the-trainers workshops - covering all countries with SSHP potential – have been organised and train-the-trainers platform on SSHP is established • A comprehensive training on field investigations is realised, resulting in assessment of at least 6 x 5 potential sites • At least six 2-weeks technical trainings each with 15-25 participants are implemented each year in different ECOWAS countries and participants' satisfaction is continuously monitored • At least three 3-day (high level) workshops on legal, institutional and financial aspects each with 25-35 participants are implemented each year in different ECOWAS countries and participants' satisfaction is continuously monitored	• Training modules • Trilingual handbook • Database with trainers and network web site • Lists of participants and reports on trainings and workshops • Participants' appraisal	• Participants have at least basic know-how and a similar level of understanding • Logistically capacity building can take place in conjunction with site assessment, project planning and implementation (objective 4) • Relevant key stakeholder can be identified, attend the workshops and share knowledge within their country

Activities under Output 2b):

- Elaboration of training modules including practical examples, exercises etc. for the technical training and e.g. best practice examples for legal, institutional etc. issues
- Based on available handbooks and guidelines, elaboration of a trilingual handbook on SSHP appropriate for W-African conditions and dissemination of the new handbook
- Preparation and implementation of 2 regional SSHP train-the-trainers workshops covering all ECOWAS countries with SSHP potential
- Field survey of at least 6 most promising sites in each of 5 selected ECOWAS countries and on-the-job training of surveying staff → contribution to establishment of "hydropower observatory" (objective 3)
- Preparation and implementation of various types of trainings on technical and financial aspects for engineers, technicians etc.; participants are selected from public and private sector: training and educational institutions, utilities, technical services, consultants, construction companies etc.); subject to the capacity development strategy apply the "train-the-trainers" approach wherever possible and useful; all trainings are implemented for the different language groups
- Preparation and implementation of (high level) workshops on a) policy, legal and institutional issues for policy makers and project developers (isolated and grid-connected systems, PPA, feed-in tariff, legal situation regarding access to energy resources → poverty reduction impact, etc.) and b) specific workshops for the banking / insurance sector and project developers on financing, risk management and collateralisation
- Continuous monitoring of participants' satisfaction and further training needs

Outputs / project results	Output indicators	Means of verification	External factors
Output 2c) Quality guidelines are introduced during trainings and are generally applied for development and implementation of hydropower projects	• A manual on minimum quality guidelines is available • Guidelines are in use and adapted to national contexts • Proposal on a certification procedure is available (who certifies what and for which objective?)	• Quality guidelines manual • Written proposal on "certification" options	• Authorities see benefit in using quality guidelines • "certification" of projects is beneficial to various interested developers, donor agencies etc.
Activities under Output 2c): • Develop minimum quality guidelines (site assessment, feasibility study, tendering, implementation rules, rules for SSHP operation, standards for equipment) • Include quality guidelines into the various trainings and continuously adopt them according to requirements • Analyse possibilities for "certification" of project proposals			
SPECIFIC OBJECTIVE 3: Knowledge management and awareness raising improve accessibility to crucial information for SSHP development			
Output 3a) Structures are established which facilitate open knowledge sharing and the provided tools and contents are utilised	• Number of sub-sites and quality of content of webpage on SHPP-related subjects; number of visits and of up- and downloads; regular up-dating of web entries • Expert-supported "question and answer service" is provided and leads to the establishment of active communities of practices • Realisation of at least 1 study tour per year (max 15 participants) with different foci (technical, legal, policy, institutional etc.) to countries with relevant experience (in South and North) • Feedback from "knowledge users" is collected and knowledge management strategy is adapted accordingly	• Information on web-page and related statistics • Planning tools are accessible on webpage • All relevant documents provided by ECREEE are available • Feedback during workshops	• Interested users have electricity and (fast) internet access! • Sufficient project implementations which allow the stakeholders to exchange information on substantial progress

Outputs / project results	Output indicators	Means of verification	External factors
Activities under Output 3a): • Elaboration of relevant SSHP related contents, tools, handbooks, templates etc. (see specific objectives 1, 2 and 4) • Establishment of a new well-structured web-page (integrated in the ECREEE webpage) making available tools and contents as elaborated during the SSHP Programme; caption and sharing of knowledge on various SSHP related subjects and planning tools available from other projects • Establishment of an online forum ("question and answer service") • Development of liaison programmes • The various activities (under different specific objectives) are used to get feedback and to exchange on strengths and weaknesses of the knowledge management concept			
Output 3b) An information base on relevant SSHP resources is created and helps to facilitate the development and implementation of SHP programmes and projects	• Comprehensive information on hydropower potential and sites is available • Relevant information is presented and can be complemented in the online-"hydropower observatory"	• Information on web-page and related statistics • Number of up- and downloads	• Relevant SSHP information (runoff data, feasibility studies etc.) is made available • Regional centres of excellence and experts can be engaged to help create new knowledge specific to the region
Activities under Output 3b): • Regional assessment of SSHP resources through: a) analysis of available studies, runoff data, maps etc. and b) field investigations (among others planned field survey mentioned under output 2b); presentation of the results in the **"hydropower observatory"** • Design of an interactive webpage which allows users to download and complement additional (hydrological, topographical, GIS based etc.) information			
Output 3c) A communication strategy disseminating achieved progress and raising awareness about SSHP opportunities is developed and implemented	• Increased knowledge on lack of adequate information • Flagship publications published annually • Relevant stakeholders are up-to-date on SSHP development	• Questionnaire on awareness compared with initial stakeholder analysis	• Sufficient success stories will attract interest • Publication attracts significant international attention
Activities under Output 3c): • Elaboration of strategies on how to tackle and overcome knowledge deficits, misconceptions and reasons for reluctance to get engaged in SSHP initiatives • Collect information on activities of other donor agencies, government organisations, NGOs etc. with regard to potential cooperation to develop a flagship publication • Implementation of a SSHP conference by the end of the Programme to present relevant results			

Outputs / project results	Output indicators	Means of verification	External factors
Specific OBJECTIVE 4: Investment and business promotion activities lead to planning, implementation and sustainable operation of SSHP projects and the development of a local industry			
Output 4a) At least 5 SSHP projects (< 100 kW) are operating and - during their planning and implementation - have served as demonstration projects for capacity building	• 5 SSHP sites are selected for realisation in a transparent procedure • The 5 sites are successfully planned and the whole planning procedure was linked to capacity building measures • Sustainable Operation and management structures are established for the 5 SSHP systems • The 5 sites are successfully implemented and the whole implementation was linked to capacity building measures	• Planning documents • Tender docs • Protocol on operation	• Agreement on site selection can be found • Combination of project realisation and training is logistically possible
Activities under Output 4a): All activities in the project cycle as listed in the following are integral part of capacity building (specific objective 2) and will be implemented according to the quality guidelines: • Compilation of relevant information and realisation of site surveys in order to select at least 5 SSHP projects to be implemented in the following; prioritisation according to transparent selection criteria • Preparation of feasibility studies, detailed design and tender docs; establishment of an institutional set-up for management and operation (community participation) • During implementation: development of sustainable operation and management structures, training on tariff setting, book keeping etc. • After successful bid appraisal, project implementation, site supervision and commissioning			
Output 4b) At least 2 refurbishment / rehabilitation projects (< 200 kW) are identified and realised	• At least 2 projects are selected in a transparent procedure • The 2 rehabilitation / refurbishment projects are successfully planned and the whole planning procedure was linked to capacity building measures • The 2 sites are successfully implemented and the whole implementation was linked to capacity building measures	• Planning documents • Tender docs • Operating schemes	• Agreement on site selection can be found • Combination of project realisation and training is logistically possible

Outputs / project results	Output indicators	Means of verification	External factors
Activities under Output 4b): All activities in the project cycle as listed in the following are integral part of capacity building (specific objective 2) and will be implemented according to the quality guidelines: • Preparation of feasibility studies for rehabilitations / refurbishments, detailed design and tender docs; establishment of an institutional set-up for management and operation (community participation) and implementation of rehabilitation			
Output 4c) Over 5 years, at least 35 additional projects (new projects or rehabilitations) in different ranges of capacity up to 30 MW are developed and at least 5 are brought to financial closure (funding opportunities for realisation identified); in parallel 10 SSHP related service companies are developing	• Annual call for proposals of the ECOWAS Renewable Energy Facility (EREF) on SSHP (financing windows: investment and business promotion) • At least 7 additional SSHP sites per year are developed further through the EREF, meaning they are co-funded for pre-investment activities (e.g. measurements, feasibilities, structuring); including new constructions and rehabilitations • In total at least 5 of the developed projects (1 per year) are brought to financial closure • Information on SSHP funding opportunities are published and regularly updated • At least 10 companies in the sector have been supported by the EREF and are starting to provide various SSHP related services (planning, operation, repair etc.)	• Documented proposals • Commitments for financing FS • Publications on attractive projects for realisation	• Interest by stakeholders to get engaged in programmes and projects • Relevant funding opportunities will come up during timeframe of SHP Programme
Activities under Output 4c): • Adoption of the ECOWAS Renewable Energy Facility EREF to SSHP requirements, elaboration of guidelines and standards for application; realisation of yearly calls for proposals • Financing and quality control of pre-investment activities: e.g. site assessments, feasibility studies or revision/improvement of existing FS, financial structuring • Identification of potentially interesting SSHP sites and presentation of the elaborated project proposals (based on quality guidelines / “certified” projects) to interested stakeholders (donor agencies, NGOs, private investors, other SSHP developers) for realisation • Combination of the activities with hands-on training of SSHP planners, developers etc. (harmonisation with specific objective 2) • Preferential awarding of contracts for feasibility studies, planning activities, construction works and other services to **local** companies; promotion of cooperation with international companies under the condition that additional training requirements are covered by the SSHP Programme			

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2012 INTERNATIONAL YEAR OF SUSTAINABLE ENERGY FOR ALL

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