



## Summary of the Roadmap of the ECOWAS Solar Energy Initiative (ESEI)

### Presentation

There is increased drive towards regional approaches in addressing the region's developmental challenges. The energy sector is spearheading this initiative as demonstrated by the establishment of ECOWAS Regional Centre for Renewable Energy and Energy Efficiency (ECREEE) and other on-going regional projects such as the West African Power Pool (WAPP), the West African Gas Pipeline (WAGP) and the ECOWAS Regional Electricity Regulatory Authority (ERERA).

In 2006, ECOWAS/UEMOA adopted the White Paper on regional policy on access to energy services for populations in rural and peri-urban areas. These initiatives reflect an increasing drive for integrated energy markets in the region and hence justify a regional approach in developing the renewable energy and energy efficiency sectors. For example, the ECOWAS/UEMOA White Paper foresees that at least 20% of new investments in electricity generation in the region will be driven by renewable resources.

It was against this background that Regulation C/REG.23/11/08 of the 61st Session of ECOWAS Council of Ministers in Ouagadougou, Burkina Faso, established ECREEE on November 23, 2008. On 6 July 2010 the official inauguration of the ECREEE Secretariat took place. The event marked the completion of the six-month preparatory phase and the official launch of the operational phase of the Centre.

The Vision of ECREEE is to contribute to the sustainable social, economic, and environmental development of West Africa by improving access to modern, reliable and affordable energy services, energy security and reduction of energy related GHG emissions and climate change impacts on the energy systems. The specific objective of ECREEE is to create favourable framework conditions and an enabling environment for renewable energy and energy efficiency markets by supporting activities directed to mitigate existing barriers.

To create the necessary regional awareness on the different renewable energy technology options ECREEE will facilitate technical meetings on a regular basis. In this regard, the Centre organizes its first Regional Workshop on the ECOWAS Solar Energy Initiative (ESEI) to be held in Dakar, Senegal, from 18 to 21 October 2010. It will seek to bring together regional and international experts to define a regional strategy for large-scale solar energy deployment across West Africa. The strategy will be executed under the guidance of ECREEE in cooperation with the ECOWAS Member States.





As an initial step an operational solar energy road map will be adopted in the workshop. The road map will take advantage of the full menu of feasible solar energy technology options. This includes centralized and decentralized systems for electricity generation, heating and cooling services. The potential of large-scale applications to meet the rapidly growing energy demand of urban areas and to boost regional power trade as well as small-scale installations to support productive uses in rural and peri-urban areas will be considered. The final outcome of this roadmap is to carry out the provision of sustainable energy services through implemented solar energy programs and projects. Through this Roadmap of the ECOWAS Solar Energy Initiative, we expect in a few years, establishment of conditions to start with the implementation phase of solar projects in the region.

Similar initiatives will be developed for other renewable energy sources (wind, bioenergy, small hydro, amongst others).

## Key issues of the roadmap

The key issues to be addressed includes:

1. Policies and standards
2. Solar Resource Assessment versus Existing and Potential energy facilities
3. Appropriate Solar Technology Solutions
4. Capacity building and education
5. Financing mechanisms and fund mobilization
6. Solar energy stakeholders and networks

### **1. Policies and standards**

At the regional level, policy and regulatory frameworks should be developed and adopted by the member states as an ECOWAS renewable energy protocol (e.g. regulations, codes, quality standards).

In line with the regional policy framework, national level, policies, regulations and implementation strategies, which include solar energy targets and incentives (such as “feed-in tariffs”), should be developed and adopted by each member state.

Action	Outcome
Best practises on the solar sector at international level	-Database of best practises -International awareness of the solar initiative of ECOWAS
Renewable energy policies and experiences in West Africa	-Database of renewable energy policies in ECOWAS -Regional (and national) awareness on the need for solar energy policy at national and regional levels -First analysis for a regional solar energy promotion policy
Development of a regional solar energy policy and implementation strategy (including targets, work packages and verifiable indicators)	-All stakeholders are involved during the policy design -Regional and national policies approved -Milestones at regional and national levels for the implementation of the policies established -Monitoring system introduced



Implementation and monitoring of the regional solar energy policy and strategy	-Database of the policy implementation actions and impacts established
--	--

## 2. Solar resource assessment versus Existing and Potential energy facilities

For effective and efficient deployment of solar energy in the region, a solar resource map is mandatory. A “technological solar energy map” is needed where not only the solar resource is shown but also information, particularly relevant for investment decision-making (e.g. technology suitability, grid connections, population, master plans) using a Geographical Information System (GIS). This tool will provide the optimal technology and sizes of solar installations to be implemented at specific sites. At these locations, pre-feasibility studies will be conducted, including preliminary assessment of economic, social, environmental and technical aspects.

Action	Outcome
Solar Resource assessment and data collection	-GIS with optimal locations for solar projects -National stakeholders aware of the solar energy project possibilities - Elaboration of a solar energy investment handbook for the region (including solar resource maps, data, market information, local suppliers)
Pre-feasibility studies of solar power plants and pilot programs (e.g. regional solar home system program) in the region	-Several profile projects are identified and disseminated. -Private and financial sector are aware of the major opportunities of solar energy projects in the region.

## 3. Appropriate Solar Technology Solutions

Among the broad range of already available solar energy technologies in the market, the identification and selection of the most appropriate to serve the various sectorial energy service needs of different target groups is crucial (e.g. private households, companies, industry, low-income and high-income). The ESEI will take into account the different energy realities and needs of rural, peri-urban and urban areas and will support demand-driven and not technology-driven solutions. Economic justification, including social and environmental sustainability of the different solar technology options should be carried out.

Solar cooling has good potential to reduce peak loads on electricity grids. Small scale solutions already exist, both small and large scale.

In order to get a successful solar energy deployment in the region, ECOWAS must minimize its dependence on imported technology: manufacturing and skilled human resources. For this reason, the local industry and agricultural sector must be regarded as the engine that will drive the sector and generate economic growth. On the other hand, existing heavy industries and other sectors in the region must shift their energy consumption to solar energy technologies in order to be more efficient, cost effective and clean. This would, therefore, create the demand for the solar energy within the region.

Public-Private-Partnerships (PPP) will be facilitated in order to achieve the right synergies.

Action	Outcome
Appropriate technologies for West Africa on low	-Economic justification of the different solar



temperature solar thermal systems (including warm water heating, cooling, solar drying and solar cooking solutions)	technology options by considering other available energy resources, conventional and renewable energy options
Appropriate technologies for West Africa of concentrated solar power (small-scale and large-scale)	-Selection of most appropriate technologies and applications for the region -Stakeholders of the sector contacted and aware of the solar initiative in the region
Appropriate technologies for West Africa of photovoltaic systems (on- and off grid)	
Mapping Local manufacturers and development of a technology transfer strategy	-Potential manufacturers of the region are identified and mapped -Knowledge and technology transfers on solar technology are identified
Promotion of solar energy technologies in agriculture, intensive industries and other sectors in the region	-Technology transfers is implemented at different private sector companies in the region -Agricultural, Industrial and other productive sectors in the region have switched to solar technologies in the recommended applications -The demand of solar technology in the region increases
Establishment of a regional standards certification centre	Regional Solar Standards Centre created
Development of applied research to the local manufacturing solar sector	Local solar solutions technologies developed

#### 4. Capacity building and education

Technology without skilled human resources in charge of its own manufacturing, installation and maintenance is bound to fail. If the solar energy initiative is intended to be deployed in ECOWAS, comprehensive education and training programs must be considered. Different levels of skilled human resources are needed: university, technical, continuous training and training of illiterates especially women in the rural areas for sustainability.

In order to create greater awareness at different levels about the solar energy initiative and also to acquire data on local expertise, some pilot or demonstration projects should be implemented. Projects for CSP or PV plants and hybrid plants, either on or off-grid, can be identified and implemented. It is also possible for scaling-up applications of the solar thermal energy for heating and cooling. Special attention will be paid to the monitoring and evaluation.

Action	Outcome
Overview of the current education and training opportunities on solar energy in the region and in other regions	Map of suitable educational institutions that offer solar energy studies
Development of curricula to prepare skilled human resources for the solar energy sector in the region	Existing curricula and study plans for solar energy courses, training for policy makers and training programmes for illiterates especially women for sustainability
Establishment of formal studies in academic institutions in the region and also to general public	On-going solar energy courses and trainings
Implementation and monitoring of demonstration projects	Several solar energy projects executed
Evaluation of existing solar installations	Documented lessons learned



## 5. Financing mechanisms and fund mobilization

Financing for solar energy systems need tailored funding mechanisms and schemes. For rural applications, tools such as micro-finance, start up subsidies may be required. Grid-connected solar power plants need huge financial resources and government support at the start-up phases. This financing can be in form of loans, grants, assets, private equity and venture capital, or a combination of these options. Private and public financing is desired to secure the funds needed to implement large and medium size solar power plants. Other financing mechanisms like Green Fund, GEF (e.g. country contributions from the GEF 5 country grant to West Africa), CDM, Kyoto and non-Kyoto protocol mechanisms should also be employed. Another option to be considered is financing from national governments themselves (e.g. Renewable Energy Fund, levies on electricity or fossil fuels) <sup>1</sup>.

Renewable energy projects are also considered as high risk investment by financing institutions. An assessment directed to reduce this risk for solar power plant investments must also be conducted.

Action	Outcome
Economic and financial analysis of solar energy projects in the region for small, medium and large scale solar energy investments (including identification of experiences and lessons learned of the deployment of solar energy)	Dissemination of the financial analysis report to donors, regional development banks, private financing sectors
Promotion and facilitation of innovative financing mechanism (e.g. GEF, CDM, carbon finance) for solar energy projects in the region	Application of different financing mechanisms
Assessment of the viability to establish a West African Solar Energy Fund as a part of the ECOWAS Renewable Energy Facility for rural and peri-urban areas (EREFF)	Analysis of a Renewable Energy Fund proposal
Execution of a special solar financing window in the ECOWAS Renewable Energy Facility for rural and peri-urban areas (EREF)	Call for proposals by the EREF launched and implemented

## 6. Solar energy stakeholders and networks

Actual and potential networks/stakeholders at international, regional and national level must be involved in the solar energy programme (e.g. industry, policy institutions, financial institutions, universities, research institutions, NGOs...).

Action	Outcome
Data collection on various solar energy sector stakeholders, associations and platforms	Database of solar energy stakeholders established
Establishment and promotion of a network of solar energy stakeholders, associations and platforms	Solar energy network established and operational
Establish formal agreements with relevant institutions involved on solar energy (e.g. IRENA)	Formal agreements signed
Creating internal and external communication and information platform	

<sup>1</sup> Action plan adopted by the International Conference on Renewable Energy in Africa – Scaling up renewable energy in Africa, 2008



## Roadmap Time Frame

These key issues are expected to be implemented within the next five years.