

**The Republic of The Gambia  
Office of the President  
Energy Division**

**Renewable Energy Study for The Gambia**



**Institutional Study Report**

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## Abbreviations

AfDB	African Development Bank
DCD	Department of Community Development
DoE	Director of Energy
GBA	Greater Banjul Area
GDP	Gross Domestic Product
GoTG	Government of The Gambia
GREC	Gambia Renewable Energy Centre
GTZ	German Agency for Technical Co-operation
IMSC	Inter-Ministerial Steering Committee
LI	Lahmeyer International
LPG	Liquefied Petroleum Gas
NAWEC	National Water and Electricity Company
NGO	Non-Governmental Organisation
OMVG	Organisation pour la Mise en Valeur du Fleuve Gambie
OP	Office of the President
PIU	Project Implementation Unit
PM	Project Manager
PV	Photovoltaic
RE	Renewable Energy
REIS	Renewable Energy Information System
REMP	Renewable Energy Master Plan
RETs	Renewable Energy Technologies
SMU	Study Management Unit
TAF	Technical Assistance Fund
TOR	Terms of Reference



## 1. Introduction

Under funding of AfDB Lahmeyer International has been contracted by the Government of The Gambia, Office of the President, Energy Division to provide consulting services for the “Renewable Energy Study for The Gambia”.

The study purpose is to develop and promote the use of renewable sources of energy in The Gambia, with particular emphasis on rural areas. The study further is meant to assist the Gambian authorities in preparing projects that will provide sufficient energy to the population and improve their access to social services such as education, health services and water supply. In consequence, the study is supposed to contribute to poverty reduction through the improvement of economic and social conditions of the population particularly in the rural areas and to help to stop the ongoing environmental degradation.

One important part of the project, is the Institutional Study, which carries out an assessment of the institutional set-up in the Republic of The Gambia with regard to renewable energy sector development, in order to identify information, resource and capacity constraints which limit the subsector’s stakeholders’ ability and effectiveness to further develop the use of renewable energy sources in The Gambia.

The study identifies the interrelations and distribution of work and responsibility of the institutions and organisations concerned, to assess the adequacy and current capacity of those institutions, and to propose a revised institutional set-up, which will ensure an enabling environment for RE implementation, as well as a high degree of private sector involvement.

The institutional study is based on an inventory of those institutions and organisations that are or should be involved in the renewable energy planning and market development process in the Gambia (government bodies, parastatals, scientific institutions, NGOs, community-based organisations, and selected industry players).

The Consultant defined and executed an interview program, which aimed at analysing each organisations activity with regard to

- The match between formal responsibility on the one hand and project work and/or planning & co-ordination activity put into practice on the other;
- The adequacy of resources and information access to perform its assigned planning or execution task in an effective way;

The interviews were documented and summarised, in order to draw conclusions and elaborate recommendations for changes and improvements in the institutional set up with regard to:

- information gathering, storage and processing needs as well as required research support
- supportive policy measures and standards
- necessary modifications in the legal and institutional sector structure as well as the sector’s legislative and regulatory environment



- capacity building needs among government entities, private sector players and /or local communities.

In the final part of the report, the Consultant discusses and proposes the adequate institutional set-up and capacity for the successful implementation of RE projects and policy in general and the proposed Master Plan in particular.

## **2. The Renewable Energy Sub-sector in The Gambia**

### **2.1. General Considerations**

When analysing the status and capacity of Renewable Energy in a country, one has to consider the unique circumstances and conditions of the country that promote or hinder the use of renewable energy.

This includes the analysis and consideration of aspects, like

- What is the energy system in place and what are the energy and development challenges which the country is attempting to address
- What are the primary drivers, motivations, for the nation to support the development of RE. What are the stated goals of the government and what lies behind them? Is it imported fuel substitution, rural economic development and electrification, or climate change?
- What were some of the policy or program mechanisms which the country attempted to undertake and were they successful in creating an environment in the energy market for new energy technologies and implementers at root?
- What were the lessons learned?

For The Gambia a serious lack of reliable and affordable energy can be considered as one of the primary constraints to sustained economic and social development. The country, due to its dependency on thermal electricity production, has been particularly hit by the high cost of fuel for power generation. It also suffers from the following energy-related problems:

- Rapid rate of biomass depletion and natural resources degradation, primarily associated with uncontrolled exploitation of natural forests (fuelwood) for cooking needs;
- Low agricultural productivity and insufficient improvement in the quality of life for low income rural and urban populations due, in part, to the absence of tools, equipment and systems, which could make more effective use of energy, including renewable energy.

In response to these constraints, a number of renewable energy projects were implemented in the past, like the “Solar-powered equipment for rural areas” funded by UNCDF, and “The Regional Solar Programme” (RSP), funded by the EC, among others. Both projects focussed upon the installation of solar-powered equipment primarily for the health, education, telecommunication and social development programmes and for provision of potable water in rural areas.



Throughout the Gambia, there is an urgent need for the further promotion and wide spread implementation of renewable energy technologies, as this could be expected to:

- reduce the dependency on petroleum through implementation of use of solar energy devices (photovoltaic), wind generators and thermal (water heating) systems
- reduce the biomass depletion through improved wood stoves
- improve the quality of life by reducing the time and effort required to obtain basic social amenities
- reduce the strong current agricultural dependence on weather conditions through installation of PV (Solar) small/medium scale irrigation systems
- improve the rural health care through the installation of solar powered refrigerator/ freezer that could preserve vaccines
- improve the access to education and training through solar powered TV satellite systems (in order to provide locally suitable adult education programmes), and the setting up well-defined regional structures to promote periodic day as well as night-time training programmes at several levels.

The following sections present a comprehensive analysis of the major stakeholders in the Renewable Energy market in The Gambia, including government bodies and parastatal organizations, non-government and community based organizations, as well as private sector participants. Similarly the existing legal framework and the RE policy measures and targets were compiled and reviewed. For the main legislative documents and the main RE market stakeholders a more detailed analysis of content, structure as well as functions and roles has been executed, and the capacity, strength and shortcomings of the RE sub-sector have been critically assessed.

## **2.2. Government Institutions**

### **2.2.1. General**

The number of institutions in the public sector which, in one way or another, are concerned with aspects relevant for Renewable Energy planning, policy and project design and RE project implementation is large, and basically comprises the following:

- Energy Division – Office of the President
- Gambia Renewable Energy Centre (GREC)
- National Water & Electricity Corporation (NAWEC)
- The Gambia Public Utilities Regulatory Authority (PURA)
- Department of State for Forestry, Parks & Wildlife and the Environment (DoSFP&W&E)
- Department of State for Local Government and Lands (DoSLG&L)



- Department of Community Development-DCD)
- Department of State for Justice (DoSJ)
- Department of State for Finance and Economic Affairs (DoSF&EA)
- Department of State for Agriculture (DoSA)/ Department of Livestock Services (DLS)
- Department of State for Fisheries and Natural Resources (DoSF&NR)
- Department of Fisheries
- Women's Bureau
- The Gambia College
- GAMTEL
- National Agricultural Research Institute (NARI)
- Gambia Technical Training Institute (GTTI)
- Rural Development Institute (RDI)
- National Environment Agency (NEA)

Presently the whole energy sector responsibility is allocated to the Office of the President (OP). The two Divisions overseeing energy issues are the Petroleum Division and the Energy Division.

The Petroleum Division is responsible for the promotion of the country's hydrocarbon potentials, negotiating the award of exploration and production licences, negotiating bilateral and multilateral co-operation agreements and developing policies and strategies to enhance the development of the industry.

The Energy Division formulates energy policies and supervises the activities of the Gambia Renewable Energy Centre, a body responsible for research, development and utilisation of alternate energy resources. The Division collaborates with the Department of Forestry within the Department of State for Agriculture on policy for fuel wood supply and demand.

The National Water and Electricity Corporation (NAWEC) is responsible for the nation wide generation, transmission and distribution of electricity, as well as for the supply of potable water. It is as well supervised through the Office of the President.

Other Departments of State are involved in the traditional energy sector through the implementation programmes aiming at biomass conservation. Among these is the Department of Community Development (DCD) in the Department of State for Local Government and Lands, which conducts adaptive research into improved technologies for energy production with traditional fuels, and also handles sociological aspects of traditional fuels;

The Department of Fisheries and the Women's Bureau are implementing programmes on improved fish smoking ovens and the Forestry Department and the Gambia-German Forestry Project are working on forestry management, the



preparation of national inventories of forest resources and wood fuel supply management.

The Department of Water Resources (DWR) is the responsible for The Gambia's participation in the OMVG initiative to generate hydro-electricity for its member-countries (The Gambia, Senegal, Guinea and Guinea-Bissau).

Concerning the RE sub-sector, the Energy Division, through its technical arm, the Gambia Renewable Energy Centre (GREC) assumes the responsibility for conducting adaptive research and development, and promotion of renewable energy and alternative energy technology use. The scope and objectives of the main public sector institutions related to the implementation of RE based projects and policies are described in some detail in the following.

### **2.2.2. The Energy Division in the Office of the President**

The aim of the Division is to ensure a reliable, efficient and least-cost provision of energy services as well as to maximise the efficient development and utilisation of scarce energy resources to support economic development in an environment-friendly way for poverty reduction.

The Division of Energy has been assigned the responsibility to:

- Establish Policy that promote an environment conducive to attracting investments in the construction and rehabilitation of the electric sector in the short, medium, and long term;
- Promote the restructuring and privatisation of state enterprises in the electric sector and the establishment of a competitive electricity market;
- Support scientific research and education in electricity sector matters, promote efficiency in the production, transmission, distribution, and marketing of electricity, and create a comprehensive electricity conservation program for the Gambia;
- Monitor and recommend policies regarding the effect on the environment of all electricity activities, and incorporate national environmental protection goals in formulation and implementation of energy programs;
- Establish policies to promote the establishment of relationships between Licensees and electric sector entities in foreign countries, and promote the establishment of transit and import/export relationships in the electric sector;
- Establish policies regarding direct subsidies for electric supplies to specific customer classes and policies regarding priority consumers of electricity;
- Establish a strategy for electric sector emergency situations; and
- Establish policies to enhance The Gambia's energy security.

The capacity of the Energy Division in terms of number of staff and staff qualification is limited, some of the already very small number of positions are vacant, others occupied by staff, which is mainly involved in their overseas studies and qualification efforts. The office environment is partially inadequate and working tools and facilities are poor, or do just not exist.





### **2.2.3. The Gambia Renewable Energy Centre (GREC)**

In mid-1984, the government of The Gambia requested the assistance of the Regional Centre for Solar Energy (CRES) in establishing a Gambia Renewable Energy Centre (GREC). CRES, in turn, applied to the Gesellschaft für Technische Zusammenarbeit (GTZ) to delegate a 'project exploration and project definition mission' for the purpose of elaborating a project proposal for a Gambian Renewable Energy Centre.

The government by the end of 1984 inaugurated the centre and its primary tasks include:

- assisting the then Ministry of Economic Planning and Industrial Development in the preparation and implementation of projects falling within the scope of renewable energy technologies or exhibiting some such components,
- preparing planning bases for Renewable Energy Projects,
- installing and testing demonstration facilities,
- encouraging the production of Renewable Energy systems and system components in The Gambia,
- providing training for the operation, maintenance and production of Renewable Energy equipment, systems and/or components,
- performance of maintenance & repair work on Renewable Energy systems,
- initiation or participating in popularization campaigns for Renewable Energy equipments,
- cooperating with comparable West African and other international institutions and
- coordination and/or participating in Renewable Energy Projects involving Renewable Energy components.

On the 8th of August 1990, the Ministry of Economic Planning and Industrial Development was changed to be the Ministry of Trade Industry and Employment (DOSTIE) and GREC was further consolidated as the technical arm of the Ministry, responsible for research, development and development and utilization of alternative energy sources.

GREC was involved in a number of activities among which are the following:

- GREC planned and installed demonstration facilities i.e. windmills for water pumping, solar home systems (photovoltaic), improved stoves, solar water heaters, etc.
- GREC has also, through collaboration with the Folke Centre for Renewable Energy (a Research Centre in Denmark), secured and installed a wind turbine at Kololi in the Greater Banjul Area.
- GREC implemented GAM\86\CO1 (Renewable Energy for rural areas). This project was responsible for the installation of solar refrigerator freezers and lighting systems in 25 health centres throughout the country as well as solar



power equipment for telecommunication including solar operated pay phones, as well as solar water heaters.

- GREC is also responsible for the coordination of the home system aspect of the Regional Solar Program (RSP), financed by European Union, the project provided for the country 36 solar system i.e. light and freezers for veterinary sub-stations and day care centres country wide.
- Workshops and seminars were held for the public and private sector.
- Support to DoE for its participation in regional projects like PREDAS, etc.

Irrespective of its activities in the past, the current state of the GREC is poor, with a very limited number of qualified staff, and deteriorated and obsolete offices, office equipment and technical installations. The GREC is currently not fulfilling any of its initially defined tasks and responsibilities its capacity for RE promotion, demonstration, project and financing identification and project implementation and control has completely vanished.

In the course of the current RE Study, some of the GREC offices have been refurbished and adequate office equipment (including IT hard-and software, internet access, etc.) was installed.

#### **2.2.4. The Public Utilities Regulatory Authority (PURA)**

The Gambia Public Utilities Regulatory Authority Act of 2001 provides for the establishment of a "Public Utility Regulatory Authority (PURA)" to regulate the activities of providers of certain public services, amongst them energy services (electricity, petroleum, gas) communication services, water and sewerage services and transport services.

The Act came into effect after it was gazetted by the Secretary of State for Finance and Economic Affairs in November 2003. The PURA was finally established in 2005.

The functions of the Authority are to

- (a) provide guidelines on rates and fees for the provision of regulated public services;
- (b) examine rates and fees chargeable for the provision of regulated public services;
- (c) protect the interest of consumers and of public utilities;
- (d) monitor and enforce standards of performance by public utilities;
- (e) initiate and conduct investigations into standards of services by public utilities;
- (f) promote fair competition among public utilities;
- (g) conduct studies relating to economies and efficiency in the provision of regulated public services to consumers;
- (h) collect and compile data on regulated public services and their provision necessary for the performance of the Authority's functions;



- (i) provide advice in respect of regulated public services and their provision;
- (j) maintain a register (which may be in electronic form) of public utilities and the services they provide;
- (k) publish, in such manner as it considers appropriate, information relating to the Authority's functions and activities;
- (l) recommend and administer, in accordance with the Regulatory Act, a licensing system in respect of public utilities;
- (m) prepare or cause to be prepared any relevant documentation (including drafts of any required legislation) necessary to give the Authority the power to regulate public utilities in accordance with this Act; and

The Authority shall in carrying out its functions seek to balance the interests of both the consumers and public utilities.

Under the Act, the power of the Authority to issue licenses for regulated utility services is stipulated. The license arrangement will give the Authority power to ensure that the interests of both, the service provider and the customer are adequately protected.

Price determination is a major regulatory function, as the regulator tries to restrain the monopolist from setting excessive prices. The Electricity Act, contains detailed provision for the regulation of tariffs.

The key source of funding of PURA is a regulatory fee levied on the service providers. This is provided for under Part X of the PURA Act and is therefore legally binding upon all regulated service providers to contribute a share of their revenues as their share towards the cost of regulation.

The main aspect, apart from the requirements that will be imposed on potential providers of RE based energy/electricity supply to customers, will be the conditions as defined in the license requirements, but to an even larger degree the decision of the PURA concerning the prices to be allowed for the service providers. The decision, whether it will be a cost-plus based tariff, or whether the approach of "full avoided cost" will be chosen, will have a major impact on the attractiveness of the RE market to the private market and the potential investors.

Due to the fact, that the PURA has only been established in early 2005, it has not yet taken full responsibility for the tasks and responsibilities assigned, but is still in an inception phase to establish basic infrastructure, and to design, prepare and implement first customer related (information) projects and documents.

## **2.3. The Legislation**

### **2.3.1. General**

There are a large number of legislations in place in The Gambia, which in one way or another are relating to aspects relevant for Renewable Energy planning, policy and project design and RE project implementation. The legislations in general are the:



1. National Environment Management Act, No. 13 of 1994
2. Local Government Act, Chapter 33:01, Act 26 of 1963
3. Continental Shelf Act, Chapter 26:01, Act 11 of 1965
4. Public Health Act, Chapter 40:03, Act 2 of 1990
5. Public Health Regulations (Subsidiary Legislation)
6. National Water Resources Council, Chapter 66:02, Act 22 of 1979
7. Forest Act, Chapter 61, Act 9 of 1977
8. Wildlife Conservation Act, Chapter 62:01, Act 1 of 1977
9. Petroleum Act, Chapter 65:01, Act 14 of 1921, amended by 3 of 1976
10. Petroleum (Exploration and Production), Chapter 65:02, Act 13 of 1986
11. Land Tenure and Land Use: Lands (Provinces) Chapter 57:03, Act 16 of 1945
12. State Lands Act, 1990
13. Physical Planning and Development Control Act, 1990
14. Land Use Regulations, 1995
15. State and Lands Regulations, 1995
16. The Gambia Divestiture Agency Act, 2001
17. The Gambia Public Utilities Regulatory Authority Act, 2001
18. The Electricity Bill, 2005

The analysis of the various clauses and regulations potentially related and influencing the development of the RE sub-sector would by far exceed the scope and requirements of this study, some of the key legislation and supporting documents, however, are presented in more detail in the following.

### **2.3.2. The Electricity Bill 2005**

The objectives of the Bill, among others, are to

- (a) promote the generation, transmission, supply, dispatch and distribution of electricity in The Gambia for public, domestic and industrial purposes;
- (b) set standards relative to electricity services;
- (c) promote energy efficiency and supplies;
- (d) assure sufficient and reliable electric supplies for all classes of consumers;
- (e) establish cost-effective and reliable electric supplies for all classes of consumers;
- (f) determine adequate rates, charges and fees in relation to electricity and relative methods of collection thereof for services rendered to all classes of users; and



- (g) effect a transition to a private investor controlled and operated electricity sector in which, through competition, where feasible, and regulation in non-competitive markets, prices accurately reflect the costs of efficient production, transmission, dispatch, and distribution of electricity.

According to the Bill, the responsibility for overall policy development in the energy and RE energy sub-sector rests with the Department of State, which will, among other things, be responsible for

- (a) establishing policies that promote an environment conducive to attracting investments in the construction and rehabilitation of the electricity and RE Energy sub-sector in the short, medium and long term;
- (b) promoting efficiency in the production, transmission and distribution of electricity and in the use of electricity by consumers, and creating a comprehensive electricity conservation programme for The Gambia;
- (c) monitoring and recommending policies regarding the effect on the environment of all energy activities, and incorporating national environmental protection goals in the formulation and implementation of energy programmes.

The Gambia Public Utilities Regulatory Authority is vested with the power to administer the Bill in accordance with the provisions of the Bill and The Gambia Public Regulatory Authority Act, 200.

### **2.3.3. The Public Regulatory Authority Act**

This Bill complements The Gambia Divestiture Agency Act, 2001 by establishing The Gambia Public Utilities Regulatory Authority (PURA) charged with the duty of regulating the activities of persons (public utilities) who provide certain services to the public (regulated public services) especially where they enjoy a monopoly in the provision of a service.

The public utilities that may be regulated are those providing energy services (electricity, petroleum and gas), communication services (telecommunications, broadcasting and postal services), water and sewage services, and transport services (on land, water and in the air).

The power to issue licences to public utilities is vested in the Secretary of State responsible for the regulated public service concerned or such other person as may be specified in the legislation applicable to the regulated public service on the advice of the Authority.

The Bill provides for licensing arrangement which will be administered by the Authority. In cases where licensing may not be necessary because, for example, there is sufficient competition in the provision of the regulated public service, the Act permits the Authority a degree of control by requiring a public utility to comply, when providing the service, broadly with certain standards, and the fees and charging guidelines prescribed by the Authority.

The licensing arrangement will give the Authority the power to ensure that the interest of both the public utilities providing a regulated public service and the consumers of the service are adequately protected.



The Authority is accordingly vested with the necessary powers to enable it to discharge the functions and duties for which it is to have responsibility under the Act.

The Authority is to operate entirely independently and is not subject to control by the government nor by any other person. This is necessary if people are to accept that the Authority is acting as an independent arbiter – in much the same way as the courts act. The members are therefore given a degree of security of tenure so that they may act without fear or favour.

The sources of the Authority's funding are varied and include monies provided by the Government, and fees and charges it receives from licensees and for the other services it provides.

By virtue of being able to charge these fees and charges, the Authority is expected to become self-funding so that it can be seen as truly independent and not reliant on government funding to continue to be able to carry out its regulatory functions.

The Authority is to submit annual reports to the Secretary of State who is required to lay them before the National Assembly as soon as practicable.

Finally, the Secretary of State, acting on the advice of the Authority, is empowered to make any necessary regulations under the Act.

#### **2.3.4. Energy Policy Document Final Version January 2005**

The objectives of the Energy policy concerning RE energy is stated in the document as follows:

The aim of the Renewable Energy sub-sector is to ensure the promotion and judicious utilisation of renewable energy that will bring about the sustainable development of the country. The specific objectives are to:

- a) Promote the utilisation of renewable forms of energy such as solar, wind and bio-mass;
- b) Promote the use and develop, to the extent possible, a domestic production capacity for renewable energy fuels and technologies;
- c) Ensure the sustainable supply of renewable energy fuels/device/technologies at competitive prices through private sector participation.

### **2.4. The Private Sector Organizations**

#### **2.4.1. Private Companies**

The list of private sector companies and organisations which are participating in the RE sub-sector is given in the following:

- GAM-Solar Engineering Company
- V.M Gambia Ltd.
- Gambia Electrical Company (G.E.C)



- Dabakh Malick Energy Centre
- Touba Gas
- M & C Gas
- Gam Gas
- Swe Gam

The main players in the RE market seem to be GAM-Solar Energy & Engineering Co. Ltd and Gambia Electrical Company.

GAM-Solar Energy & Engineering Co. Ltd., a private company with about 23 employees is active in promotion and marketing of clean energy technologies including solar home systems, solar water heaters and energy efficient light bulbs. E&Co and the Rockefeller Foundation supported GAM-Solar in 1999 with a \$30,000 loan for the preparation of a business plan and \$125,000 in equity for working capital to implement a solar home 8 village pilot project.

As a result of the pilot project, GAM-Solar's business strategy is the implementation of a solar energy and electrical lighting efficiency plan in The Gambia serving 5,000 customers in the residential and commercial sector over 5 years.

GAM-Solar offers three types of energy services: Photovoltaic (PV) solar electricity systems, solar water heating systems (SWH) and energy efficiency compact fluorescent light bulbs (CFLs). GAM-Solar will provide households and businesses with electricity through the installation of solar systems and portable PV lanterns, both through cash sales and short-term credit. Credit is offered to qualified organisations, including the Village Development Committees (VDCs), Teacher's Credit Union and other credit unions, NGOs and employers that can make periodic deductions from their members or employees salaries. GAM-Solar is also considering providing a line of income generation equipment tied to solar energy sources to these organisations. In May 2001, E&Co approved an additional \$30,000 loan to GAM-Solar to purchase equipment.

Gambia Electrical Co. LTD (GEC LTD), a company of about 70 employees is active in the traditional electricity supply areas, like generators installation and cabling, but also to a certain extent in the provision and installation of solar equipment.

Other companies operate on a rather small scale in the RE market, or, like V.M Gambia are reconsidering their business strategy, with the possibility that renewable energy might no more be part of their portfolio.

From an initial assessment, the GAM-Solar Energy & Engineering Co. Ltd. seems to be the private company, which covers the broadest scale of RE related services, and which already has acquired some experience with the cooperation with external financiers for the implementation of RE projects. A very valuable experience is the administration of the Village Maintenance Fund for sustainability of the project after the Five-Year Warranty of the solar based pumping stations.



#### **2.4.2. Non-Governmental and Community-based Organisations**

The main organizations include:

- **AFET** (Association of Farmers Educators & Traders)
- **FORUT** (For Development & Solidarity)
- **TANGO** (The Association Of Non-Governmental Organisations)

#### **2.5. Ongoing and Planned Sector Reform Developments**

Regarding the structuring of the electricity sector, the objectives of the government focuses on the increase of electricity supply capacity that is presently inadequate and unable to meet the demand. The government therefore continues to seek foreign and local partnership in increasing the generating capacity, as well as:

- capital investment to improve the poor state of the transmission and distribution system which result in high technical losses and un-metered consumption; and
- improving efficiencies so as to reduce the extremely high cost of energy.

The Government continues to undertake measures at overcoming these problems through institutional strengthening and other restructuring efforts. In that regard, the Government tries to attract local and foreign interest in the sector so as to achieve, in the short to medium term

- reduction of the cost of electricity
- increase of the accessibility and supply reliability of electricity nation-wide, and
- mitigation of the environmental impact of the power sector.

Strategies laid down for the energy sector/renewable energy sub-sector include the creation of a more conducive legal and regulatory framework, the formation of a partnership with the private sector, and the participation of independent power producers (IPP's).

Regulations for full privatisation of the electricity sector were established in the recent past, and the sale and handing over of NAWEC to private investor(s) had already been negotiated, but was finally not concluded.

The proposed (improved) institutional framework for the implementation of the energy policy is described in the "Gambia Energy Policy Document Part 2 - final version of January 2005" as follows:

- a) Office of the President to be the coordinating office for implementing this Policy;
- b) Creation of a National Energy Commission (NEC) to guide policy implementation and review. The Commission should be composed of members from both the public and private sectors, to reflect the holistic approach necessary for efficient development of the Sector. The mandate of the Commission shall include:
  - Overseeing and monitoring the implementation of the National Energy Policy (NEP);





- Participate in periodic policy review;
  - Deliberation on energy-related matters that impact on the Energy Sector and the economy;
- c) Strengthening of the Energy Unit in the Office of the President in the immediate future, to enable it conduct its technical coordination functions; and elevation of the Unit to a Department of Energy (DOE), in the medium-term to long-term, to serve as the Technical Secretariat to the NEC and also execute the following responsibilities:
- Planning, coordination, monitoring and evaluation of all energy-related activities in the implementing institutions (existing institutions as well new ones proposed to be created to facilitate policy implementation);
  - Foster effective in-country inter-agency collaboration, to facilitate efficient policy implementation;
  - Ensure strengthening of the Gambia Renewable Energy Centre (GREC) to provide technical backstopping in the sound development and use of renewable energy;
  - Establish/nurture linkages with sub-regional/regional energy-related initiatives (including knowledge networks, WAPP and the OMVG), to facilitate accrual of substantial benefits to The Gambia, in energy development and utilisation;
  - To network, as appropriate, with other countries/organisations abroad, particularly in the development of technologies and human resources, to enhance the Gambia's potential in the development and use of energy-efficient and environment-friendly technologies for national energy supplies;
  - Prepare list of roles for all participating institutions to ensure effective policy implementation;
  - Monitor each institution to ensure that there is maximum efficiency in the execution of their assigned tasks;
  - Conduct periodic evaluation exercises and submit reports;
  - Periodic reports should identify constraints in the implementation process and propose measures for overcoming the constraints;
  - Ensure that all existing and new legislation are implemented;
  - Ensure effective liaison between the participating institutions, the private sector and non-government organisations;
  - Prepare and identify funding for a comprehensive capacity-building programme for the energy sector, in collaboration with the various sub-sector agencies, to build a critical mass of expertise, at all levels that would facilitate sustainability of energy supplies.

Although those proposals have not yet, or just partly implemented, they clearly mark the Governments efforts and commitment to the establishing of an adequate



and efficient institutional and regulatory environment for the energy/renewable energy sector/sub-sector.

## **2.6. Critical Assessment**

### **2.6.1. General**

The major constraints for the larger scope implementation of RE in The Gambia can be summarized as follows:

- The human, physical and financial resources available for energy planning and management activities including further research development and promotion of Renewable Energy technologies on all levels of government is very limited.
- Legislation and energy policy documents provide for a major role of Renewable Energy in The Gambia, the application and implementation of those regulations and policies, however, seems to be slow and fragmented.
- Technical training of local technicians in Renewable Energy technology and systems is insufficient.
- The operation, repair and maintenance capability for RE equipment and systems is still limited throughout much of the country.
- The marketing and dissemination of RE systems for productive purposes and domestic requirements is still not deemed sufficient.

### **2.6.2. Information gathering, storage and processing capacity**

In the course of the study, the available information sources and media, as well as the quality and completeness of the information provided by the different study stakeholders was reviewed. The analysis finally led to the assumption that there is just very limited, often unstructured and dispersed information, documentation and data about Renewable Energy available in the respective institutions in the Gambia. There exists no central information registration and storage system, which would allow fast and structured identification and access to those data and information required for RE planning and implementation. Individual persons and institutions have some scattered documentation and information available, but it is often outdated and even obsolete.

The adequacy, reliability and validity of information is, however, even more important in the RE sector than in other areas, as the Renewable Energy market and the basic data of research and implementation experience are permanently increasing and improving, technologies are developing fast and price and cost levels are permanently changing.

There should be a central library and database established, most probably in the GREC, which should provide all standard documentation relating to those sources of RE which are applicable in the Gambia. Relevant basic information and data which are usually required for adequate planning of RE projects should be collected from those other Government agencies, like Central Statistics, which are in charge to produce and develop it. Such information, in electronic and printed version, should be analysed, and finally registered and made available to other



Government institutions as requested, but should also be made available to the public in general and potential investors in particular. A computer based document administration system with adequate indexing and search function will have to be implemented.

The space, furniture, and IT requirements: a computer, software, adequate office room and furniture are already available thanks to the present study.

In the course of the ongoing RE study, a resource potential database for RE is being established. This infrastructure should already provide a good basis for the future, more comprehensive database and documentation system.

### **2.6.3. Planning and research capacity**

At present, there seems to be no considerable planning and research capacity existing in the Gambian RE sub-sector. It seems as if research in RE technology has always been very limited, planning capacity must have been existed due to the number of RE projects and measures implemented in the past.

The technical and human resources capacity for even just basic research in RE energy technologies, like the analysis of the adequacy of certain RE technologies for the specific environment of The Gambia, possible ways and means to adapt such technologies, etc. were initially part of the planned activities of the GREC, but at present nothing is existing. The technical installations which were initially installed at the premises of the GREC are nowadays in poor condition, long outdated, or just not functioning anymore and therefore obsolete. The entire technical infrastructure for basic research in RE will have to be re-established. There seems to be no relevant research activity in the private or non governmental sector.

The analysis of recent programs and projects which were implemented and which included RE technologies shows, that there were e.g. activities concerning the installation of solar based water pumping systems executed by the Ministry of Water, but without involvement of the GREC. Other projects were implemented by private companies, but also without the involvement of the GREC. The private companies were mostly supported and strengthened by private, non commercial organizations.

Therefore, a certain project planning capacity should exist in The Gambia, but it is located outside of the governmental institutions.

### **2.6.4. Project implementation capacity**

Similar to the assessments made above concerning information and research aspects, the project implementation capacity of the governmental institutions can be judged as being poor. This evaluation is even more true, if the capacity is evaluated e.g. in the light of the requirements of the large number of (parallel) projects, that can be expected to result from the implementation of the RE master plan.

For those projects, which would include small scale activities with relatively inexperienced local counterparts, like local communities and institutions an even more comprehensive implementation support would be required, than for projects



which are finally executed by international experienced companies. For local investors and project companies implementation capacity would also have to include the aspects of support of feasibility assessment, technical design, financing, as well as the support of counterparts concerning project execution and management, operations, billing and accounting.

The current capacity and structures of the existing government institutions which could potentially be assigned the responsibility for the implementation of RE projects is inadequate, means almost non-existent.

Due to RE projects executed in the last years, some project implementation experience and capacity can be expected to exist in the private sector of The Gambia.

### **3. The Proposed Institutional Set-up for the Renewable Energy Sub-Sector**

#### **3.1. General**

The institutional framework includes the roles and relationships among the various institutions, bodies and agencies, at all levels of the bureaucracy, involved in developing and managing RE resources.

In most countries, the authority and responsibility for developing and managing the renewable energy resources belong to the State, and it is usually executed by a central government agency, depending on the form of government.

In some countries that have adopted a policy of decentralization, the authority and responsibility of the State is devolved from the central level to the lowest appropriate level of the bureaucracy. The principle is that nothing should be done at a higher level of government that can be done at a lower level.

Among the strategic policy actions to ensure an effective institutional framework are those related to the central national agency to coordinate planning of sub-sectors and planning across sectors.

The management instruments are the tools and techniques that enable decision makers to make rational and informed choices between alternative actions that would make governance more effective. These choices should be based on agreed policies, available resources, analysis of environmental impacts, and social and economic consequences.

The management instruments may be grouped into RE resources assessment, the establishment of adequate communication and information systems, legal instruments, and economic instruments.

Proposed government efforts to improve RE governance include creating a favourable “enabling environment”, restructuring the institutional framework to ensure the integration and coordination of all activities, and developing and implementing the management instruments for effective RE governance.



The enabling environment for effective governance consists of the basic laws, policies, and regulations for developing and managing RE resources, which governments provide through legislative and executive actions.

Considering the often large number of comparatively small sized projects, and in the light of the often insufficient quantity of financial resources that can be made available by governments from international funding and own resources, the governments increasingly rely on the private sector to provide additional investment and support. Therefore the enabling environment should be defined to attract private sector investment without compromising the rights and assets of all stakeholders: government, private sector, and the public.

Among the strategic policy actions that would enhance the enabling environment are those related to RE legislation on service licensing and service provision, decreasing role of government and more focus on policy making and regulation; identification of service providers that are responsive, autonomous, and accountable; private sector participation to attract investments, improve performance and efficiency; and resource and economic regulation.

However, strategic policy reforms take time to develop and must be adapted to rapidly changing environments. To be successful, a prudent, measured approach may be necessary with countries prioritizing proposed actions rather than trying to change everything at once.

### **3.2. The “Enabling Environment” in The Gambia**

In general terms, there are well defined and elaborated targets concerning the important role of Renewable Energy in The Gambia defined in the energy policy documents of the country. Similarly, the legislation already provides for a major role of Renewable Energy, and the institutional set-up, with a renewable energy centre and a regulating authority for (government) independent administration and control of private sector participation in the RE sector already provides an adequate theoretical basis for RE program implementation.

In reality, however, the situation is quite different, as the current institutional capacity for the design, implementation and support of RE programs and projects in The Gambia is poor. The government agency which is basically responsible for the policy design, the establishing of adequate sub-sector planning and coordination, as well as the promotion and support of private sector participation in the provision of RE services, the Division of Energy, has, as a Division, an inadequate status within the government structures. It has just limited number of staff, inadequate working environment, as well as a lack of the basic working tools and systems.

The GREC, the body responsible for the research, promotion and implementation support of RE technologies and know-how, is in a deteriorated state, not only in respect of its offices and installations, but also in terms of the qualified manpower assigned to the organization (just one technician has been identified).

Such an environment is not just inadequate to fulfil the basic tasks and responsibilities for a basic support of the diffusion of RE in The Gambia, it is deemed even more inadequate for the challenges of the envisaged implementation



and supervision of a large number of projects resulting from the RE Masterplan currently under preparation.

For the GREC, two aspects and responsibilities can be identified: its general role in terms of provision of information and support for the research and promotion of renewable energy, and its potential role in the implementation of the upcoming projects.

The support immediately required to enable GREC to fulfil its tasks and responsibilities as originally defined would include

- rehabilitation of offices,
- provision of basic working tools and facilities,
- installation of adequate IT equipment for the information database, data processing, preparation of demonstration and promotion materials
- rehabilitation and/or replacement of the RE demonstration facilities,
- identification and acquisition of new staff and
- training of the new and existing staff.

In addition, however, further efforts would be required to create a truly “enabling environment” in The Gambia, which would also foster the strong participation of the private sector in the implementation of RE projects. The current structures would have to be upgraded towards the creation and provision of comprehensive and low/no cost support to potential investors for RE projects. The concept is called “One Stop Shop”. All capacity, know how and support facilities would be concentrated in one location, in order to ensure that potential investors would not finally be frustrated and lost in “the jungle” of governmental institutions and regulations.

Tasks for the One Stop Shop includes:

- a) Advertise its existence and services, make contacts with actors in the sector
- b) Support the Implementation of projects by
  - providing assistance for project identification and assessment
  - providing advice and assistance to entrepreneurs
  - assisting in preparing proposals for funding
  - providing links to suppliers in the country/region/internationally
- c) Bring together projects for making project financing easier
- d) Help upgrade project proposals to fungibility/ bankability
- e) Bundling of projects to attract finance / minimise transaction costs / find easier ways to bring in money

It is proposed to establish a body, which fully supports all phases of project identification towards the final implementation of a project in a manner, that the investor, either a community based or a private body, in a full and comprehensive manner. The investor would not just be assisted in terms of basic data i.e. RE



resource data and advice, but guided through all planning and implementation phases by qualified engineers, economists and financial experts, advised e.g. on the possible provision of grants and loans with preferred conditions, operational matters, like how to organise billing and revenue collection, bookkeeping and annual balance sheet requirements, etc.

In the Gambia, this responsibility should be allocated to the GREC.

With the improved new structure, there would be a section which could provide information from the future database, and already give some explicative demonstration on the basis of the demonstration equipment installed at the centre. In terms of project implementation GREC would provide the specific support to the potential investor, in terms of design of information about the requirements and the execution of the feasibility study, inform about the financing options and conditions, support after the feasibility of a project has been proven, support of the application for financing support, and, if applicable, also determine the degree to which the GREC, through project development funds would be willing to bring in own funds as equity participation.

At the next stage of the implementation, the GREC would, through its Technical Unit, also provide the advice and support concerning practical questions and approaches for technical and organisational project implementation. Training related to maintenance and support would be made available through the GREC, as well as some training about the billing and accounting processes and systems. Such training would be staffed from the different section of the GREC, and provided according to the requirements of the projects under implementation.

As those activities would relate to the standard and day-to-day business of a RE Centre, it will have to be analysed, to which extent this structure would also be able to cover the management and supervision of the large number of projects that will result from and be financed and co-financed by the fund from the African Development Bank. For such projects there is usually a separate and relatively independent Project Implementation Unit established.

### **3.3. The Project Implementation Unit**

The term "PIU" refers to foreign-assisted project units that take many forms – such as Project Co-ordinating Unit, Project Management Unit, Project Implementation Unit, Policy Advisory Units, Project Implementation Cells or Technical Implementation Units – and that may be found in different locations inside or outside government, and sometimes within the donor agency itself.

However various their forms, PIUs are commonly distinguishable by organisational variables such as special arrangements for management and accounting, staffing and reporting that parallel routine government procedures. They are supported, at least in part, by external funding, exercise a degree of operational autonomy, and are more or less exclusively focused on a particular project or programme. Because of their autonomy, and inherent separation of powers (between government and donor agencies) the most common form of organisation for PIUs involves independence from the government entity (usually a Ministry) within which it operates. Studies have found that the majority of PIUs surveyed are in some way organisationally or operationally distinct from their 'parent' department.



There is a common management dilemma encountered in setting up special programme or project units for program implementation in order to compensate for weak institutional capacity in the host country. They are usually seen as pragmatic mechanisms for getting the job done. PIUs have demonstrated that, even in adverse circumstances, goals can be met, services delivered, and good performance extracted from quasi-national institutions. PIUs usually work well in the short-term; compensate for host-country institutional weaknesses; allow greater flexibility in hiring and staff incentives; ensure direct monitoring and accountability to funding agencies; ease language barriers between donors and host-country staff; and help minimise mismanagement and corruption in procurement.

However, PIUs raise fundamental issues related to national ownerships and capacity development. Even when they enhance service delivery, PIUs are parallel organisations with vested interests and competing incentives, making their absorption into the public sector often problematic. PIUs can thus embody a fundamental disconnect between two development principles: short-term efficiency and longer-term capacity.

To address this dilemma, the Consultant recommends that PIUs never be adopted as a first option, but that if PIUs are inevitable, steps are suggested to address problems of insularity, capacity-draining and non-absorption into the host agency.

- Pre-plan for project implementation: spend more pre-project time on understanding and preparing for project implementation, such as substantial upfront efforts for participative management training and preparatory restructuring of the host agency in the public sector. This will mean addressing the issues of longer-term capacity development during project design in an explicit manner.
- Link PIUs to host agency, not to donor agency: in some PIUs, staff carry business cards with the logo of the donor agency. This must be discouraged; the identification with the relevant public sector agency must be overtly acknowledged. The link of PIUs to sub-national constituencies and local authorities charged with project implementation must be made as explicit as possible.
- Identify an exit strategy: while some PIUs will naturally expire once their job is done, others will not. For the latter, it is crucial to make explicit the strategy of how to incorporate parallel institutions into the government structure as part of the PIU design. This requires clear sunset provisions and time-bound tenures from the outset of the project; as well as assuring adequate funds in the host agency budget to secure carryover of PIU functions.
- Avoid hiring from another PIU: One way to avoid the proliferation and extended use of PIUs, and thus contributing to government brain drain, is to avoid hiring staff from other PIUs. In all cases, PIU staff hiring should be a transparent and competitive process.
- Harmonise PIU with administration of host agency, not that of donor agency: align PIU policies, procedures, functions and reporting schedules with standard government operations. The PIU procedures should be seen to be working within the host agency, and not be tailored to fit the needs of the donor agency.

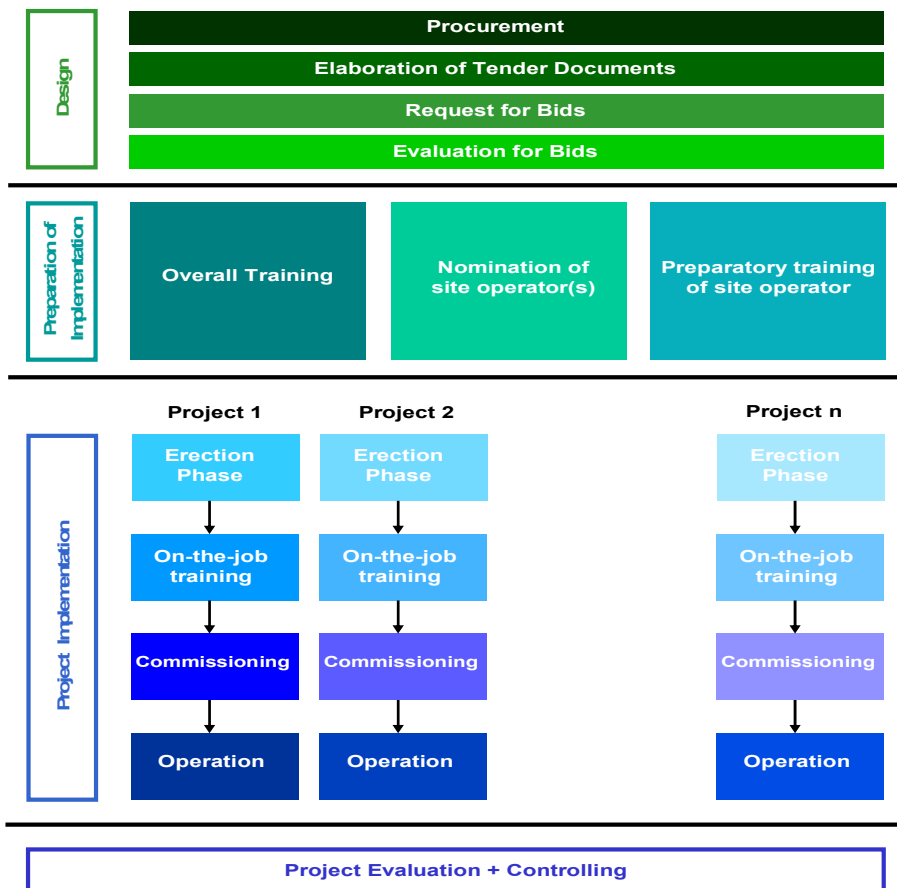




- Mobilise national capacity: engaging national talent from abroad through Transfer of Knowledge through “Expatriate Nationals” or virtually through the Internet, can be a practical mechanism for brain-gain rather than brain-drain. The UNDP-supported TOKTEN has been successful in bringing expertise back by encouraging skilled professionals to engage in the development issues in their country of origin.

For the RE Master Plan and The Gambia, the allocation and inclusion of the PIU unit as a section of the GREC is recommended. Some, if not all of the negative aspects could be avoided by this set-up, and a close collaboration between the “traditional” sections of the GREC and the RE Project implementation Section would be very helpful and fruitful. The phases and activities of the project implementation phase are presented in the following.

### Implementation of the pilot project phase



As a major part of the RE projects in The Gambia are expected to be executed by, or with the participation of the private sector, this aspect has to be further reviewed.



### 3.4. Private Sector Participation

There are numerous examples of private sector participation in RE based (rural) electrification in Africa along-side governments and development banks. A few are outlined in this section.

An example where rural electrification through PV technology has become a market is found in Kenya. The initial phase in solar home system diffusion was pushed with donor money but slowly a shift occurred leading to a private market for solar home systems installations. Still, however, some donor contributions are made both to financing and through education campaigns. A specific feature of the Kenya experience is that the systems installed are typically comparatively small and technically unsophisticated, which has increased the affordability for rural groups and hence the market. This has contributed to the development of an independent supply industry for PV.

In South Africa, a very ambitious programme on rural electrification through solar PV has been embarked upon. It is initiated by government as a part of its national rural energy programme and taking support from the private sector and the national utility, ESKOM in what is called public-private partnerships. In a pilot phase, six concession areas are established, each serviced by such a partnership, and serving about 50 000 households each. A partnership typically consists of ESKOM, a multinational supplier of PV technology, an international development fund, while local private entrepreneurs are used to a varying degree for installation and services. The aim is to electrify at least 1.5 million households in a ten-year period.

The participation of private sector participants in the implementation and operation of RE based projects could be on the basis of

- Unregulated private supply
- Private sector involvement through franchised operation subject to regulation by a public authority.
- Provision by consumer cooperatives.

In cases where single distributors obtain a monopoly to supply electricity, so that the consumer does not have the choice of switching to another supplier, the government has to ensure that prices reflect cost and that consumers are not victimized.

In order to ensure larger scale privately financed and operated RE projects also in areas, where grid supply by the national utility is already established, the framework and regulations have to be established, which ensure, that the utility will be required to buy (excess) electricity from private operators, like e.g. those which would install and operate small scale wind farms at the coast line of the Gambia close to the GBA NAWEC network. The question, under which conditions and obligations and to which price private operators would be allowed to feed into the national grid, is quite complex, and, irrespective of the fact, that GAMPOWER, the first African IPP is operating in the Gambia for a number of years, the existence of an adequate framework and legislation has to be adapted to the specific requirements of small scale production.



Whilst small RE based IPPs would require a license and would most probably be under the regulating authority of the PURA, there will also be small producers and private/community suppliers, where the question has to be answered to which degree those should fall under any kind of regulation or licensing.

In order to ensure a balance between project size and administrative requirements and efforts, the requisition of e.g. comprehensive application and licensing should be limited to larger scale producers (e.g. above 50kW installations), smaller producers should only be requested to register with the Regulatory Authority. Any other arrangement would provide a considerable hurdle for dissemination and multiplication of smaller supply projects.

As a consequence of the registering with PURA, the authority would ensure, that a certain degree of control of the non-licensed producers would be ensured, and that customer complaints could be directed to the PURA for analysis and respective action.

One of the major problems arises from the pricing of the energy. As renewable energy is usually more expensive as the one produced in larger conventional production facilities, many countries, which wanted to boost the installation and use of renewable energy created respective legal frameworks, which required the national and regional supply companies to buy the available access electricity from local producers at a preferred rate, which was even sometimes above the average price of production of the national supply company. The argument was, that the RE energy should be based on the concept of avoided cost, means on the basis of those production capacity (the most expensive one in operation) which could be replaced by the RE based supply.

The national supply companies in consequence established special tariffs (green electricity) where customers were able to purchase the renewable energy at a higher cost. The company was requested to ensure, that it obtained the amount of electricity produced on the basis of renewable energy per year, which was equivalent to the quantity the group of consumers with green electricity tariffs have requested. With the increase in numbers of customers and sales volumes of such customers, the utility has to establish own renewable sources and/or buy the respective amount from producers of such energy.

In terms of licensing of small scale electricity supply enterprises, a balance has to be found between the interest of the state, to ensure the adequate, safe and cost efficient supply of electricity to the clients of a small scale electricity producer, and the negative impact of additional and often time and cost intensive application of heavy administrative and information requirements a potential investor, either private or community based would have to be provided. If administrative and reporting requirements are heavy, it might have a preventive effect on the potential small scale investors.

For the community based cooperatives, which might be potential partners for project implementation, adequate business models have to establish, to support them in the setting-up and operation of those systems, like billing and project accounting practises.

Each village/community which will be selected for the implementation of a larger scale RE project should be advised to establish a Membership Co-operative to co-



ordinate the management of electricity/energy services inside the village. This may include meter reading, bill distribution and tariff collection, conducting minor electrical extensions to new customers, etc.

With the adequate support, community based institutions, which would be established with the primary target to supply its members with electricity services (whatever form of renewable energy used to produce it), and to also be involved into the distribution and marketing of efficient means of energy consumption, like improved stoves, solar stoves, etc., can be effective project catalysts. This is even more so, when sustainability is considered, as the objectives of such an organization and of e.g. a private firm are somewhat different. The most important objective of an independent firm is striving towards profit maximization; the purpose of a cooperative is the advancement of the interest of its members.

In the case of a rural electrification/rural energy cooperation, the advancement of the interest of its members involves the provision of sufficient and reliable services at the least cost consistent with good practises.

If the selection between the cooperative and the private firm is to be taken for the implementation of a program or project, in general, it could be assumed, that the independent firm would not contribute to the community development in the way a cooperative would be able to do that.

Although correct in general, the aspect of know-how, capacity and continuity are to be considered, when comparing the alternatives. The private company, through the possible involvement into various projects would be able to built up a adequately number of well experienced staff, which would ensure the quick and efficient implementation of projects, as well as the adequate provision of after sales services, sometimes even through the hiring of local staff from within the community, which would be trained and cover the day to day aspects of operations, like small scale maintenance, billing and revenue collection.

The cooperative approach, however, would, with adequate involvement of the community ensured at the early phases of the project and by adequate training of cooperative staff for the aspects of the maintenance, billing and revenue collection, most probably be a more cost efficient, or at least cheaper solution, which would also possibly be more sustainable, as the continuation would not depend on an external company, the profit margin and management decision and policies, but ensured through the interest of the community concerned.

The aspect of economies of scale, means the advantage of duplication of work and systems for a large number of relatively small communities, could be tackled through the development of regional and national community cooperative centres, which would take over the responsibility for some of the central and costly functions, like e.g. the installation and operation of billing and accounting systems for a larger number of individual cooperatives..

### **3.5. Institutional Strengthening and Capacity Building Proposals**

The most important and challenging aspect for the implementation of the RE master plan is the strengthening of the Division of Energy and of the Gambia Renewable Energy Centre (GREC).



Whilst the upgrade and strengthening of the Division of Energy towards a Department of Energy is already considered in the context of the Government plans, the re-establishment of the GREC will be the important task to be already considered and supported in the context of the next steps and activities of the RE Project.

Some improvements have already been achieved in the first phase. The offices of the GREC have been partially rehabilitated with the funds of the RE study, and some infrastructure, like office furniture, computer equipment and communication facilities have been established. Those offices are currently used as project offices, but will be handed back to the GREC at the end of the site activities of the study staff.

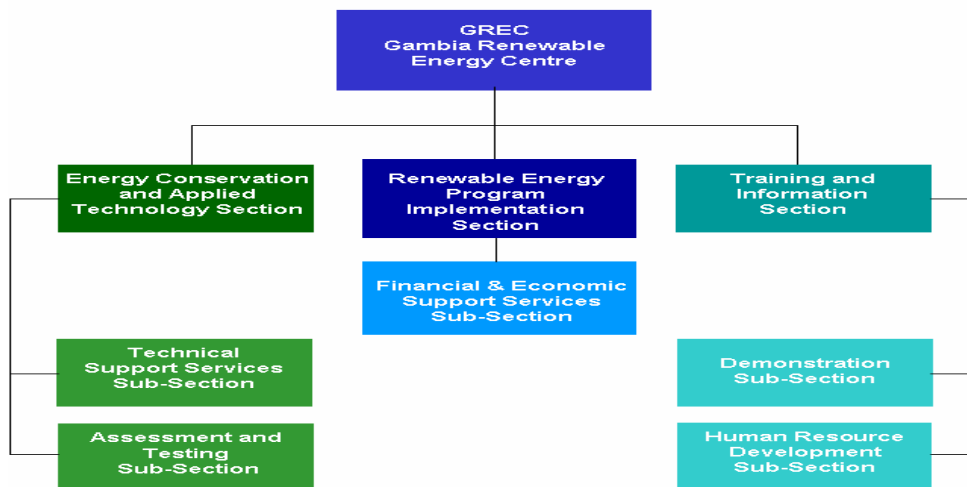
Furthermore some basic RE documentation has been procured and registered on a local computer in the GREC offices and a small bibliotheca. This documentation will be further completed with the useful results of the study, like statistical data, a RE Information System developed on the basis of the measurement campaigns, etc. The main task, therefore, will be to continue and intensify this activity.

In addition, the capacity of the Gambia Renewable Energy Centre will have to be re-established in order to ensure the adequate promotion of renewable and appropriate energy technologies. Qualified staff will have to be identified and recruited as soon as possible, so that they will be able to participate in the training measures to be executed in the course of the project.

As discussed before, the project implementation unit should be set-up in way, that sustainable and lasting capacity is established, and not just an efficient but temporary structure which will continue to exist, when the externally financed activities and projects are completed.

In the light of the above the proposed structure of the “new” GREC would look as follows:

**Recommended organisational structure for the GREC**





There would be two Sections with two sub-sections each, one section responsible for “Energy Conservation and Applied Technology”, another for “Training and Information”. In addition to those standard sections of a Renewable Energy Centre, a third section is proposed, The “Renewable Energy Program Management Unit”, the PIU/Program Management Unit for the implementation of the RE Masterplan Pilot Project(s), as discussed in detail in the previous chapters.

The advantage of the inclusion of this unit with its additional resources in terms of economic and financial expertise, would not only be, that the negative aspects of separate and “independent” Project Management Units could be avoided or at least reduced, the set-up would also allow the flexible use and bundling of all established capacity and resources of the centre, in order to achieve a set-up and capacity, which would represent an entity, which would come close to the “one window shop” ideals as discussed in the previous chapters.

In terms of staff number, composition and qualification, it should be assumed, that a total staff of 10-12 would be sufficient, consisting of one administrative head of the centre, 3-4 RE planners and engineers, two economic and financing experts, one training and curricula development expert, one IT expert and one to two secretaries, 3 people as support staff drivers should be assumed.

It has to be noted, that the GREC staff would also strongly support and enhance the capacity of the Division/Department of Energy as well as the PURA, when there is a need for advice on RE related matters, like technical and performance standards, cost data, etc.

The training to be provided as basis for the reestablishment of the GREC, but also including staff from the Division of Energy and the private sector, is shown in general terms in the following:

Overall Training				
	Seminars abroad	Practical Training	Training on-the-job	Management Training
DoE Department of Energy	●			●
GREC Gambia Renewable Energy Centre	●	●	●	●
Private Sector Participants		●	●	●



The above figure shows the involved target groups and the training they should receive. The participation of the private sector is important in order to broaden RE technical and project management expertise among private companies within The Gambia. Only with this availability of expertise and skills among the private sector, will there be a chance for sustainable development of renewable energy technologies in the energy sector.

The following paragraphs provide some additional information about different training elements to be included into a comprehensive training program, which will ensure the required capacity building in the Renewable Energy sub-sector of The Gambia.

#### Train-The-Trainer

Training success depends mainly upon learning to teach the applied methods. There is currently no know-how in this area available in the GREC. An intensive course to train-the-trainer would dramatically improve training success achieved by the GREC, and have the highest multiplying factor in terms of know-how transfer to The Gambia.

#### Study tours of Manufacturer and Institutions for RET

Understanding of the manufacturer's perspective is indispensable for the successful application of the provided technology. Respectively the management staff of renewable energy projects should receive the opportunity to visit suitable manufacturer and institutions in order to be prepared to properly implement these projects. This would also build links between manufacturer and management staff in developing countries during study tours which can lead to a sustainable development concerning the further application of renewable energy as part of the energy supply for these countries.

The study tour(s) should be complemented by additional workshops during the study period, where experiences made will be summarised and proved with regard to their application under specific circumstances in developing countries. The result of the study tour would be a comprehensive, documented knowledge about RE systems application e.g. in remote areas.

#### Seminars and Workshops

During seminars and workshops, the necessary theories about RE know-how will be provided to the respective target groups to prepare the participants for the following on-the-job training. The assigned training experts will also make extensive use of training resources prepared in the so-called train-the-trainer courses previously conducted. Training objectives for these seminars and workshops shall be elaborated based upon a task-skill matrix to be established before. The GREC training facilities are to be re-established and sufficiently equipped for implementing this training. However, some additional equipment will be necessary for successful training implementation (demonstration tools, models etc.).

#### On-The-Job Training

Based on the theoretical concepts learned during seminars and workshops, members of the pilot-project teams will apply their knowledge during real field



work. This skill development will be supervised by an expatriate RE project implementation expert in order to finely tune these practical skills.

On-the-job training will cover both managerial tasks and technical tasks in comparable projects. It is important that, during this phase of the project, the private sector be involved in the training activities.

#### Evaluation of Training

The evaluation of training should be conducted in parallel during the entire project implementation. All provided training elements will be evaluated separately in order to guarantee the success of each training element. These evaluation steps will also allow for the adjustment of training sessions if necessary. Evaluations will be carried out by the project manager of the entire pilot project phase.