



**CEMMATS GROUP LTD**

THE GOVERNMENT OF SIERRA LEONE

MINISTRY OF ENERGY AND POWER

**THE ENERGY POLICY FOR SIERRA LEONE**

**(DRAFT)**

**A UNECA sponsored study**  
**Conducted by CEMMATS Group Ltd**

**The main policy goal of the Sierra Leone energy sector is:** *To meet the energy needs of the Sierra Leone population by establishing efficient energy production, procurement, transportation, distribution and end user systems in order to contribute to social and economic development in an environmentally sustainable manner*

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## GLOSSARY

BHEP	Bumbuna Hydroelectric Project
BHP	Bumbuna Hydropower Project
BKPS	Bo-Kenema power Services
CSSL	Council of Churches in Sierra Leone
CHEC-SL	Commonwealth Human Ecology Council
CMU	Coordination and Monitoring Unit
CSSL	Conservation Society of Sierra Leone
DCA	Sierra Leone Directorate of Civil Aviation
EA	Electricity Africa
EA	Environmental Assessment
EAG	Environmental Action Group
ECOWAS	Economic Community of West African States
EFA	Environmental Foundation for Africa
ENFOSAL	Environmental Foundation for Sierra Leone
EPP	Emergency preparedness Plan
FAO	Food and Agricultural Organisation
GGDO	Government Gold and Diamond Office
GOSL	Government of Sierra Leone
GTZ	German Technical Services
IMF	International Monetary Fund
IPPs	Independent Power Producers
JUHI	Joint Hydrant Installation
LPG	Liquid Petroleum Gas
MAFFS	Ministry of Agriculture, Forestry and Food Security
MEP	Ministry of Energy and Power
MF	Ministry of Finance
MFO	Marine fuel Oil
MMR	Ministry of Mineral Resources
MOTC	Ministry of Transport and Communication
MOUs	Memoranda of Understanding
MTI	Ministry of Trade and Industry
NCP	National Commission for Privatisation
NDMC	National Diamond Mining Company
NEPPCU	National Energy Policy Planning and Coordinating Unit
NP	Sierra Leone National Petroleum Company
NPA	National Power Authority
NRA	National Revenue Authority
ORIENT	Organisation for Research and Extension of Intermediate Technology
PIC	Product of Incomplete Combustion
PIU	Project Implementation Unit
PRSP	Poverty Reduction Strategy Paper
PSTP	Power Sector Transformation Project
PU	Petroleum Unit
RAP	Resettlement Action Plan
RETs	Renewable Energy Technologies
RTA	Sierra Leone Road Transport Authority



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SALWACO	Sierra Leone Water Company
SLAA	Sierra Leone Airports Authority
SLADEA	Sierra Leone Adult Education Association
SLMA	Sierra Leone Maritime Administration
SLPA	Sierra Leone Ports Authority
SLRA	Sierra Leone Roads Authority
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNHCR	United Nations High Commission for Refugees

## **1.0 INTRODUCTION**

### **1.1 The Need for an Energy Policy**

Sierra Leone is just emerging from a decade long civil war, which has virtually paralysed the economy, and during which period most of economic and social infrastructures, including energy-related facilities, were destroyed.

As the country embarks upon its post conflict development process and modernisation of its economy, there is need to address energy problems seriously. All modern economies are energy dependent. This means that if economic prosperity has to be achieved and sustained and living standards for the majority of Sierra Leoneans improved, a paradigm shift in policy and planning for energy supply and consumption is necessary.

Energy policy statements have often been made through Annual Ministerial budgets.

Yet the importance of the energy sector in the economy requires that a long-term planning approach for energy development be adopted.

Sierra Leone is reasonably well endowed with energy resources, particularly biomass energy (forestry), hydroelectricity and other renewable energy sources (e.g. solar energy). There is an extensive network of rivers and tributaries that provide a large hydroelectric power potential conservatively estimated at 1,200 MW. These resources can play a catalytic role in sustaining Sierra Leone's development. The country however faces difficulties with commercial energy supplies, particularly electricity supply. Sierra Leone also imports all of its petroleum fuels requirements.

The institutional framework that was in place in the mid-1980s has not changed significantly. Most of the institutional deficiencies, which represented a major obstacle to the efficient and reliable supply of commercial energy, particularly with regard to the absence of a single Ministry for formulating and coordinating energy sector policy, have not yet been addressed.

Sierra Leone experiences Energy poverty in Sierra Leone. This is evidenced by the low levels of consumption of modern energy forms (electricity and petroleum products), the inadequacy and poor quality of electricity services and the dominant reliance on wood fuel sources.

Energy planning has often focused on the urban areas which are the main users of commercial fuels. The energy needs of the majority of the population who live in rural areas and depend largely on

biomass have largely been ignored. Energy supply improvement in the rural areas will play a pivotal role in poverty eradication.

An objective of the Millennium Development Goals is to reduce global poverty by half by 2015. To implement the goal accepted by the international community to halve the proportion of people living on less than one dollar per day by 2015, access to affordable energy services is a prerequisite. The Sierra Leone constitution states as one of its economic objectives that the state shall “harness all natural resources of the nation to promote national prosperity and an efficient, dynamic and self-reliant economy.” An energy policy that exploits the vast potential for energy from biomass, hydro resources and other renewable energy resources is certainly geared towards meeting this economic objective. The need for an appropriate energy policy is also recognised by major programmes for various sectors in the Poverty Reduction Strategy Paper (PRSP).

As the country embarks on this transition process, it is not only appropriate but also essential that it considers the centrality of energy to the realization of the country’s economic development. The vulnerability of the economy in the last decades to insecure energy supply demands that a hard look is taken at the energy situation with a view to accomplishing two interrelated outcomes. Firstly, it is necessary to adopt a policy that has short, medium and long-term perspectives on how to address the energy needs of the country. Secondly, an environment must be created for the sustainable supply of affordable energy services. A critical factor in this direction will be improvement in the governance of the sector including the efficient management of the sector, affordability of the service and widened access to cover the rural productive sectors.

## **2.1 The process of energy policy formulation**

It is necessary to have an in-depth knowledge of issues in the various energy sectors before embarking on policy formulation. Key issues can then be identified that will assist in focusing on the main policy issues.

Based on an assessment of the existing institutional framework and energy demand and supply patterns, policy papers on specific energy issues were prepared by the consultants which served as discussion documents at a stakeholders’ consultative meeting. The main goals, objectives, and strategies making up the National Energy Policy as well as an Action Plan were also derived through a consultation process with stakeholders. Policy-related investigations have sought to address the problem related to some of the major inefficiencies that characterize the existing institutional framework of the energy sector, as well as the management of the different energy sub-sectors in

Sierra Leone. Information has been garnered from various sources—Ministries, agencies, NGOs and various stakeholders.

The general approach to policy formulation has changed. Greater emphasis is now placed on transparency, inclusiveness and accountability. The energy policy process has therefore attempted to achieve the following:

- ❑ To make the approach to energy policy formulation transparent
- ❑ To build public confidence in the policy formulation process
- ❑ To clarify accountability and organisational roles through the process of policy formulation
- ❑ To communicate policy in a manner which is clear and understandable for all
- ❑ To integrate various government policy processes.

A second stakeholders' meeting was held after the release of the draft policy document. Stakeholders discussed several issues emanating from the document at this meeting.

The Energy Policy specifically takes into consideration the need for:

- (a) Having affordable and reliable energy supplies in the entire country;
- (b) Reforming the market for energy services and establishing an adequate institutional framework to facilitate investment, expansion of services, efficient pricing mechanisms and other financial incentives
- (c) Enhancing the development and utilisation of indigenous and renewable energy sources and technologies
- (d) Comprehensively taking into account environmental considerations for all energy activities
- (e) Increasing energy efficiency and conservation in all sectors

### **1.3.1 The approach to policy formulation**

The energy sector is a complicated one. The sector can broadly be divided between demand and supply. Activities on the supply side do not necessarily arise as a result of demand. In Sierra Leone, there has been a tendency to promote policies mainly from the supply side.

The approach to policy formulation for the energy sector is similar to that of many other sectors. This approach consists of the following:

- ❑ Recognising the problems
- ❑ Identifying the underlying causes
- ❑ Identifying potential solutions, analysing their implications and making choices

- Monitoring and evaluating the effects of the implementation of the policies when these commence.

As Energy constitutes a large proportion of the country's GDP and a considerable percentage of household energy expenditure, energy efficiency measures have been accentuated in the policy document. The major sectors for energy conservation have been examined in this respect.

An analysis of the energy sector starts with the identification of different demand and supply sub-sectors. In the Sierra Leone situation the demand side is analysed in terms of the energy requirements of households, industry, commerce, mining, transport and agriculture. Supply sub sectors include electricity, oil and gas, petroleum products, energy based minerals and renewable energy resources. The demand and supply sub-sectors can be broken down into smaller divisions as required.

Several cross cutting issues have a bearing on the energy sector. It is also necessary for the policy document to address these issues.

#### **1.4 The expression of policy**

Energy policies must take cognisance of policies in other allied sectors and should be carefully co-ordinated with these sectors to avoid unsavoury side effects. A policy for rural electrification for instance will not solve rural energy poverty on its own. There will be need to complement it by other policies and programmes, such as forestry programmes, education and job creation, to have the desired effects. Energy policies must also be co-ordinated between energy sub-sectors.

The expression of policy has been preceded by providing a comprehensive background to each energy sector. This has been followed by a listing of the key issues in each of the sectors. In expressing energy policies for the particular demand, supply and cross-cutting sectors, the key challenges in presenting policies for the sector have been outlined. The following components are presented within each section:

- Government's *policies* for the sector, stating the rationale for such policies
- Details on the *implementation* of the policies
- Mechanisms for the *monitoring* and *evaluation* of policies.

A set of clear policy objectives is established at the start to guide policy choices. These are presented in the following section, which deals with the context, challenges and objectives for energy policy.



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## **PART 1-ENERGY SECTOR ISSUES**

## **2.0 THE ENERGY SECTOR IN SIERRA LEONE**

### **2.1 General**

Energy services are a crucial input to providing adequate food, shelter, clothing, water, sanitation, medical care, schooling and access to information – important aspects in addressing poverty reduction in Sierra Leone. Energy use is closely linked to a range of social issues, including poverty reduction, population growth, urbanization and opportunities for women. Energy is needed to meet basic human needs (food consumption, clean water supply, shelter, health, education, employment etc) and economic growth. Generally, the quality of life improves with commercial energy use, which is associated with increased economic activities and industrial development. Sierra Leone is reasonably well endowed with energy resources, particularly biomass energy (forestry), hydroelectricity and other renewable energy sources (e.g. solar energy). These resources can play a catalytic role in sustaining Sierra Leone's development. The country, however, currently faces difficulties with commercial energy supplies, particularly electricity supply. Sierra Leone imports all of its petroleum fuels requirements. The institutional framework that was in place in the mid-1980s has not changed significantly. Most of the institutional deficiencies, which represented a major obstacle to the efficient and reliable supply of commercial energy are still present.

The Energy Sector is a key sector in the Sierra Leone economy. It is a major source of government revenue (e.g. fuel taxes, license fees and royalties). On the other hand it accounts for a significant percentage of imports (fuel imports account for 26% of total imports). It has been necessary for the government to subsidise the electricity utility.

The Ministry of Energy and Power (MEP) is the custodian of the Electricity and Water Sectors. The MEP is responsible for sector policy and coordination. The wider Energy Sector is however, within the purview of various Ministries. The MEP handles matters related to electric power supply, including that from hydroelectric schemes and, nominally, renewable energy matters related to solar and wind energy. The Ministry of Agriculture, Forestry and Food Security (MAFFS) handles biomass issues (plant and animal-derived matter), especially fuel wood. Petroleum marketing and sales are handled by the Ministry of Trade and Industry (MTI). The Ministry of Finance (MF) also plays a supportive role in fiscal matters. Petroleum exploration and extraction is now within the purview of a Presidential Petroleum Commission. The Ministry of Mineral Resources (MMR) deals with extraction of minerals, including energy related minerals.

Coordination between the various Ministries on energy matters is poor. There is no central institution capable of assessing potential energy resources, making projections of energy demand and supply and designing an energy development and investment plan to meet overall economic objectives.

Although the operation of various sub sectors are governed by various Acts of Parliament, some aspects could conflict with existing laws. There are also several grey areas relating to functions of various Ministries.

## **2.2 Electricity sub sector**

The Ministry of Energy and Power, which has responsibility for the entire electricity sector, is the policy making organ of this sector. Its responsibilities also cover harnessing the country's considerable hydropower potential, the most notable of which is the Bumbuna Hydroelectric Project (BHEP), and matters related to alternative energy sources.

The National Power Authority (NPA) is the vertically integrated monopoly supplier of electricity in the Western Area, where the capital, Freetown, is situated. The NPA is further responsible for the operation of electricity supply in the provinces. The Bo-Kenema Power Services (BKPS) is a semi-autonomous division of NPA responsible for the integrated supply of electricity to the townships of Bo and Kenema and their environs. Power supply is still grossly inadequate and is subject to frequent interruptions in Freetown.

Oversight of NPA currently rests with the National Commission for Privatisation (NCP) pending its eventual privatisation.

The National Power Authority Act of 1982 established the NPA as the entity with the sole responsibility for carrying out power (including hydro) generation, transmission, distribution and supply in the country. The 1993 NPA (Amendment) Act stipulated additional governance duties for NPA.

The Project Implementation Unit (PIU) for the BHEP reports to the Ministry of Energy and Power. The NPA forms part of the Technical Committee which oversees the Bumbuna PIU. Operational oversight of NPA is provided by a Board, which reports directly to the NCP in preparation for Private Sector Participation.

### **2.2.1 Sector performance**

Less than 10% of Sierra Leone's population has access to electricity. Most of these live in the Western Area around the capital, Freetown. The country's generating capacity prior to the civil conflict in 1991 was about 120MW of which 116MW were thermal power plants, and 4MW were from the hydro plant at Dodo in the Kenema District. Of the total installed capacity, NPA operated 33.4MW in the Western

Area, and 14.5MW in isolated provincial towns. There were some 28MW of captive capacity in the mining sector, and 40MW of estimated capacity of auto-generators. The available capacity for generation then in the Western Area was however, significantly less than the installed capacity due to poor maintenance, a shortage of spare parts and inadequate technical skills of NPA staff.

The captive capacity in the mines and the installed capacity in the provincial towns, were all virtually wiped out during the 10 years conflict. In the Western area, in spite of substantial investment in the sector since 1991, the situation continues to be desperate. Rural electricity supply has largely been ignored. Over the past two decades, the Bumbuna Hydroelectric Project has undergone various implementation stages but has been fraught with difficulties related to finance, the ten-year civil war, and technical problems. This project, now about 85% complete has restarted.

Despite the infusion of a considerable amount of capital to improve the electricity situation, NPA's underlying problems still exist. The utility has made a loss after tax for the last ten years. The unaudited draft financial statement for 2003 indicates a loss for the year of Le19.4 billion or US\$7.7 million. The accumulated loss at the end of the year was Le105.5 billion or US\$42.2 million. The government has given subsidies to meet capital and operating requirements. The capital subsidies however are very insignificant relative to the capital requirements of the utility.

About 80 percent of the power generated by NPA is consumed in the Western Area. The consumption pattern is roughly 70% industrial/commercial, 30% percent residential. Previous studies have projected annual growth rates of 4.5 percent and 7.4 percent for the Western Area and the provinces respectively. The state of the power sector indicates that there is a considerable gap between power demand and supply.

### **NPA's Operation in the Western Area**

The electricity supply and service in the Western Area is poor. The installed capacity is totally inadequate and breakdowns are frequent. There is consequently frequent load shedding and the situation is unlikely to change in the immediate future. The state of the network is also unsatisfactory. Current improvements funded by the EU will only increase network capacity to about 31MW. Network efficiency is also low.

The electricity tariff is one of the highest in the sub region, even though it does not include an element for capital cost recovery. High technical and commercial losses combined with poor revenue collection are the major contributors to the liquidity problems of the utility. The customer base is small at 35,000 to 40,000.

The GOSL has signed two Memoranda of Understanding (MOUs) related to the provision of power by Independent Power Producers (IPPs) but no concerted plans have yet been made.

There is a high degree of suppressed demand. Lahmeyer International estimated that suppressed demand had grown to approximately 40 GWh in 1994.

### **Bumbuna Hydroelectric Project**

The Bumbuna Hydroelectric Project is now about 85% complete. The project has the potential to make a substantial positive impact on the national electricity supply. The associated transmission infrastructure will provide the link for priority provincial areas and eventually become the backbone of a national grid. Bumbuna could provide up to 50MW at the peak of the rainy season and 25MW during the dry season. Subsequent stages of the project could result in electricity generated of up to 300 MW. A recent donor conference resulted in additional pledges for Bumbuna. The \$57 million budgeted for the completion of the project is however short by about \$6 million. This however takes into consideration the partial risk guarantee of \$20 million promised by the World Bank to guarantee any possible financing required by a private sector investor participating in the completion of the project.

### **Bo-Kenema Power Services (BKPS)**

The BKPS is entrusted with the zonal responsibility for the generation, transmission, distribution and sale of electricity to Bo, Kenema and environs. The BKPS has a mixed hydro-thermal operation.

The BKPS operates a 33kV sub-transmission line with 11kV and low voltage local distribution. There is need to expand and upgrade the distribution network because of growing demand.

In 1999, BKPS served about 8000 consumers. The generators in Bo are in a bad state and need to be overhauled urgently. Most of the consumers are domestic consumers. BKPS faces the same problems with its commercial operations as NPA.

### **Provincial Stations**

These are a range of island generation and local distribution networks outside the NPA (Western Area) and BKPS spheres of operation. These add up to an installed capacity of 6.7MW. Most of the provincial stations are now in a state of total disrepair. .

The cost required to get the stations and services back to their pre-1994 levels is Euro 13 million. The total number of consumers in all of these provincial stations in 1994 was estimated at about 4500.

### **2.2.1 Hydroelectric potential**

In the Power Sector Master Plan Study carried out in 1996, a number of very promising sites were identified. Up to 1200 MW of electricity could be provided from hydroelectricity in the country. Of the twenty four additional hydro sites were identified during study, only four of these could provide hydropower at low cost with annual flow regulation.

### **2.2.3 Restructuring of the electricity sub-sector**

The rationale for reforms in the Sierra Leone Power Sector could be attributed to the following factors:

1. Capital crisis-
2. Performance crisis.
3. Access crisis
4. Cost burden to government-

The GOSL considers that a competitive market structure in which the private sector plays a dominant role in the investment, management and operation is necessary. The objectives of electricity reform are to achieve efficiency, sustainability and improved access.

Institutional and operational reform will involve addressing sector governance and sector operation issues. In the area of sector governance, the role of the Ministry will be focused on electricity policy making. In house technical expertise will be beefed up to support this mandate. An independent sector regulator will oversee entry into the electricity sector, technical and safety performance of sector operations and tariff adjustments. A new Electricity Policy and the revision of the existing Act should be pursued.

The reform plan calls for transforming the existing NPA into a corporatised, self funding utility. It will mainly be a transmission and distribution company and act as a producer of electricity in the last resort. Independent Power Producers (IPPs) will be allowed to produce power and sell to the new NPA whose operation will be considerably shored up and made more efficient. BKPS will continue as a non grid operation until reached by the national grid. Those provincial stations that will be connected to the national grid will be connected. Some isolated stations will require technical and financial support. Consideration is being given to the management of NPA for a few years through a performance based management contract, during which period the operation will be considerably strengthened by the infusion of capital into appropriate areas. This will augur well for the entrance of a strategic partner for NPA into the sector in future and the Private Sector Participation into other areas of the power sector, especially the provision of extra generation through IPPs. It is envisaged that Bumbuna will be operated as an IPP.

The main implementation activities associated with restructuring the electricity sector are variously of an institutional, organisational, legal and infrastructure nature. Although a possible timeframe for implementation of such activities is long, there are some that will need to be undertaken urgently. A budget amounting to some \$50m has already been drawn up for these activities. Activities (including budget) for the proposed World Bank Power Sector Transformation Project (PSTP) indicate the World Bank will only meet \$19.5 million of this amount.

### **2.3 Household energy sector**

Sierra Leone is richly endowed with a variety of renewable energy resources which include plentiful woody and non-woody biomass, solar, wind, and hydrological resources. Presently, with the exception of biomass, only a meagre fraction of the country's renewable energy potential is exploited. Biomass (firewood and charcoal ) plays a very significant role in Sierra Leone's energy supply. It constitutes over 90% of total energy consumption in the country. It provides almost all the energy used to meet basic needs of cooking in rural and most urban households and is the main source of energy for rural industries.

Other Renewable Energy Technologies (RETs) have also been considered under this section. Sierra Leone's experience with other RETs is fairly limited. Liquid Petroleum Gas (LPG) is also considered in this section.

#### **2.3.1 Fuelwood and charcoal sub sector**

##### **2.3.1.1 Sector Governance and Institutional Matters**

The organisation of this sector is confusing. Officially, the Ministry of Agriculture, Forestry and Food Security has responsibility for fuel wood matters. Forest depletion and reforestation matters are within the purview of this Ministry. However the downstream operations seem to be within the purview of various other Ministries and Agencies and many of these operations are poorly regulated or not regulated at all. In the urban areas there is a proliferation of Wood Sellers Associations, Charcoal Sellers Associations and other organisations involved in the manufacture and sales of improved stoves. There is considerable confusion in the downstream sector. Many of these organisations have an arms length relationship with the Ministry of Agriculture and Forestry which is mainly involved in awareness raising programmes.

The Forestry Division of the Ministry of Agriculture Forestry and Food Security (MAFFS) officially has responsibility for wood fuel and related matters. It is also responsible for the protection and

management of all state and some chiefdom forests. Its responsibility also extends to the encouragement of sustained yield management and development planning of other chiefdom and private forest lands.

### **2.3.1.2 Policies, legal and regulatory framework**

The new Draft Forestry Policy recognizes the extent and the seriousness of destruction of forests. The policy goal therefore is to support the development and exploitation of the forests and wildlife of Sierra Leone in a sustainable manner for the material, cultural and aesthetic benefit of the people of Sierra Leone in particular and mankind in general. The sector is governed by the Forestry Act, 1988 and the Forestry Regulations , 1989.

### **2.3.1.2 Biomass resource base for wood fuel and derivatives**

Wood fuel is derived mainly from forests and mangroves, which are extensive in Sierra Leone.

### **Forest Resources**

It is estimated that 86% of Sierra Leone's land area (7.3 million hectares) is covered with natural forest. Only 5% of the land area is closed high forest (365,000 ha) located largely in the eastern and north eastern part of the country. About 52% of the total land area (60% of natural forest) is forest regrowth, which is derived from closed high forests. It represents the fallow phase of the bush fallow cultivation system and amounts to 3.7 million hectares. Secondary forest amounts to 261,000 hectares, Savannah woodland 1.6 million hectares and mangrove and swamp forests 286,000 hectares. Out of the 365,000 hectares of closed high forest, 219,000 hectares are productive closed forests of which 100,000 hectares remain unlogged. Fuel wood supplies in Sierra Leone are obtained mainly from closed high forests and Savannah wood lands.

### **Waste from commercial sawmilling**

At present, there is no activity in the big commercial saw milling industry. Just before the onset of the rebel war in 1991, there were two saw mills in operation. These satisfied the national demand for saw log of 50,000 m<sup>3</sup> annually. About 50% of commercial saw logging is waste and should be available for fuel wood use.

### **Mangrove swamp forests**

Where conditions are favourable, mangroves may form very extensive and productive forests. The total area of mangrove vegetation in Sierra Leone is 171,600 ha. Mangroves however have many uses. These include fuel, construction, fishing, textiles, leather, food, drugs and beverages, household items, paper products, other natural products. Mangroves make excellent charcoal

### **Future supply**

There is a close link between food production and energy procurement, Fuel wood is obtained from lands cleared for agricultural purposes. Tree regrowth during the fallow period plays an essential role in regenerating soil fertility after cropping, maintaining soil structure, retaining moisture, preventing run-off and performing many other functions. With increasing serious fuel wood shortages, premature felling of trees for fuel wood purposes could occur, thus shortening the fallow period and further augmenting the risk of irreversible soil damage.

#### **2.3.1.4 Fuelwood and charcoal production and utilisation**

##### **Fuel wood use**

There is an overwhelming dependence on fuel wood for household energy needs. The Projected demand for 2004 is 4.2 million m<sup>3</sup>. Firewood is normally harvested as an integral part of land clearing for farming, taking care of the energy needs of farming families in the rural areas. Fuel wood can also be a by product of forest management e.g. thinnings from silvicultural treatment and wood wastes from logging and sawmilling.

All mangrove species in Sierra Leone are used as firewood. Mangrove as fuel wood is used extensively in virtually all coastal villages for smoking fish and salt manufacturing.

Fuel wood is used in crop and food processing and preservation, for heating houses during the wet season, and also extensively in cooking, for artisanal activities, and to provide lighting on social occasions. Perhaps of more importance, wood is part of the subsistence production system. Over 95% of fuelwood used in Sierra Leone is for household purposes. The results of an FAO study in 1990 puts the consumption per head at 0.58 m<sup>3</sup>.

##### **Fuel wood production**

The major areas of production for the urban market include farming areas adjacent to motorable roads or those areas accessible by waterway. These areas have become heavily exploited. The main charcoal

producing forests of the Freetown Peninsular Reserves, the mountain village forests and sections of the mango forests also fall into this category. Most of the woods from the provinces are by products of annual bush clearance. Fuel wood is associated with upland mixed farming practices.

### **Charcoal**

Charcoal is the product of incomplete combustion or carbonization of wood. As much as 30% of the wood produced is converted to charcoal. The wood-charcoal conversion ratio for traditional technologies is about 1.7 for wet wood. Yields range from about 20-30% by weight for wet wood. The most widely used production method in Sierra Leone is the earth pit. This traditional method of charcoal production is inefficient but inexpensive.

Charcoal is manufactured on a limited scale in inefficient underground kilns. A majority of the charcoal produced is brittle and burns quickly and there is need to identify which wood species are best suited to the process. Charcoal is in much demand in urban areas but not as much in rural areas, where it is used mainly by blacksmiths and goldsmiths.

Charcoal plays a relatively minor role as a fuel source in Sierra Leone. This may be due to consumption habits of consumers preferring fuel wood, higher prices for charcoal and its susceptibility to moisture damage during the rainy season. In terms of volume, charcoal forms only about 10% of wood resources used for energy production. In 1980, it was estimated that there were 200-300 charcoal burners in Sierra Leone, producing about 200 tons per year using traditional open pits. The charcoal yield, using the traditional method is about 10 percent from dry wood compared to 20-25% using masonry or steel kilns.

### **Household energy consumption patterns**

The household energy survey carried out in 1986 indicated that 96% of the fuel wood produced and 90% of the charcoal is used in the household. The petroleum product used in the household is mainly kerosene. As a percentage of total energy utilised in Sierra Leone, fuel wood usage accounts for well over 80% of the total. Fuel wood is mainly used for cooking and ironing and hardly ever used for lighting purposes. This information is corroborated in the April 2003-May 2004 Household Survey by

Statistics, Sierra Leone which indicates that as income levels increase, there is a progressive shift from the use of kerosene, charcoal, firewood and candles towards the use of gas and electricity.

#### **2.3.1.5 Fuelwood and Charcoal Marketing**

## **Fuelwood Distribution and Marketing**

Distribution to meet urban requirements is monetized and commercial, while distribution in rural areas rarely involves monetary transactions. Transportation cost is a major element of the costing for supply of fuel wood to urban areas. The urban distribution is characterised by a spatial spread of traders, middlemen, and producers from the urban and peri-urban areas to distant rural areas. Rural distribution on the other hand, is part of the traditional subsistence economic system.

Along coastal areas, fuel wood from mangroves is transported by canoes to wood cutters in coastal villages. Larger boats, capable of transporting up to 500 kg are used for bulk purchases made by owners of fishing vessels. Productivity is usually low because the resources are scattered, tools are of very poor quality, working conditions are difficult and felling is poorly organised.

### **Fuel wood and charcoal prices**

Prices of fuel wood vary considerably from town to town and from one province to the next. Fuel wood is traded on the free market and prices are dependent on the supply situation. During the rainy season, when the supply is low, prices shoot up.

#### **2.3.1.3 Improved stoves programmes**

The Forestry Division and some environmental NGOs like SLADEA, CCSL, EFA have recently been making some efforts to promote the use of improved stoves in the country. There are various types of stoves manufactured. The mudstove is the cheapest and can easily be made and repaired. It is claimed that the mudstove is 48% more efficient than the three stone-fireplace. Wonderstove manufacturers claim the stove is 50% more efficient than other conventional stoves. There have however been no independent tests done to assess the relative efficiency of these stoves. Stove use is not pervasive.

#### **2.3.1.5 Sustainability of future supplies of fuel wood and charcoal**

##### **Forest depletion issues**

Sierra Leone's current population is estimated at 5.6 million. According to Statistics- Sierra Leone's projection, the country's population is expected to reach 7 million by the year 2010. Population growth has a profound influence on land use. Where human and animal population growth is increasing, land is often utilized beyond its carrying capacity. The use of fuel wood and its derivatives as preponderantly main sources of household energy will result in severe problems of availability if no attempts are made to ensure that the supply is sustainable. The fuel wood economy has relied very

much on the bush fallow system. Nevertheless, wood yield from this source is declining due to the shortening of the fallow period.

### **Land Use And Deforestation**

Rapid population growth and urbanisation, and poverty have focused increasing demands on the natural environment in concentrated areas. Deforestation caused as a result of shifting cultivation, uncontrolled grazing, timber, poles and fuel wood production, wild bush fires and mining account to a large extent for environmental degradation in the country. Over 80% of the original forest areas is currently deforested.

The traditional farming practice shifting cultivation is the main factor responsible for deforestation. The fallow periods have been reduced in some parts of the country to the extent that much forestland remains devoid of significant regrowth. It is estimated that 600,000 hectares of forested lands, representing about 8% total arable uplands, have been cleared for farming.

Mining activities, particularly in the Eastern and Southern regions, have left around 80,000 – 120,000 hectares deforested and degraded. In the main, these activities continue unabated and without control and reclamation.

### **Management and Planning**

There is no detailed management Plan of the current forest resource base. No inventory has been carried out for the last three decades to assess and evaluate forest resources in order to estimate their present and future sustainable yield of fuel wood and timber.

### **Research Development and demonstration**

There is virtually no coordinated research activity in the fuel wood sector. No research is being conducted on productive fuel wood species. Work is being done on designing cooking stoves by

different institutions such as SLADEA, EFA GTZ, Engineering Department of Njala University College etc. but the efforts are not coordinated.

### **Resource Conservation**

Heat losses during conversion of wood to energy (by traditional cooking methods) and wood loss during processing operations (for charcoal production) have a significant impact on supply and demand.

Large losses usually occur in the conversion of wood to charcoal. The traditional pit method of making charcoal is still being used. It takes about 5 kg of wood to make 1 kg of charcoal. The charcoal production process by the earth mound is not efficient.

### **Environmental and social problems**

Cooking with firewood is often done in confined places with poorly ventilated conditions leading to high exposures to health-threatening air pollution. In addition, dependence on such fuels can lead to other health problem due to greatly increased time and effort required for gathering them. In Sierra Leone, women traditionally do the cooking and are more exposed to these health problems than men. In rural areas processes of fuel wood collection, preparation and use are mainly the preserve of women. Children may also be involved in many of these. The increasing distance covered to fetch fuel wood places severe strains on women and children.

## **2.3.2 Other Renewable Energy Technologies and LPG use**

### **2.3.2.1 Other RETs**

There are very few companies dealing with other renewables. Solar energy systems is an extremely small area and there are hardly any wind energy systems. There are very few groups dealing with renewables in Sierra Leone. Employment of RETs for sustainable development faces various challenges, including the establishment of suitable institutional frameworks, levelling of the playing fields between grid and off grid electrification, meeting all energy services, lack of awareness of the RETs and poor technical support. Many of the traditional financing bodies dealing with the rural poor who were interviewed have very little or no knowledge of RET programmes.

### **Solar Energy**

Not much work has been done in this area. The Power Sector Master Plan study done in 1996 considered in the main power plants with considerable contribution to the overall power generation. This implied an output of at least 100kWel. Renewables with an output power below that like photovoltaic home systems were not studied. The study concluded that large photovoltaics were not economic at that time and in the future.. The average solar radiation was estimated at 1460 to 1800

kWh/(m<sup>2</sup>/y). The study concluded the solar generation was not economically viable and generation would cost between 20-25 USc/kWh. The study also estimated photovoltaic electricity generation costs at 1800kWh/(m<sup>2</sup>/y) at 65-85 USc/kWh. The contribution of photovoltaic power plants to Sierra Leone's power supply would in any case be insignificant. The study suggested that the future of PV systems is in PV home systems which typically consist of one 40-60 Wp module and a battery which are competitive in many rural areas in Africa.

### **Wind energy**

The Power Sector Master Plan study estimated mean velocity in 10 m above ground to be 3-5m/s.. Assuming an average wind velocity of 5 m/s the electricity generation costs are estimated at 8-10 USc/kWh (without grid connection). Compared with other electricity generation alternatives wind energy in general could only be very limited economically viable.

### **Biomass (Non woody)**

Biomass in Sierra Leone is promising under certain circumstances. Fuel wood has been treated earlier in this report. Total energy production from various other sources of biomass amount to over 2700 GWh/yr. A more accurate assessment of energy potential of crop wastes would however need to be undertaken. The detailed treatment of other forms of biomass is beyond the scope of this work.

#### **2.3.2.2 LPG use**

Only two of the Petroleum sales and marketing companies-Safecon and NP deal with LPG. LPG is not readily available and there have been several instances where it has not been available. It cannot therefore at present be regarded as a fuel that could be purchased and used continuously. Interviews revealed the following problems related to LPG use in Sierra Leone:

- ❑ Some consumers had perceived or real safety problems related to its use
- ❑ Canisters are not readily available and connections from bottle to equipment are not standardised
- ❑ Marketing companies cite cost, shipping, storage during shipments, storage at depot and inland transportation as serious setbacks.
- ❑ Consumers also complain about high cost of purchasing

In general Petroleum companies have not made any conscious effort to address these problems.

## **2.4 Petroleum/Mining sector**

Petroleum marketing and sales are handled by the Ministry of Trade and Industry (MTI). The Ministry of Finance (MF) also plays a significant role in the import and storage of petroleum products. Petroleum exploration and extraction is now within the purview of a Presidential Petroleum Commission. The Ministry of Mineral Resources (MMR) deals with extraction of minerals, including energy related minerals. Petroleum products are predominantly used by the Transport sector which is under the supervision of the Ministry of Transport and communications. There are grey areas in the operation of many of these sub sectors and their coordination leaves a lot to be desired.

### **2.4.1 Petroleum exploration and production/mining sub sector**

#### **Governance and Regulation**

The petroleum exploration and production sector is regulated by the Petroleum Exploration and Protection Act, 2001. This act makes provision for the establishment of the Petroleum Resources Unit, which is under the authority of the President and is headed by a Director-General. This unit has yet to be fully established and at present it is being managed by the newly appointed Director-General.

The Ministry of Mineral Resources has the responsibility to “Develop policies and programmes for the systematic and economic exploitation of mineral resources as well as formulate appropriate regulations for the mining industry and related activities to ensure that the nation derives maximum benefit from the mineral resources. The minerals sector is governed by the Mines and Minerals Act of 1996. There are several regulations dealing with the industry. A Core Minerals Policy has recently been formulated. The main objective of a new policy framework is to promote the country’s mineral sector as a socially responsible, and economically important engine of growth.

#### **Petroleum production potential**

A new Petroleum Act, which establishes a Petroleum Unit to administer the Act under the Office of the President, was promulgated in 2001.

Sierra Leone revived petroleum exploration by announcing its first bid round in April 2002. Previously, the government had entered into an agreement with TGS NOPEC, a geophysics company to carry out approximately 5,700 km of seismic surveying off the southern coast of the country. The results, as well as those of old Mobil and Amoco data have also been reprocessed and packaged for

licensing by oil companies. The area covered has been divided into seven blocks each of between 3,500 and 5,500 Km<sup>2</sup> in extent to include both shelf and deep water.

### **Performance of petroleum exploration and production sub sector**

As a result of the bidding process which closed in May 2003, three companies were awarded concessions for four of the seven blocks.

The agreement with these companies provides for the exploration, development and production of petroleum in the contract areas or blocks. The work to be carried out by the companies involves additional Seismic interpretation and regional studies to define the area of 3D seismic data to be shot.

### **Lignite**

Lignite occurs interbedded with sands and clays of the bullom group, a series of poorly consolidated near horizontal quaternary sediments. Most recent surveys show that lignite deposits occur in the Koya chiefdom in an area south of the Rokel river estuary about 35 km east of Freetown. In this area 2 million tons have been proved whilst another 20 million tons have been estimated as probable reserves.

### **Energy-based Minerals (Radioactive Minerals)**

In 1957 a reconnaissance survey was undertaken by the Atomic Energy Division of the Geological Survey of Great Britain to assess the uranium and thorium potential of Sierra Leone. The areas covered involved the Sula Mountains, The British Titan Products Lease, Mandu Area, along major roads and the Woama area. However no significant deposits of uranium and thorium were observed during that period of reconnaissance.

## **2.4.2 Petroleum marketing and sales sub sector**

### **2.4.2.1 Governance and Regulation**

The country experiences severe balance of payments difficulties resulting from the escalating cost of oil imports and stagnating foreign exchange earnings needed to pay for these imports. The petroleum

marketing and sales sector is dominated by the five petroleum companies operating in the market. Mobil, Safecon and NP are the major players with Unipetrol and Leonoil having relatively smaller operations.

The sub sector plays an important role in the economy. Close to 200,000 tons of petroleum products are imported annually, representing in monetary terms some 26% of all imports into the country. There are severe repercussions for the country's foreign exchange situation and the balance of payments deficit.

The Sierra Leone Oil Refinery was sold in 1994 and the company is now known as the West African Refinery Company, a company that has all Nigerian participation including the Government of Nigeria.

The Petroleum Unit (PU) was set up in June 1992 under GOSL's comprehensive Structural Adjustment Programme for macroeconomic stabilisation. The PU is supervised by the Ministry of Trade and Industry (MTI) in close collaboration with the Ministry of Finance (MF). In 1999 the GOSL announced its commitment to a liberalisation program for the private sector to take over the responsibility of importation of the main petroleum products, as well as the fixing of pump-prices, in line with Government's effort of creating a private sector driven economy in Sierra Leone.

The PU has been given a new mandate to serve as industry regulator/coordinator. The Law Officers Department has been advised to commence proceedings for the implementation of the relevant legal procedures of a statutory enactment for the consolidation of the revised operational format and the inclusion of new rules and guidelines reflecting the Petroleum Unit mandate.

There is a Fuel Unit within the Ministry of Trade and Industry that has mainly a monitoring function. A Standards Bureau within the MTI plays a key role in calibrations and measurements in the petroleum industry.

#### **2.4.2.2 Performance**

The industry volume has been growing steadily since the initial realignment in 1993, and import levels are almost back to the pre-war level of 200,000 Metric Tons per annum. The industry contributes as much as Le 46 billion annually to government revenue in terms of Excise Tax and Road Users Tax.

The Downstream Petroleum Sector in Sierra Leone has relatively satisfactory product supply and distribution programs. There however remains a lot to be done in terms of combating typical oil industry malpractices of product adulteration and fraudulent/illegal practices.

The industry is faced with a number of problems. Storage capacity is limited, thus oil companies cannot import huge quantities of product at any one given time. The need to book fuel boats well in

advance for relatively small quantities of fuel results in higher shipping charges. The unavailability of foreign exchange to pay for products is perhaps the biggest constraint facing oil companies in Sierra Leone. Oil companies also have difficulties converting local currency into foreign currency. Exchange rate fluctuations only serve to make an already bad situation worse.

The Ministry of Trade and Industry has mooted the idea of a Strategic Reserve For Petroleum Products Programme consisting of the following in MT: Petrol-5500, diesel-6600, kerosene-6000, fueloil-6000. This would have cost \$7.38 million in March 2003 and was based on prices reflected in February 2003. Funding problems however seemed to have thwarted this programme.

Unscrupulous dealers are often accused of being involved in various malpractices from adulteration of fuel to charging higher than stipulated prices for products, especially in the provinces. Despite the fact that the rural poor are mainly in the provincial areas, they pay more for all classes of petroleum products because of added transportation costs.

Supply difficulties are experienced from time to time. These are related more to unavailability of products at the SIR refinery in Abidjan and bottlenecks in allocation or chartering of vessel and maintenance to vessels. The procedures for procurement and delivery of oil products often result in long delays and unreliable supplies. There are also shipping and storage limitations.

The Govt of Nigeria is currently accepting bids for the sale of its 48% share in the West African Refinery Company, which bought over the Sierra Leone Oil Refinery Company. Since the refinery was purchased it has only been used for storage purposes and sales of the limited quantity of refined products brought in by Unipetrol (SL). The Refinery still remains non operational ten years after it was sold.

#### **2.4.2.3 Pricing and Government Revenue Issues**

Prices are fixed according to an agreed formula which takes into consideration the Platt price for petroleum products, and the exchange rate. Allowances are made for various levies and a distribution cost to arrive at the pump price. Prices also differ in various parts of the country. The following comments are pertinent:

- ❑ A standard charge of Le 15 for the Petroleum Fund is now levied per each gallon of petrol, diesel and kerosene as the petroleum. Most of this should go towards the operation of the Petroleum Unit.
- ❑ A Road Users' charge is levied on each gallon of petrol and diesel. This should go to the SLRA's Road Fund and should be used for road maintenance work.

- Prices of products are much higher in most provincial areas. There is ample evidence that the prices set are not necessarily adhered to. In many instances prices are considerably higher than stipulated.

### **2.4.3 The Transport sub-sector**

#### **Governance and Regulation**

The Transport Sector is within the purview of the Ministry of Transport and Communications. The sector comprises three major sub sectors, each with a subset of implementing agencies:

#### **Road and Road Transport**

Sierra Leone Roads Authority (SLRA)  
Sierra Leone Road Transport Authority (RTA)

#### **Ports and Maritime Administration**

Sierra Leone Ports Authority (SLPA)  
Sierra Leone Maritime Administration (SLMA)

#### **Airports and Civil Aviation**

Sierra Leone Airports Authority (SLAA)  
Sierra Leone Directorate of Civil Aviation (DCA)

Sector coordination is performed through a Coordination and Monitoring Unit (CMU), under the Ministry of Transport and Communications (MOTC).

#### **Performance**

There are various steps being taken to revamp the Transport sector in line with the new Transport Sector Policy.

Sierra Leone is almost entirely dependent on imports for key agricultural inputs, industrial inputs, machinery and equipment, spare parts and fuels for all its sectors, including agriculture, mining, manufacturing, and construction. Most of these imports are handled by the Freetown Port and then dispatched to the final destination predominantly by road. Some high value pharmaceuticals, spare parts and equipment are handled by Lungi International Airport. In actual fact, the price and efficiency



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of the transport system accounts for a large portion of the cost of production of most establishments in Sierra Leone.

### **3.0 ENERGY CONSERVATION**

#### **3.1 General**

The potential for energy efficiency in Sierra Leone is great. There is considerable room for improvement in the various energy sub sectors. Energy constitutes a large proportion of the country's GDP and a considerable percentage of household energy expenditure. Pursuing energy efficiency measures will contribute significantly to savings. Fuel substitution is also important to reduce the negative impact of the use of some fuels on the environment and to reduce the cost of energy services.

The major sectors for energy conservation are as follows:

- ❑ Transport
- ❑ Industry and Commercial buildings
- ❑ Households and institutions
- ❑ Agriculture

The long term functioning of all sectors must take into consideration energy efficiency and conservation. Energy audit is an important tool that helps to indicate energy use patterns and proposes measures to achieve energy savings. There is however inadequate awareness and improper attitudes towards rational use of energy, as well as non-existence of legislation and regulatory framework for energy efficiency and conservation. There is, therefore, a need to create awareness on energy efficiency and conservation in order to induce a behavioral change. It is also important to encourage cleaner production and recycling, integrate energy efficiency in architecture and building designs and establish standards and legal framework.

#### **3.2 Transport**

The transport sector consumes a large percentage of petroleum products but the sector needs to address issues of energy efficiency more seriously. The state of the roads, the lack of a mass transport system and mechanical condition of the vehicles sorely affect the transport sector. Gaseous emissions from vehicles also constitute a significant portion of pollutants in towns and greenhouse gas emissions.

The public uses mainly taxis and minivans for transportation, many of which are second hand vehicles. The number of vehicles imported after the end of the civil war has increased tremendously.

#### **3.3 Industry and Commercial Buildings**

The industrial sector is small in Sierra Leone and there has been very little investments in new industries. Efficiency of energy usage is low in most factories. This is due to a combination of factors

including operating below rated capacity and the use of old inefficient technologies. Efficiency in small industries (tobacco curing, fish smoking, tile making etc.) is low compared to other countries.

Although NPA carries out cursory energy audits for large industries and commercial enterprises, this is not done in a concerted fashion and there are no awareness raising programmes.

### **3.4 Households and Institutions**

Most households in Sierra Leone use firewood. Charcoal and a variety of traditional stoves are used in some households especially in urban areas but they are largely inefficient. Improved stoves and kilns and substitution fuels (LPG, kerosene) for cooking are not extensively spread due to their cost, the lack of awareness and other different socio-economic barriers. Most of the urban households use electricity for lighting (using inefficient incandescent lamps) whereas the majority of rural households use kerosene, which is more expensive. Appliances used in households (refrigerators, deep freezers, air conditioners, etc.) are old and mostly bought second hand and are therefore inefficient.

### **3.5 Agriculture**

Agriculture accounts for some 65% of Sierra Leone's GDP but fuel consumption in this sector is negligible because of the largely non-mechanical nature of the sector. The energy consumption in agriculture is not usually accounted for in the national energy balance of Sierra Leone. There are very few agro based industries. The amount of diesel used in farms is almost negligible. The GOSL's implementation of the food security programme will involve modernisation of the Agriculture sector in which energy will play a significant part.

## **4.0 KEY ISSUES IN THE ENERGY SECTOR**

It is necessary to outline the key issues that affect the supply and consumption/demand of energy in the country.

### **4.1 Broad sector issues**

The broad sectoral issues are as follows:

- ❑ The need to improve on the coordination of the various Energy sub sectors and for the consolidation of some functions.
- ❑ Inadequacies in information on energy supply and demand as well as the country's resource potential
- ❑ Inefficient supply and use of energy resources due to the neglect of the sector during the country's years of economic and political turmoil
- ❑ Budgetary constraints
- ❑ Inadequate co-ordination and information sharing among the various projects, government institutions and the private sector.
- ❑ Lack of appropriate mechanisms to enable modern and efficient energy services to be accessed by the rural population
- ❑ Finance, logistical and manpower requirements to satisfy new organisational structure and rationalising and estimating coordination requirements.
- ❑ The issues of overall energy planning and energy statistics would need to be carefully considered. Will these functions be centralised? Who will carry them out?
- ❑ Creation of a technical and planning division within the Ministry of Energy & Power which will unite and coordinate all the various stakeholders
- ❑ Creation of a consolidating, coordinating and regulating commission for all energy issues and programmes:
  - Adequately resourced to play its different roles;
  - Potential conflict of interests should be addressed e.g. line ministries and NCP mandate;
  - Review the terms of reference of the oversight committee at Parliament;
  - Review and study the provision for an adequate reporting body;
  - Commission should reflect the diversity of the various social groups

## **4.2 Sub-sector issues**

The key issues within the various sub sectors are as follows:

### **4.2.1 Electricity sub sector**

- Inadequate public financing to the sector to meet increasingly growing demand
- Poor quality of electricity supply and customer service
- High technical and non-technical losses
- Low access to electricity services, especially in the rural areas
- Inefficient commercial operations characterised by poor meter reading and high accounts receivables
- High Electricity tariffs-tariffs are highest in the sub region
- The absence of a proper governance structure to oversee rural electrification needs
- The lack of funding to resuscitate the provincial stations
- Obtaining additional funding to complete the Bumbuna project.

### **4.2.2 Household energy sector**

#### **Fuel wood and charcoal**

- Large-scale use of wood resources, increasing demand for arable land, and urban expansion require that traditional methods be improved or modern ones adopted to sustain forest resources
- Inefficient production and use of biomass energy resulting in adverse effects on the environment and the health of biomass energy users, especially in rural households
- Fuel wood supply chain long and dominated by middle men-hence retail price high.
- Unavailability of reliable information system and data banks resulting in poor planning and monitoring progress of implementation.
- Poor development of competitive alternative energy sources and lack of incentives for their development. Also there is an absence of policies that promote the use of substitutes (such as agricultural residues, biogas, solar energy, peat, lignite and natural gas) that will lessen the demand for fuel wood
- Quality of charcoal produced varies with tree species. Distances to good quality trees have increased considerably
- Production methods (charcoal) not standardised and regulated
- Poor regulation of fuelwood and charcoal industries.

### **Other RETs/Improved stoves/LPG use**

- Low public awareness about the efficacy and potency of renewable energy technologies (RETs): even if people are aware of RETs, their real potential and technical limits and constraints are generally underestimated
- Underdeveloped markets in RETs equipment and services because of high initial investment costs and lack of financial capacity to cover the initial investment
- Lack of mechanisms to monitor standards and ensure quality control of RETs: the poor quality of some technologies available on the market reduces their lifetime and damages the image of RETs. This also applies to improved stoves.
- Inadequate financing mechanisms and other incentives to facilitate investment, communication, promotion and dissemination of RETs and improved stoves.
- Inadequate data available on the potential of indigenous renewable energy sources geothermal, solar, wind, mini and micro hydro, etc
- Regulation and safety issues
- Legal, financial and administrative matters for rural energy development
- Codes, guidelines etc. for RETs.

### **4.2.3 Petroleum/Mining Sub-sector**

#### **Petroleum exploration and production/mining sub sector**

- Limited public resources available for investment

#### **Petroleum marketing and sales sub sector**

- Low storage private capacity compared to national requirements.
- Unscrupulous dealers are still accused of being involved in various malpractices from adulteration of fuel to charging higher than stipulated prices for products, especially in the provinces.
- Despite the fact that the rural poor are mainly in the provincial areas, they pay more for all classes of petroleum products because of added transportation costs
- Perceived inefficient utilisation of fuel levies.
- Although there are plans for strategic petroleum reserves, these have not been concretised mainly because of funding problems.
- The problems with foreign exchange encountered by oil companies..
- Responsibilities for monitoring by various institutions need to be clearly spelt out.
- Need for clear unequivocal standards for new entrants into sector

- ❑ Supply and storage limitations for various products.
- ❑ Revamping the institutional and legal frameworks that regulate the petroleum supply industry
- ❑ The development of large primary industrial, mining and minerals beneficiation sectors which are energy intensive will exacerbate the fuel supply problems unless special arrangements are worked out.
- ❑ Further studies on the economic justification of continuing the refinery's operation may be required

#### **4.2.3 Energy conservation issues**

##### **General**

- ❑ Insufficient awareness among energy end-users about energy conservation possibilities and practices, thus hampering investment in demand side management measures
- ❑ Lack of incentives including financing mechanisms to invest in modern, efficient technologies and practices
- ❑ Lack of specialised and skilled manpower in energy management.

##### **Industry**

- ❑ Dominance of old energy-inefficient technologies and lack of replacement parts
- ❑ Lack of proper instrumentation in a number of plants
- ❑ Poor housekeeping by most industries
- ❑ Lack of awareness, skilled manpower and appropriate financing mechanisms in the area of energy management

##### **Transport**

- ❑ Dominance of old fleet of vehicles that are energy inefficient, resulting in increased pollution
- ❑ Poor maintenance culture
- ❑ Inadequate mass transit system, resulting in increased traffic congestion during peak hours and energy consumption per passenger
- ❑ Bad road infrastructure coupled with low road maintenance.

##### **Agriculture**

- ❑ Over dependence on human and animal energy

- ❑ Lack of data on energy consumption in agriculture
- ❑ Lack of incentives to introduce mechanised farming to smallholder agricultural producers

### **Households and institutions**

- ❑ Low efficiency of technologies in use, including wood fuel stoves, lights and other appliances
- ❑ Insufficient incentives to introduce fuel/technology substitution, e.g. electricity for kerosene and wood fuel, LPG for wood fuel, solar water heaters for electric water heaters and wood fuel, fluorescent lamps for incandescent lamps, etc.
- ❑ Lack of information about improved energy technologies and efficient practices
- ❑ Socio-economic and health burdens occasioned on rural women in the collection and use of firewood.

## **5.0 CONTEXTUAL FRAMEWORK, MAIN OBJECTIVES AND PRIORITIES FOR ENERGY SECTOR**

### **5.1 Energy policy context**

It is necessary to define the contextual framework within which the Energy Policy operates. There are many factors within and without the country that have significant impacts on policy decisions. The Sierra Leone Energy policy has been formulated within the following settings:

- The existing economic, social and environmental policies;
- The nature and linkages of the energy sector with other sectors
- International and regional linkages of the sector.

#### **5.1.1 Existing economic, social and environmental policies**

##### **Economic Framework**

Sierra Leone is recovering from a ten-year rebel war. Serious social disorders occasioned by the war have hampered economic growth. The Sierra Leone economy has always been based on the exploitation of natural resources, notably agricultural, marine and mineral resources. Public sector influence has been pervasive in economic activity. There is a huge imbalance between imports and exports. The GDP in 2002 was \$829 million with a per capita GDP figure of \$160. The per capita GDP has shown a constant decline from \$363 in 1980 to \$190 in 1990 to the much lower present figure. The economy is dominated by the agriculture sector, which accounts for 44.1% of the GDP followed by industry (24.4 %) and services (27.1%)<sup>3</sup>. The % contribution to the GDP from the industrial sector by sub sector is as follows: Mining and quarrying (13.6), Manufacturing and handicrafts (6.2), Electricity and water supply (1.8) and Construction (2.8). The economy grew 6.3% in 2002 and 6.5% in 2003, reflecting the continuing recovery in agriculture and expansion of activities in the manufacturing, construction and services sectors.

The current population of Sierra Leone is 5.6 million. Agriculture has remained traditional and subsistence in character, incapable of providing the food requirements of the nation and of improving their standard of living (some 60 to 70% of the population are employed in this sector. Sierra Leone embarked upon a Structural Adjustment Programme (SAP in 1989/90 endorsed by the Bretton Woods Institutions, the main objectives of which included a) to achieve and maintain a stable macroeconomic environment b) to redefine the public sector's role while restoring the government's capacity to provide basic services c) to create an economic environment conducive to private sector development with a predictable transparent and fair regulatory framework. To realize these objectives the government embarked upon the liberalization of trade and exchange rate, price deregulation,

strengthening fiscal management and domestic resource mobilisation, elimination of subsidies, streamlining the civil service and the divestiture of state enterprises. These objectives and strategies still constitute the basic framework of Government's economic reform policy.

The sparse coverage, unreliability and extremely high costs of services provided by state utilities constitute huge barriers to sustainable economic growth.

The energy policy recognises that there are linkages between the energy sector and the other sectors. In particular policies on the economy, environment, water resources, agriculture, forestry, industry, health, transport, education and decentralisation should be taken into consideration.

### **Social Framework**

Poverty is pervasive in Sierra Leone. The country has consistently ranked at the bottom of the UNDP's Human Development Index. Characterised by low life expectancy (39 years), high illiteracy rate (67%), low per capita income and poor health and nutritional standards, the country is caught up in a vicious poverty cycle. Poverty reduction programmes need to be enhanced and the government is presently in the throes of completing its Poverty Reduction Strategy Paper (PRSP) Although the programme is based on access to basic services, empowerment has also been given strong consideration and investments in other sectors like the infrastructural sector have been given strong support. Poverty reduction programmes aim at economic and social empowerment of the poor and creating an enabling environment for development, through investment in transportation, communications, energy and other economic, social and physical infrastructure.

The government has articulated specific goals for poverty reduction in order to reduce extreme poverty by half by the year 2010. The overall vision according to Vision 2025 is total poverty eradication by the year 2025. In the social domain, Vision 2025 aims at developing "a healthy, and well-educated society with a high quality of life" and again access to affordable energy services is vital in all spheres of the social sector be it in education, health, job creation, safe drinking water, etc.

Reforms in the economic sectors are mainly based on creating the enabling environment for private sector participation. The government's role should be policy formulation and looking after social activities.

The government has also embarked on the process of decentralization. This is not only in terms of governance but also fiscal decentralisation. Local government elections will take place shortly. The private sector involvement in the infrastructural sector is particularly encouraged. As far as energy is

concerned the government intends to develop energy services to contribute towards development of economic activities in rural areas.

### **Environmental Framework**

There is a National Environmental Action plan that also defines the environmental framework for various sectors, including energy. The objectives of the plan are to ensure sustainability, security, and equitable use of resources to meet the basic needs of present and future generations, with recourse to health and environmental considerations.

The Environmental Protection Act (National Environmental Protection ACT, 2000) addresses administrative matters and the institutional machinery to handle environmental issues. A National Environmental Protection Board to facilitate coordination, cooperation and collaboration amongst government Ministries, local authorities and government agencies in all areas relating to environmental protection is in place. The environmental department within the Ministry dealing with the environment is responsible for the promotion of goals and strategies, monitoring, setting of standards, education and training, coordination of national policies and the provision of environmental data and information.

The energy sector has bigger environmental impacts than most other economic sectors. Energy policies should, therefore be geared towards the mitigation of these impacts. Economic, social and environmental objectives must be integrated in to result in the overall benefit of present and future generation.

#### **5.1.2 The nature and linkages of the energy sector with other sectors**

An efficient institutional arrangement is a prerequisite for the proper functioning of the energy sector. There should be a clear division of roles and responsibilities.

Government's role should be mainly to provide effective regulation, monitoring and coordination of the sector. The government must also vigorously support private sector initiatives. The ministry should also ensure that resources are mobilized into areas where market forces may not be enable the supply of adequate energy services. It will also absolutely necessary to determine by legislation the roles and relations of the different players, the ministry, regulators and operators of the sector. The licensing of operators, monitoring of markets and performance will be done through the regulatory functions.

#### **5.1.3 International and regional linkages to the sector**

The Energy Policy must be compatible with global and regional energy policies. Local policy developments must acknowledge international and regional energy trends, especially in areas of energy investment, pricing and global impacts. The involvement of private finance in the energy sector is becoming increasingly important world over. Therefore, Government needs to create an energy policy that attracts investments, while ensuring the achievement of overall national policy objectives. On an international perspective the Government is a signatory to several international conventions on climate change, land degradation and environmental issues.

New Partnership for Africa's Development (NEPAD) offers an immense opportunity to integrate Africa's energy to enhance energy trade, thus optimising the development and use of resources and providing cost-effective energy services. The West African Power Pool (WAPP) also offers considerable opportunities for interconnections and inter country trade in energy.

Within the West African sub region, Sierra Leone is a member of ECOWAS, which is promoting regional energy cooperation and integration.

The proposed energy policy must, therefore, address energy issues that are in consonance with aspirations of NEPAD and ECOWAS aimed at attracting private sector investments, development of interconnections, cross-border infrastructure to facilitate energy trade and sharing of information on petroleum resources and exploration and the development and use of renewable energy resources.

Sierra Leone's energy sector is influenced by international pressures. The role of the state in the energy sector is changing. This is particularly true of the electricity sector in which preparations at an advanced stage for private sector participation. Greater emphasis is now being placed on commercialisation, corporatisation and privatisation. The GOSL's involvement in the sector will be mainly for maximising the achievement of national policy goals.

The traditional role played by Global Financial markets is changing. The World Bank and other multi-lateral lending agencies which have hitherto been very active in financing the energy sectors of developing countries are now increasingly stressing the need for private sector participation. Private finance is now very important and the structure of energy markets and energy investments is reflecting this fact. Government now faces the challenge of creating a policy framework with appropriate legal, fiscal and regulatory regimes to attract domestic and international investment, while ensuring that national policy objectives are achieved.

## **5.2 Main policy goal and broad objectives**

Key issues already alluded to define Sierra Leone's energy situation. Challenges are socio-economic, technical and environmental. Strategies and plans should be drawn up to address the situation. These must however conform to the main policy goal of the sector.

The key issues identified define the current situation in Sierra Leone's energy sector. They cover a wide range of challenges, mainly socio-economic, technical and environmental nature. The National Energy Policy should, therefore, provide a sound basis for addressing these challenges through strategies and plans that are in conformity with the overall national-economic policy

The main policy goal of the Sierra Leone energy sector is: *To meet the energy needs of the Sierra Leone population by establishing efficient energy production, procurement, transportation, distribution and end user systems in order to contribute to social and economic development in an environmentally sustainable manner.*

### **5.2.1 Broad objectives**

The following broad objectives should be addressed by the energy policy:

**Objective 1** -*To ascertain the availability, potential and demand of the various energy resources in the country.*

To meet this objective, Government shall:

- Prepare a database on all the available energy resources and energy consumption patterns. This will enable government to match supply to demand over the long term and also provide information on potential projects for investment.
- Build the necessary local capacity to acquire the required data and assess and evaluate the resources.

**Objective 2** - *To increase access to modern, affordable and reliable energy services in order to contribute to poverty eradication*

To achieve this objective the Government shall:

- Encourage private sector investment and management in sector
- Promote competition between energy service providers
- Promote the development of markets in energy technologies and services.
- Create the enabling environment to markedly improve on rural energy supply and access by
  - a) applying subsidies for certain types of capital investments

- b) applying differential tariffs to different areas and projects
- c) organising rural communities for better provision of services
- Provide education and technical advice and information on energy conservation.
- Encourage local financial institutions to establish sustainable financing mechanisms for energy programmes.
- Intervene through transparent, regulatory and other carefully defined and timed mechanisms, to ensure effective delivery of energy services to consumers where market failures are identified.

**Objective 3** –*To improve Governance of the energy sector by clarifying the relative roles and functions of the various governance institutions thus making the operation of these institutions more accountable and transparent, and their membership more representative and to strengthen Government capacity to better formulate and implement energy policies.*

To achieve the above objective government shall:

- Clarify the roles and functions of the various institutions involved in the energy sector increasing the role of the private sector, NGO's and communities
- Create a transparent legal and regulatory framework for the sector
- Build capacity at the national and local levels for better formulation and implementation of energy policies and programmes
- Build the capacity of regulatory agencies to provide even-handed and predictable regulation;
- Improve the coordination between government departments for effective implementation of government policies
- Consult stakeholders in the formulation and implementation of new energy policies in order to ensure that policies take into consideration the views of a wider range of stakeholders.

**Objective 4** –*To stimulate economic development, Government will ensure that energy plays a central role in the economic development of the Sierra Leone and the sub region.*

To achieve this the government will do the following:

- Encourage competition within the energy markets to achieve efficiency.
- Attract investments in energy services provision by providing appropriate incentives.
- Ensure energy supply security and reliability.
- Promote energy trade within the region.

**Objective 5** -*To manage energy-related environmental impacts. Government will ensure that environmental considerations are given priority by energy suppliers and users to protect the environment and put in place a monitoring mechanism to evaluate compliance with established environmental protection guidelines.*

To meet the above objective, Government shall:

- Promote the use of alternative sources of energy and technologies which are environmentally friendly;
- Sensitise energy suppliers and users about the environmental issues associated with energy;
- Work towards the establishment and acceptance of broad targets for the reduction of energy-related emissions that are harmful to the environment and energy users;
- Promote efficient utilisation of energy resources
- Strengthen the environment-monitoring unit in the Ministry dealing with the environment.



## **PART 2-ENERGY POLICY STATEMENTS**

## 6.0 REGULATION PRINCIPLES FOR THE ENERGY SECTOR

With the liberalisation of Sierra Leone's economy it is necessary that decisions pertaining to the energy sector should ensure appropriate energy supply and use. An efficient and sustainable energy sector needs open and competitive markets that will result in efficiency of allocation of resources. However, where markets are imperfect, energy prices may not accurately reflect the full social cost and energy suppliers may not choose the most efficient options. Government intervention may be warranted in such instances. With the ushering in of private sector participation in some of the energy sectors, especially the power sub sector, legislative and regulatory gaps would still exist, resulting into unfair practices by the players. This calls for government intervention to ensure fair play, protect consumers, ensure the financial viability of private investments, promote competition and collect information.

### Sub sectoral regulatory policies

#### **Power Sub-sector**

*The GOSL intends to have a regulator in place soon for the power sector. The new regulatory system for the power Sub-sector will be conceived to give confidence to both private sector participants and consumers. It is envisaged that the regulator will issue licences, prescribe licence fees, establish a tariff structure, and develop and enforce codes of conduct, performance and quality standards.*

#### **Petroleum Sub-sector**

*The regulatory framework will aim to monitor the sub-sector to reinforce and promote competition among the players. Principles of an open and competitive market will be established and regulated by the Petroleum Unit. The industry will be regulated through an effective monitoring system. Private initiatives and investments will be promoted and protected against discretionary interference, discrimination or favouritism by the authorities. A levy in the petroleum pricing structure will support the establishment of the effective regulatory system.*

## **Household energy**

*Biomass and other renewable energy technologies which are predominant in this sector are not well regulated. All providers of services dealing with the provision of RET will be required to register with the Ministry of Energy and power which will provide appropriate guidelines for the operation of the sector. All fuelwood and charcoal sellers and groups dealing with improved stoves should be registered with the Ministry of Agriculture, Forestry and Food Security. The purpose of registration will not only be for the provision of the required regulation but to enable measures to be taken to increase awareness, quality control and standards.*

## 8.0 ENERGY DEMAND SIDE OBJECTIVES AND STRATEGIES

### 8.1 Household sector (Including institutions)

Unemployment is high and most households are poor. In poor households, fuel wood and charcoal are mainly used. Kerosene lamps and candles are used mainly for lighting. Several types of fuels are used for different end-uses. This militates against the efficient and rational use of energy. Furthermore, low-income households tend to purchase cheap and unsafe appliances, thus increasing the risk to health. The numerous problems experienced with fuelwood and charcoal would require a combination of policies that border on efficiency of energy use, energy conservation and a switch to modern forms of energy in certain cases. In rural areas, there is need to have access to electricity especially for communal facilities. Fairly more affluent household in urban areas use mainly electricity but this percentage is very small.

**Objective:** To provide affordable energy services for households and community based services including water supply and sanitation, health, education, public lighting and communication in order to improve the social welfare of the rural population.

#### Policy Statements

- ❑ *The government shall encourage the use of efficient end-use technologies and good household practices.*
- ❑ *Alternative sources of energy for cooking, heating, cooling, lighting and other applications will be encouraged.*
- ❑ *The safety of household energy appliances will be ensured through regulation of safety standards.*
- ❑ *The government shall lend support to schemes that support the provision of electricity services to communal facilities in rural areas.*

#### Strategies

- ❑ A comprehensive Household Energy Plan, which adequately addresses issues related to shortages and inefficient use of biomass and affordability of modern energy services, will be developed.
- ❑ The adoption of energy demand management in middle and high-income households and the implementation of energy conservation measures in institutional buildings and in Government departments will be emphasized.

- ❑ Incentives will be created to make electricity and other modern fuels more easily accessible in rural areas.

### **8.2.1 Industrial sector**

Generally, the national utility cannot meet the demand of industry and there is need to increase the level of power generated to cater for this sector. Lack of expertise in industry has also been identified as one of the key barriers to increased energy efficiency. Most industries in Sierra Leone use a large amount of electricity inefficiently. Implementing energy efficiency programmes will not only reduce consumption but will also reduce operating expenses.

#### **Objective:**

To cater for the power needs of the industrial sector and introduce energy efficiency measures in Industry so as to result in overall financial and environmental benefits that will make Sierra Leone industry more competitive.

#### **Policies**

- ❑ *The government will ensure that energy supply is adequate in order to meet energy demand of the industry.*
- ❑ *Energy audits will be made mandatory and energy efficiency and conservation measures will be regulated*
- ❑ *Government will promote the performance of audits, demonstrations, information dissemination, sectoral analyses and training programmes.*

#### **Strategies**

- ❑ Training and other incentives will be given to industries in order for them to adopt more efficient energy end-use technologies.
- ❑ Environmental performance auditing will be enforced
- ❑ Co-ordination between institutions concerned with energy, industry and environmental issues will be improved.
- ❑ Financial incentives will be given for energy efficiency, e.g. the introduction of “time-use” electricity tariffs, will be developed.
  
- ❑ Government will promote an energy efficiency awareness amongst industrial energy consumers, and will encourage the use of energy-efficient practices by this sector.

### **8.3 Commercial sector**

The commercial sector includes among others wholesale and retail shops, hospitals, hotels, restaurants and recreation centres. Overall, the demand for energy in the sector is mainly met by commercial electricity and petroleum. There is also a paucity of power services to commercial operations, which suffer the same fate as industries.

#### **Policy statements**

- ❑ *The government will ensure sufficient and cost effective energy supply to meet the increasing demand in the commercial sector*
- ❑ *Energy management practices will be promoted and regulated as necessary*
- ❑ *The efficient use of alternative energy sources will be encouraged*

#### **8.4 Mining sector**

Power demand in such areas is currently met by auto-generation, in order to meet the energy demand of existing and new mines. The mining companies will be encouraged to generate their own power and cooperate in development of power infrastructure. Mining companies will be encouraged to develop surplus power from auto-generation which will be sold to neighbouring communities.

#### **Policy statements**

- ❑ *Mining companies will be encouraged to provide their own power supply. Mining companies will also be encouraged to have an increased energy mix in energy generation and distribution.*
- ❑ *Mining companies will be encouraged to provide and possibly sell power to communities in the environs of their mining areas.*

#### **8.5 Transport**

The transport sector is a major user of petroleum products. Although road transportation is predominant, various forms of transportation play vital roles in the lives of the rural populace. Although some amount of regulation is in place, inefficient practices abound in the sector.

**Objective:** To promote optimum, efficient and environmentally acceptable utilisation of petroleum fuels and substitution.

### **Policy Statements**

- ❑ *The government will promote energy efficiency and conservation in the transport sector.*
- ❑ *Encouragement will be given to the use of more efficient transportation modes*

### **Strategies:**

- ❑ Government will formulate fiscal and transport policies to promote energy conservation and efficiency
- ❑ The feasibility of introducing measures for pollution control will be explored, including using environmentally friendly fossil fuels e.g. unleaded gasoline, low sulphur diesel and importation of more efficient vehicles
- ❑ Incentives will be created in order to promote mass transport systems so that the proliferation of individual vehicles is reduced
- ❑ The development of sub sectors concerned with other forms of transportation should be encouraged eg boat transportation to coastal areas.

## **8.6 Agriculture Sector**

The economy of Sierra Leone is dependent on agriculture, which employs over 75% of the workforce. Subsistence farming is the most common activity and women are the main stakeholders in most agricultural activities. Drying and processing of agricultural products is by traditional applications of solar energy and firewood. Many agricultural activities contribute towards deforestation, through extensive farming and slash-and-burn practices.

The current Agricultural Policy calls for increased output and efficiency in agricultural production, timely delivery and efficient use of energy inputs into agriculture and increased use of tractors. The main energy challenge within agriculture is to ensure supply of sufficient and cost-effective energy to meet the requirements for improved agricultural activities, including agro-processing and irrigation. There is a need to create a commercial environment and encourage entrepreneurs to develop and distribute energy products and technologies in order to improve efficiency in agricultural production and add value to agricultural products. Furthermore, methods and approaches on how to maximise the use of alternative sources of energy such as, micro-hydro, solar, wind, biomass, and other renewable energies, need to be developed and commercialised.

### **Objective:**

To increase the use of modern energy in agriculture to result in increased agricultural production, leading to the achievement of the country's food security objectives.

### **Policy statements**

- *The government will ensure sufficient energy supply to meet the increasing demand in agriculture sector*
- *Energy efficiency measures will be encouraged in irrigation, agro-processing and other agricultural activities*
- *Agro-processing centres will be facilitated with appropriate energy alternatives, with emphasis on electrification in order to promote small-scale industry, employment creation and economic growth*
- *The enabling environment will be created for governmental institutions and private sector, which are engaged in research and development, and the distribution of energy products and development of appropriate energy technologies for agriculture.*

### **Strategies**

- *Farmers will be encouraged to implement modest mechanisation that focuses on providing access to energy services, which help to raise the productivity of labor-intensive agriculture*
- *Capacity building, information and awareness campaigns will be undertaken and facilities to finance energy services for rural agro-processing will be provided*
- *Measures should be taken to ensure that petroleum products are readily available in rural areas.*

## 9.0 ENERGY SUPPLY SIDE OBJECTIVES AND STRATEGIES

### 9.1 Electricity

The national utility can only provide a fraction of the electricity requirements in urban areas and electricity is virtually absent in rural areas. The power sector reform is aimed at improving the performance of the sector and increasing access to electricity nationwide. Policy measures should in the main aim at creating conditions to attract private sector capital into the sector.

#### **Objective**

To increase access to safe, reliable and efficient power supply for Sierra Leoneans to meet national economic and social development needs.

#### **Policy statements**

- ❑ *Government policy borders on having private sector participants into the sector. The role of government will be limited to policy formulation and providing regulatory support without undue interference into the sector's operation*
- ❑ *The entry of multiple players into the generation market will be encouraged. Generation of electric power shall be fully open to private and public investors as Independent Power Producers. Investment shall be based on economic and financial criteria considering open access to the network, balanced domestic supply and environmental impacts.*
- ❑ *Government will consider proposals by local authorities to provide and distribute power and will propose parameters for local government. If necessary these parameters will be enacted through new legislation and policy implementation. Government commits itself to implementing reasonable legislative and other measures, within its available resources, to progressively realise universal household access to electricity.*
- ❑ *Government will consolidate the electricity regulatory regime by establishing the powers and functions of the National Electricity Regulator through a clear legislative mandate and by strengthening its capacity to achieve its mandate. Amendments will be made to the 1982 NPA Act to allow new participants into the sector and the new Act will be*

*presented to parliament for ratification. Government will provide guidelines on the regulatory philosophy and approach which should be adopted by the National Electricity Regulator.*

- ❑ *Regional co-operation and integration shall be given strong consideration in investment matters in order to exploit low cost energy sources for regional trade.*
- ❑ *The National Power Authority will in the medium term be open to strategic partnerships with technically suitable, and financially strong investors, in the sector, as a step in the development of a strong utility that will carry out the transmission, distribution and commercial arms of the operation very well. To enable this to be done, the government will support the implementation of a performance based management contract for the national utility for a few years.*
- ❑ *The Government shall establish a new governance system in the power sector by differentiating the roles for (a) policy making and legislative functions carried out by the Government and the Parliament; (b) the regulatory functions carried out by an independent regulator; and (c) other functions carried out by public and private operators.*
- ❑ *Government is committed to extending the transmission line from Bumbuna to other parts of the country to be the backbone of a new national grid. Extensions from this grid will be made on a rational and economic basis*
- ❑ *The government will legislate that part of the tariff for electricity includes a levy for rural electrification. The government is committed to the setting up of a Rural Electricity fund.*
- ❑ *The development of mini/micro hydro sites will be encouraged by government*
- ❑ *The government will take legislative steps to criminalise electricity theft to serve as a deterrent to the significant amount of people abstracting electricity illegally.*

### **Strategies**

- ❑ *Increase competition in the sector, operate and expand the existing distribution system at minimum cost and price electricity to reflect the marginal cost of supply in order to achieve efficiency.*
- ❑ *Create incentives to attract private sector investment including, wherever relevant and appropriate, access to loans on concessionary terms, financial instruments, government guarantees and “smart subsidies” (or grants) for infrastructure investment*
- ❑ *Implement the Power sector reform strategy already outlined for the sector.*

- ❑ Establish a regulatory agency to provide even-handed and predictable electricity sector regulation
- ❑ Implement a Rural Electrification Strategy and Plan along the following lines:
  - Progressive development of rural electrification schemes on a demand driven basis whereby capable sponsors can initiate and develop electrification projects
  - Creation and capacity building of a Rural Electrification Agency
  - Establishment of a Rural Electrification Board, a Rural Electrification Fund and a transparent mechanism for funds disbursement to bring down capital costs through the provision of grants and loans for rural electrification schemes

## 9.2 Oil and gas-exploration and production

### 9.2.1 Mining/Petroleum exploration and production

This sector is in its infancy and the companies granted leases by the GOSL are in the process of setting up offices in Sierra Leone. There is however room for further exploration work and investment into the sector but there is need to improve on the resources in the sector and enhance technical capacity. The emphasis is mainly on the oil sector as energy based minerals are well considered under various initiatives undertaken by the Mineral resources Ministry.

**Objective:** To establish the petroleum potential of the country and to promote Its exploitation.

#### Policy statements

- ❑ *Exploration of petroleum will be promoted in accordance with best petroleum industry practices*
- ❑ *Regional and international co-operation will be encouraged in exploration, development of infrastructure, trade, database and capacity building*
- ❑ *Natural gas exploration and exploitation will be explored*
- ❑ *Major oil companies will be encouraged to invest in exploration in the sector*

#### General Strategies:

- ❑ Create conducive conditions for attracting more investors into the sector.
- ❑ Develop a mitigation plan to reduce environmental hazards in all oil Operations
- ❑ Facilitate the acquisition of geological and geophysical data for assessing the petroleum potential of the country

- Build capacity and maintain an efficient institution to monitor and regulate petroleum exploration and development.

### 9.2.2 Petroleum marketing and sales

The difficulties with supply, storage and availability of foreign exchange need to be addressed. since petroleum imports account for 26% of all imports into the country, issues in this sector need to be addressed with seriousness as they have the potential to impact on the economy. Also of concern is the distribution network in the country making petroleum products considerably more expensive in distant rural areas.

#### **Objective**

To ensure an adequate, reliable and affordable supply of quality petroleum products for all sectors of the economy at internationally competitive and fair prices within appropriate health, safety and environmental standards.

#### **Policy statements**

- *The government will adopt and implement a new legal framework for the industry*
- *International standards and codes of practice will be adopted and adapted within the industry*
- *The government will keep appropriate levels of strategic stocks based on an assessment of the risk of supply disruption*
- *The petroleum companies will be encouraged to extend their marketing networks to smaller towns in various parts of the country. It is envisaged that all towns with populations of more than 10,000 will be supplied with fuel directly from the marketing companies, irrespective of location*
- *The government will ensure that standards are set for lubricants to be utilised in the country and that there are testing programmes locally for these lubricants.*
- *The government will lend its support to schemes to pool resources for the procurement of large stocks of petroleum products to result in cost reductions*
- *The government will provide resources to support all bodies involved in the regulation and monitoring of petroleum products*
- *The government will lend assistance to oil companies to enable easier access to foreign exchange for the importation of petroleum products*

- *The government will commission a study to assess the economic viability of operating the existing refinery or of building a new one*
- *The government commits itself to utilising the Road Users' Fund for the intended purpose of road maintenance only.*

### **9.3 Other Renewable Energy Resources & LPG use**

Rural areas will continue depending on biomass for a considerable period. The continued supply of woody biomass is threatened by several factors that need to be addressed. Other RETs are hardly addressed and this area can almost be considered a Greenfield area in Sierra Leone despite the abundance of energy sources. Proactive measures should be taken by government to address problems that thwart the effective utilisation of the s energy sources. LPG is not readily available and policies need to be put in place that will encourage its use.

**Objective:** To develop the use of other renewable energy resources and LPG use for both small and large-scale applications.

#### **Policies**

- *Appropriate financial and administrative institutions will be set up to manage RETs.*
- *Appropriate norms, codes of practice, guidelines and standards for RETs will be instituted thus creating an enabling environment for its sustainable development.*
- *Biomass conversion and end-use technologies will be promoted in order to save resources; reduce rate of deforestation and land degradation; and minimize threats on climate change*
- *Environmental considerations will be included in all renewable energy planning and implementation co-operation will be enhanced with other relevant stakeholders*
- *Research and development work will be supported in renewable energy technologies*
- *A central body will be set up to regulate the RET industry*
- *Government will legislate the registering of associations and organizations involved with fuel wood, charcoal and improved stoves with the MAFSS.*
- *Government will consider the reduction of taxes and giving out waivers for the importation of RET equipment*

- ❑ *Government will actively encourage the use of LPG in urban areas. To this end government will put in strategies and provide the necessary incentives to make the use of LPG more pervasive*
- ❑ *Agro based industries will be encouraged to produce electricity from their wastes*
- ❑ *The manufacture of RET equipment will be actively pursued by encouraging their promotion and providing the necessary investments*

**Strategies:**

- ❑ Support the dissemination of biomass and other Renewable Energy Technologies (RETs) to increase their positive impact on the energy balance and the environment
- ❑ Facilitate adequate financing schemes for RETs by establishing sustainable financing mechanisms to make them more accessible
- ❑ Ensure that RET producers and importers ascribe to certified performance and technical standards
- ❑ Include renewable energy and energy efficiency in the curricula of schools, Universities, vocational training centres and other institutions of education
- ❑ Support efforts to develop biomass resources in agreement with the national Forestry policy
- ❑ Promote Agro-forestry enterprises – including fruit trees and mechanisation in the Inland Valley Swamps
- ❑ Encourage solar water heating in Hospitals, clinics, boarding homes etc for sterilisation and hygiene purposes
- ❑ Take measures to allay fears of using solar cookers in rural areas because of cultural and traditional practices
- ❑ Co-operatives should be encouraged to facilitate the financing mechanism for RETs.

## **10.0 RURAL ENERGY**

Economic activities in rural areas are greatly influenced by energy. All rural economic activities including agriculture, business, social services, poverty and gender equality are influenced by energy services. Energy services will impact positively on the welfare of the rural population and the attainment of sustainable economic growth. The majority of Sierra Leoneans live in rural areas and it behoves any planning in Energy to consider the rural areas separately. Biomass, particularly wood-fuel, constitutes 95% of rural energy consumption, which has significant impact on the process of environmental degradation. Fuelwood is the main source of energy for most rural households and access to sustainable and secure fuelwood supplies is important for the survival of many rural households. Demand exceeds sustainable supply in many areas of the country and this, coupled with agricultural and settlement pressures, is resulting in the denudation of natural woodland. The balance of the energy requirement is met by other options mainly kerosene, petrol, diesel and candles. Less than 1% of the rural population has access to electricity. The low consumption of commercial energy has suppressed economic growth, which is manifested in low levels of agricultural mechanisation and industrialisation.

There is hardly any investment in rural energy development. The challenge to increase access to commercial energy facilitate a diversification of energy services should therefore be taken seriously. Rural energy is diverse and characterised by various actors and interests. A sustainable institutional framework that can cope with the diversity, manage and co-ordinate various efforts, is a key factor for successful development of rural energy. There is a need to establish an institutional framework that can mobilise, co-ordinate and facilitate private and public initiatives in rural and renewable energy.

The development of commercial activities in underdeveloped areas will be a crucial factor in the economic empowerment of the poor. Commercial activity usually begins with small businesses and micro-enterprises, such as shops, entertainment facilities and agro-industrial activity. The development of commercial activity provides services and employment for people living in underdeveloped areas. Modern energy services are an essential input for the development of commercial activity. Electricity in particular is a key requirement for commercial activity. Where the supply of grid electricity is impractical, costly or delayed, alternative electricity supplies are required.

Many of the measures to be taken have been addressed under specific energy sub sectors. Those that have a significant bearing on rural energy supply are mentioned again.

### **Objective**

Improve on the traditional methods of supply of energy to rural areas and take measures to markedly improve on the provision of commercial energy services to contribute meaningfully to the social and economic development of rural areas.

### **Policy Statements**

- *A Rural Electrification Strategy and Plan will be instituted along the following lines:*
  - *Progressive development of rural electrification schemes on a demand driven basis whereby capable sponsors can initiate and develop electrification projects*
  - *Creation and capacity building of a Rural Electrification Agency*
  - *Establishment of a Rural Electrification Board, a Rural Electrification Fund and a transparent mechanism for funds disbursement to buy down capital costs through the provision of grants and loans for rural electrification schemes*
- *The government will set up a Rural Electrification Fund. This fund will be for the purpose of encouraging and implementing rural electrification schemes in the country. The fund, to be set up and administered within the Ministry of Energy and Power will consist of the following contributions:*
  - *A levy of part of the electricity bills paid to the national utility-this requirement to include a rural electrification levy as part of the utility bills will be legislated*
  - *Funds provided by the government specifically for rural electrification*
  - *Funds provided by donors and other agencies specifically for rural electrification*
- *The government will support research and development of rural energy*
- *The application of alternative energy sources other than fuelwood and charcoal will be promoted, in order to reduce deforestation, indoor health hazards and time spent by rural women in search of firewood*
- *Entrepreneurship and private initiative in the production and marketing of products and services for rural and renewable energy will be promoted*

- *The government will ensure continued electrification of rural economic centres and make electricity accessible and affordable to low income customers*
- *There will be a conscious effort to facilitate increased availability of energy services, including grid and non-grid electrification to rural areas*
- *Norms, codes of practice, standards and guidelines for cost effective rural energy supplies will be established*

## **11.0 CROSS CUTTING ISSUES-OBJECTIVES AND STRATEGIES**

### **11.1 Energy Planning**

There is no central planning unit that plans for the energy sector and the planning coordination for the different sub sectors is poor. Energy needs should be analysed in terms of how their fulfilment will contribute towards attaining national economic and social goals. The potential of energy supply systems and demand side management to meet current and potential future energy needs should also be assessed. This would include analyses of individual supply sub-sectors and the linkages between sub-sectors.

The implementation of Energy Planning requires sufficient capacity to carry out these technical functions and to engage with energy policy processes. Such capacity does not currently exist within Sierra Leone and consequently there is an insufficient level of the information required to inform policy development on the South African energy sector. There are key policy challenges that must be addressed. The World Bank is funding an energy planning unit for the Ministry of Energy and Power, which at present has no technical wing. It is envisaged that various planning experts in the various energy sub sectors will constitute this unit which will be required to liaise with line Ministries and other agencies allied with the energy sector for input into the planning process.

#### **Policy statements**

- *The government will establish appropriate structures and systems to carry out energy planning functions within the Ministry of Energy and Power. This central Planning unit will consist of planners disciplined in all the*

*energy subsectors who will be required to liaise extensively with line Ministries and agencies for input into the planning process.*

- *The government will provide the necessary resources to operate energy planning structures and systems. Apart from the central planning unit within the Ministry of Energy and Power the government will support the strengthening of sub sectoral planning and information gathering units*

## **11.2 Energy information systems and dissemination**

Energy information systems are one of the tools for policy implementation. Energy information collection, storage, analysis and exchange is vital for planning, policy formulation and in decision-making for implementation of programmes and policies. In Sierra Leone, there is a lack of an energy information system, resulting in poor information exchange amongst energy stakeholders. There is also inadequate capacity to manage and analyse energy information. There is a need for establishing a proper energy information system that will mobilize human resources and undertake sensitisation and information dissemination to stakeholders in the sector for effective implementation of the energy policy.

Although the Ministry of Energy and Power will take lead responsibility for the implementation of this policy, it is clear that opportunities exist to integrate energy information into existing communication and education programmes run by other organisations. Other Ministries, NGOs, the private sector and the formal training sector, can all play a role in communication and education. The Ministry of Energy and Power should monitor the development of energy awareness and regularly assess these communication strategies.

### **Policy Statement**

- *A proper information and communication system will be established and strengthened in the energy sector and human resources mobilized to undertake sensitisation, advocacy and dissemination of information to stakeholders.*

### **Strategies**

Comprehensive strategies will be developed to build knowledge, skills and confidence, and, where necessary, change attitudes and behaviour. In particular such strategies will aim to:

- Enable consumers to make informed decisions regarding the safe, healthy, efficient and environmentally sustainable use of energy;
- Enable representatives (particularly at community and local government levels) to proactively take up the energy issues of the communities they represent
- Enable development and health practitioners to provide appropriate advice and practice and to integrate energy needs into project planning and implementation.

### **11.3 Energy efficiency and conservation**

There is a need for government to play a role in facilitating increased efficiency in the use of energy. Barriers to the adoption of efficiency measures include:

- Inappropriate economic signals;
- Lack of awareness, information and skills;
- Lack of access to efficient technologies;
- High return on investment criteria; and
- The high cost of capital.

#### **Policy statements**

- ❑ *Government commits itself to the promotion of energy efficiency and the development of holistic programmes for households, industry and commerce*
- ❑ *Energy audits in industries, particularly the energy intensive ones will be ensured*

### **11.4 Energy and environment**

Environmental implications of energy consumption need to be considered in all sectors. All stages of energy resources (be it fossil or non-fossil) exploitation, production, conversion, transportation, storage and end-use can have negative impacts on the environment. Health, safety and environmental consequences of energy production and utilisation have become a major concern. For example, hydropower dams construction has led to increased dangers of water borne diseases; uncontrolled use of woodfuel puts pressure on forests and leads to erosion, desertification, and contributes to carbon-dioxide emission. The combustion of fossil fuels produces significant amount of pollutants including greenhouse gases and particulates. Further, there are environmental impacts of the construction of transmission lines and pipelines. On the other hand, renewable energy sources, including solar, wind,

and geothermal have rather small negative environmental impacts. The production and consumption of energy should not endanger the quality of life of present and future generations.

### **Policy Statements**

- *Environmental Impact Assessments will be a requirement for all energy programmes and projects*
- *Energy efficiency and conservation will be promoted as a means towards cleaner production and pollution control measures*
- *The development of alternative energy sources including renewable energies and wood fuel end-use efficient technologies to protect woodlands will be promoted.*
- *Programmes for disaster prevention, response plan and standards for exploration, production, conversion, transportation, distribution, storage, and fuel end-use will be promoted*
- *Government will monitor international developments and will participate in negotiations around response strategies to global climate change, in order to progressively balance its environmental responsibilities and development interests, along with health related local issues, in these processes.*

### **11.5 Research and Development**

Research and Development (R&D) efforts that give rise to technological innovations in the energy sector are important as they lead to development and economic growth. Identifying and targeting R&D policies and priorities must be supportive of national socio-economic development goals. R&D issues relating to biomass, rural energy, energy end-use, affordability, and pricing mechanisms need greater attention.

The challenge is to overcome the inadequate financial resources and lack of skilled manpower for R&D. There is also a lack of understanding and appreciation of critical energy R&D issues both within the sector and for the general public. Today, there is a lack of institutional co-ordination in respect of various ongoing research activities in the sector. Co-operation between public and private sectors in R&D of energy issues such as demand and supply management, pricing, conservation and rural energy need to be encouraged and co-ordinated. There is also a need to support regional and international co-operation in R&D on technological and non-technological advancement in the energy sector.

**Policy Statement**

- *Regional and international cooperation on Research and Development of energy forms and of related advances will be promoted as well as innovative environmentally sound technologies in the energy sector*

**11.6 Capacity building and capacity development**

Education is a key input to any country's sustained development. The majority of Sierra Leoneans are poorly informed about energy and related end-use practices and options. Manifestation of this situation include: low level of renewable energy application, inefficient use of energy and economic non-competitiveness of Sierra Leonean products.

There is a need for adequate physical demonstrations on renewable energy and energy efficiency to students. It is, therefore, necessary to include energy education, in particular, renewable energy and rational use of energy, in curricula for schools, vocational training centres, colleges and other learning institutions. There is also a need for mass educational and promotional efforts on energy issues targeted to the public.

The development of the energy sector is dependent on the appropriate utilisation and development of human resources. A gender balanced human resource development programme for the energy sector is an important tool in order to ensure the fair provision of training and education. Today, there is a lack of trained and skilled energy experts in the sector, particularly, women. In addition, there are inadequate incentives to attract and retain qualified energy experts in the sector. The present situation is also constrained by cultural and traditional influences, which inhibit gender-balanced training.

**Policy Statements**

- *Energy education will be encouraged in school curricula, vocational training centres, colleges and other relevant learning institutions; emphasis will be put on practical aspects including physical demonstration, installations and operation.*
- *Local and foreign investors and others will be encouraged in the sector in the sector to train Sierra Leoneans in essential skill*
- *Good performance and conduct by individuals or organisations in the sector will be encouraged and appropriately rewarded*

- *Government will allocate appropriate funding and staffing to undertake and support capacity building, education and information dissemination programmes and will provide tax incentives for training.*

### **11.7 International and regional energy trade and cooperation**

Co-operation between neighbouring countries in Africa and international bodies is vital for development and economic growth. Sierra Leone is a member of various bodies in the region, including the African Union (AU), ECOWAS. Sierra Leone is part of the West African Power Pool under which member states will eventually be linked through a linked single electricity grid. Apart from these regional bodies and institutions, Sierra Leone is active in international agencies and fora of the United Nations and the Commonwealth in the field of energy.

There is a challenge to maximise the potential gains from the regional and international energy trade and co-operation. Sierra Leone needs to attain a stronger and closer interaction between the energy planning processes with other countries in the region, notwithstanding limitations of resources to undertake Sierra Leone's obligations in the regional and international bodies. There is a need to encourage joint development of common (shared with other countries) energy resources as a way of enhancing co-operation and collective reliance and security of energy supplies.

#### **Policy Statements**

- *The government will encourage collaboration within the West African countries in the area of energy with emphasis on future interconnections*
- *The government will facilitate international collaboration in research, exchange of data, information and documentation. Government will facilitate active regional co-operation, including energy trade, information exchange, capacity building and the training of energy specialists.*

### **11.8 Fiscal and pricing issues**

Fiscal policies have a fundamental effect on energy prices, thus affecting structural demand for energy products. The selective use of fiscal mechanisms can be very effective strategies for achieving energy policy objectives, such as encouraging fuel switching, raising dedicated sources of finance for particular needs and encouraging more efficient environmental and resource management. On the other hand, unconsidered usage of fiscal mechanisms within the energy sector can lead to unintended

consequences, perhaps even directly contradicting government's other economic and social policies. It is therefore essential that fiscal policies are aligned with energy policies, particularly as competition increases between energy service providers.

Government's current fiscal policies have many linkages with the energy sector, with various categories of fiscal transfer. The differential fiscal treatment of energy sub-sectors is sometimes done in response to particular problems. In the context of increasing competition between suppliers of

different energy carriers, all seeking to meet the same energy demand, this tax treatment introduces structural distortions into the market, which may run counter to government's energy policy objectives.

### **Policy statements**

- *The government may use selective fiscal mechanisms in promoting the use of certain types of fuels with the intention of satisfying future energy use goals. This will however be done with care and within a limited time frame to avoid introducing structural distortions into the market.*
- *The government may also consider the use of selective fiscal mechanisms in order to increase access to energy services especially to the poor and also to enable the effective dissemination of some RETs into the market.*

### 11.8 **Energy Investment**

The opportunities for investment in the energy sector are vast in monetary terms, and substantial in terms of economic development impact. With reforms taking place in the energy sector such as the liberalisation of power generation, petroleum product trade, and emphasis on enhancing rural energy supplies, private investment is bound to increase substantially. There is, therefore, a need to make domestic and international investors aware of the potentials within the energy sector. Public and private sector partnerships should be encouraged to invest in provision of energy services. Furthermore, there is a need to facilitate and encourage investment in the development of alternative sources of energy, putting emphasis on the utilisation of indigenous resources.

### **Policy Statements**

- ❑ *Private initiatives will be promoted at all appropriate levels and local and foreign investors made aware of the potentials within the energy sector*
- ❑ *The government will ensure that a transparent and predictable institutional framework, including incentives, is in place to provide for an enabling environment for investment in the energy sector.*

### **11.9 Gender issues**

Gender issues in the energy sector need to focus on the energy needs and ownership of resources. Gender issues should be looked at from both the demand and supply of energy. On the demand side, men and women have different demands on energy due to the existing socio-cultural and traditional roles. On the commercial energy supply, it is clear that women are under-represented at all levels of energy generation, transmission and distribution. There is, therefore, a gender imbalance at various levels of planning and decision-making within the energy sector. On the demand side, especially in rural areas, there is a need to relieve women from the burden of searching for energy, especially wood-fuel. All stakeholders within the energy sector need to participate and take deliberate sensitisation actions to encourage women participation in energy related education, training, programmes and projects, planning, decision-making and, not least, energy policy implementation.

### **Policy Statements**

- ❑ *Gender equality within the energy sub-sectors both on the demand and supply side will be promoted*
- ❑ *Education and training for women in all energy aspects will be facilitated.*
- ❑ *The government will promote awareness on gender issues concerning men and women's social roles in the energy sector, including training on appropriate technologies*
- ❑ *The government will promote awareness and advocacy on gender issues in the energy sector*

## 12.0 GOVERNANCE AND INSTITUTIONAL CAPACITY

Governance is the complex set of processes and control relationships which occur between various players. In the energy sector of Sierra Leone, these players include parliament, cabinet, individual ministries dealing with energy and power issues, the Minister of Energy and Power, the Parliamentary Committee on Energy and Power, various government departments at national, provincial and local levels, energy suppliers, energy consumers, regulator, other stakeholders (including organised labour, civic organisations, NGOs, researchers, consultants, financiers, contractors, equipment manufacturers and marketers), and other bodies like the West African Power pool, foreign donor agencies and organisations. Understandably, the myriad of players makes energy governance difficult. supra-national bodies such as the SADC and foreign governments and organisations with whom agreements have been entered into. Not surprisingly, the range of players and the complexity of their inter-relationships makes energy sector governance difficult to understand, and even harder to manage.

The Ministry of Energy and Power is nominally responsible for energy sector governance but as has already been indicated, the wider energy sector is within the purview of various Ministries. The clarification of roles is therefore important. As much as rational structures can be drawn up to integrate the energy sectors, the political acceptability, financing, limitations in resources and capacity problems would need to be taken into consideration in suggesting new governance structures.

### **Objective**

To institute a new governance structure for the energy sector that would meet the challenge of developing a coherent and clear framework of energy governance, which addresses in an integrated manner, the key issues that will guide the policy formulation and effective implementation. In this respect the energy governance objectives aims to:

- Provide a platform for representing their interests but also increase their understanding of their role in the policy implementation.
- Facilitate the effective delivery of the energy policy and in so doing achieve the economic, social, political goals.

### **Policy statements**

- *The Minister of Energy and Power will be responsible for the general governance of the energy sector, the integration of long term energy policies, communication with stakeholders, the management of regional and international cooperation and ensuring that appropriate institutions are established to achieve energy policy objectives. The Ministry will also be responsible for all*

coordination and overall energy planning. **Cabinet** will assist with the coordination and implementation of energy policy and ensure its integration with other sectoral policies. **Parliament** will be responsible for the approval or amendment of energy related legislation. **Parliamentary Committees** are responsible for considering proposals for new or amended legislation and supervise the actions of the ministries especially as they relate to the budget. **The Parliamentary Committee on Energy and Power** will spearhead this function for the entire energy sector

- *The government supports the retention of the present sub sectoral split of the energy sector which is as follows:*
  - *Ministry of Energy and Power-Electricity including hydro and other renewable energy resources*
  - *The Ministry of Agriculture, Forestry and Food Security-The traditional energy sector which includes mainly biomass*
  - *The Ministry of Trade and Industry-Petroleum marketing and sales*
  - *The Presidential Petroleum Commission-To remain under the President's office and be responsible for Petroleum exploration and production*
  - *The Ministry of Mineral Resources-The exploration and exploitation of minerals*
  
- *The government commits itself to the gradual consolidation of the energy sector over the medium term to include the following:*
  - *The Ministry of Energy and Power having its present function and eventually taking over the duties with petroleum products now performed by the Trade and Industry This will be the Modern Energy sector*
  - *The Presidential Petroleum Commission's work being integrated into the Mineral Resources Ministry*
  - *The Ministry of Agriculture, Forestry and Food security continuing to handle the Traditional Energy Sector*

- *The government is committed to the setting up of an independent National Energy Coordinating Unit in the medium term that will be responsible for all Energy planning, coordination and regulation.*



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## **PART 3-ACTION PLAN**

### 13.0 SHORT- AND MEDIUM-TERM POLICY PRIORITY ACTIONS.

Several policy actions will be implemented in order to achieve the broad and specific objectives of this energy policy. The details are indicated in Appendix 1. Strategic interventions required to move forward the policy priority actions are indicated alongside the proposed actions. Most of these resources will come from government and various development partners (e.g. Multilateral and bilateral cooperation, Global Environment Facility, Clean Development Mechanism).

A summary of the cost requirements is provided below.

<b>Area/Sub sector</b>	<b>Funding required Million US \$</b>	<b>Funding available Million US \$</b>	<b>Funding remaining Million US \$</b>
Sector Governance/Electricity	89.3	20.5	68.8
Household Energy- Biomass/RETs/LPG	4.7	0	4.7
Petroleum	9.5	0	9.5
<b>Total</b>	<b>103.5</b>	<b>20.5</b>	<b>83.0</b>

## **CONCLUSION:**

Investing in Future Energy is the life-blood of development. Energy supply is part of the poverty eradication process. The Energy Policy for Sierra Leone will allow the population to meet one of its basic needs in a sustainable manner. The Policy will focus on:

- Developing positive linkages between the energy sector, poverty alleviation and economic growth
- Integrating the objective of environmental sustainability into all energy initiatives
- Demand side management and energy efficiency
- Developing an energy resource base and dissemination of key information;#
- Promoting private participation and the development of competitive markets in energy technology and services
- Developing, where necessary, appropriate regulatory frameworks and capacity.

The Policy will be the basis for progressively expanding investment in modern energy production, petroleum exploration and development, rural electrification, the supply of well priced petroleum products, and for increasing the efficiency of energy use in all sectors from the household consuming biomass for cooking to the big industries and the transport sector.

The technicalities of the energy policy are important, but more so are the social dimensions. The building of human resources is paramount to the effective utilisation of energy and the ensuing benefits. Significant resources are required to implement the key policy actions in the short and medium terms. The Ministry of Energy and Power is dedicated to the economic, social and environmentally sustainable development of the Sierra Leone energy sector. In pursuit of this goal, the Ministry seeks to prioritise the policies contained in this paper and translate those priorities into strategies. The Ministry is committed to develop concrete plans to activate these policy strategies, and will undertake specific activities to ultimately make these plans a reality with the support of all the people and institutions of Sierra Leone.

## APPENDIX 1

### PROGRAMME OF INTERVENTION MEASURES IN ENERGY SECTOR \*

\* This does not include Private sector funded projects which could be considerable in extent

#### SECTOR GOVERNANCE/ELECTRICITY SUB SECTOR

Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
<b>Refurbishment of Western Area Distribution network</b>	To restore power to remaining areas of distribution network and to take measures to reduce losses and improve on efficiency of supply	+Study on work content and prioritisation	+Lower levels of power outages +More reliable electricity supply + Reduction of system losses	10	0	10	NPA	2005	
<b>Refurbishment of Auxilliaries at Kingtom Generating station</b>	-To improve on fuel efficiency and efficiency of generation	+Refurbish cooling system, sludge, fuel and lube system	+Lower fuel usage for generation +Possible lower electricity tariffs	2.5	0	2.5	NPA	2005	
<b>Restoration of Provincial electricity stations</b>	To restore electricity supply to the Provincial generating stations that had power before the conflict	+ Activities as per Cohort report	+Resumption of business activities requiring power in Provincial areas +Improved quality of life in Provincial areas	13	0	13	NPA	2005	
<b>Provision of assistance to BKPS</b>	To improve on the generation, transmission and distribution of electricity and the	+ Overhaul generators +Refurbish transmission and distribution system +Provide logistics	+Improved electricity supply in Bo Kenema and outlying areas +Intensification of	6	0	6	BKPS	2005	



Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
	overall services provided		economic activities needing power in these areas						
<b>Expansion of Dodo dam-BKPS</b>	To provide an additional generating capacity of about 4 MW from the Dodo dam	+ Feasibility studies +Construction of dam Expansion of services	+Improved electricity supply in Bo Kenema and outlying areas +Intensification of economic activities needing power in these areas	4	0	4	BKPS	2007	
<b>Completion of Bumbuna Project-Phase2-Yiben</b>	To provide additional capacity to meet growth in demand	+ Feasibility study only	+Timely start of Yiben, the second phase of Bumbuna +Markedly improved electricity supply to most parts of Sierra Leone	0.4	0	0.4	Bumbuna PIU	2008	
<b>Review of Power sector Master plan study</b>	To provide updated information on the power sector		+Enhanced energy planning for Sierra Leone	0.2	0	0.2	NPA	2006	
<b>Rehabilitation of Electricity House</b>	To cater for the office needs of a restructured power sector		+Enhanced working environment and Improved productivity of NPA staff	1.5	0	1.5	NPA	2006	
<b>Institutional support to the Ministry of Energy and Power</b>	To make for a more effective Ministry to supervise a restructured power sector	+ Projects as per Reform programme mainly to set up technical wing in Ministry	+Better supervision and coordination of energy sectors	2.0	1.0	1.0	MEP	2004	WB is sponsoring initial phases of project



Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
<b>Support for Energy Reform measures</b>	To implement reform measures successfully	+ Projects as per Reform programme -Sector policy, Electricity Act etc. + Implementation of schemes Energy Policy and Planning Unit, rehabilitation of infrastructure, capacity building, IPP transactions	+Enhanced and efficient operation of power sector for entrance of Strategic partner for NPA into sector	37	19.5	17.5	MEP/NPA	2004	WB has already committed \$19.5 m for reform measures
<b>Study to consolidate the Energy sectors</b>	To result in better coordination of the energy sectors in order to have a more effective sector management		+Achieving reform and consolidation of the energy sub sectors	0.2	0	0.2	MEP/NPA	2005	
<b>Energy efficiency studies and programmes</b>	To result in more efficient use of energy resources	Studies and programmes for energy efficiency in all energy sub sectors. This will include improvement in charcoal production, improved stoves etc.	+More efficient use of energy resources resulting in marked improvements in conservation of energy	2	0	2	MEP	2006	
<b>Studies and implementation of environmental programmes related to energy production</b>	To result in better environmental practices in the energy sector	Miscellaneous environmental programmes	+Better environmental practices in all the energy sub sectors	1	0	1	MEP	2006	
<b>Institute safety standards for household appliances, industrial appliances, commercial buildings etc</b>	To result in safer applications of electricity for various uses	+Draw up safety codes	+Safer utilisation of electricity resulting in lower accident rates	0.5	0	0.5	MEP	2006	
<b>Set up Rural Electrification Agency and</b>	To result in more effective planning and allocation of	+Enact law to set up Rural Electrification Agency and Rural Electrification Fund	+Higher access to electricity by rural population	5	0	5	MEP	2006	Only 0.5 m needed to set up Agency. Rest is



Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
<b>Rural electrification fund</b>	resources specifically for rural electrification programmes	+Set up Rural Electrification Agency +Set up Rural Electrification Fund +Implement Rural electricity programmes							money to implement some Rural electricity programmes
<b>Strengthen planning units within Energy sub sectors</b>	To result in better information gathering and coordination with central energy unit within MEP	+Capacitate units in terms of logistics and manpower	+ Better coordination and planning of all energy activities	1	0	1	MEP	2006	
<b>Support for Energy unit within University of Sierra Leone</b>	To support unit that will provide miscellaneous technical support for energy activities	+Provide support to set up unit and capacitate unit	+Improved access to energy consulting services and energy service providers in Sierra Leone	1	0	1	USL/MEP		
<b>Set up National Energy Coordinating Unit</b>	To have a central policy, planning and coordinating unit in Sierra Leone to independently coordinate all energy matters	+Provide support to Technical unit within MEP that will ultimately form the core of this unit =Provide logistics and general support for this unit	+ Better coordination and planning of all energy related activities	2	0	2	MEP	2008	
<b>Total</b>				<b>89.3</b>	<b>20.5</b>	<b>68.8</b>			

**HOUSEHOLD ENERGY SUB SECTOR-BIOMASS/RENEWABLE ENERGY/LPG**

Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
<b>Project to make LPG use more pervasive</b>	To result in better utilisation of modern means of energy supply	+ Investigations +Awareness programme +Intervention measures	+More pervasive use of LPG	1.5	0	1.5	MTI/MEP	1996	This includes support for petroleum companies importing LPG and support for marketers
<b>Set up central body to regulate use of RET equipment and formulate new codes for operation of RETs</b>	To result in proper usage of RET equipment	+ Support the setting up of this unit within the MEP	+ Greater awareness of potential of RETs and enhanced usage of RETs	0.5	0	0.5	MEP	1996	
<b>Promote the use of Renewable energy and Renewable Energy Technologies</b>	To result in more pervasive use of RETs in appropriate circumstance	+ Support for various awareness raising programmes	+More pervasive and proper use of Renewable energy and Renewable Energy Technologies	0.5	0	0.5	MEP	1996	
<b>Promotion of improved stoves programmes</b>	To result in the manufacturing of more efficient stoves and their acceptance by users	+Support for research work on improved stoves +Support for schemes to manufacture and sell improved stoves +Awareness raising programmes	+ More pervasive use of energy efficient improved stoves	1	0	1	MEP/MAFFS	1996	
<b>Regulation of operations of wood sellers, charcoal sellers and improved stoves manufacturers and sellers</b>	To have a regulatory agency to regulate the activities of wood sellers and charcoal sellers	+ Set up agency to register and regulatory wood sellers and charcoal sellers	+Proper operation of all woodselling and charcoal selling and production activities	0.2	0	0.2	MEP/MAFFS	1995	
<b>Support for miscellaneous</b>	To help conserve scarce forest	+Support for various programmes in MAFFS	+ More prudent utilisation of forest	1	0	1	MAFFS	1996	



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Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
conservation and reforestation programmes	resources		resources						
<b>Total</b>				<b>4.7</b>	<b>0</b>	<b>4.7</b>			



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**PETROLEUM SUB SECTOR**

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Project	Objective	Activities	Key performance indicators	Funding required US\$ m	Funding available US\$ m	Funding remaining US\$ m	Implementing Ministry/Agency	Project start Date	Comments
<b>Set up Regulatory agency for Petroleum sector</b>	To result in a better regulated sector with market economic considerations	+Support regulatory functions of Petroleum Unit	+Enhanced operation and regulation of petroleum sector	0.5	0	0.5	MTI/PU	1995	Functions already being carried out by PU-Need to enhance PU's capacity
<b>Setting up of strategic stocks of petroleum products</b>	To allay problems of fuel shortages and cater for emergencies		+Elimination of fuel shortage problems	8	0	8	MTI/PU	1997	
<b>Formulate New Act for the operation of the Petroleum sector</b>	To result in better overall operation of Petroleum sales and marketing sector	+ Drafting of new Act +Enactment by Parliament	+Better operation of sector	0.25	0	0.25	MTI/PU	1995	Legislation being drafted
<b>Assistance to monitoring units within MTI</b>	To enhance the Ministry's capacity for monitoring all fuel related matters	+ Support for various capacitation programmes	+ More effective operation of petroleum sector	0.5	0	0.5	MTI	1995	Support can be spread out over 5 years
<b>Initiate study for the economic viability of the Petroleum refinery</b>	To enable GOSL to make an informed decision on the advisability of having a refinery in Sierra Leone	+Carry out relevant study	+Better planning for petroleum sector	0.25	0	0.25	MTI	1996	
<b>Total</b>				<b>9.5</b>	<b>0</b>	<b>9.5</b>			