

**THE REPUBLIC OF SIERRA LEONE**  
**Ministry of Energy and Water Resources**

**NATIONAL ENERGY POLICY AND STRATEGIC PLAN**  
*ENERGY FOR POVERTY ALLEVIATION AND SOCIO-ECONOMIC  
DEVELOPMENT*

**PART 1: NATIONAL ENERGY POLICY**

**Freetown**  
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### ANEXES

List of Energy Projects

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## ABBREVIATION AND ACRONYMS

AFREC	-	African Energy Commission
BHP	-	Bumbuna Hydro Power Project
BKPS	-	Bo- Kenema Power Services
BSL	-	Bank of Sierra Leone
CEMMATS	-	Construction, Engineering, Manufacturing, Management and Technical Services
CDM	-	Clean Development Mechanism
DANIDA	-	Danish International Development Agency
ECOWAS	-	Economic Community of West African States
GDP	-	Gross Domestic Product
GOSL	-	Government of Sierra Leone
GTZ	-	German Technical Services
GWh	-	Gegawatt hour
IEA	-	International Energy Agency
IPPs	-	Independent Power Producers
KM	-	Kilometer
KV	-	Kilo volt
LPG	-	Liquid Petroleum Gas
MAFFS	-	Ministry of Agriculture, Forestry and Food Security
MDG's	-	Millennium Development Goals
MEWR	-	Ministry of Energy and Water Resources
MFDP	-	Ministry of Finance and Economic Development
MFMR	-	Ministry of Fisheries and Marine Resources
MFO	-	Marine Fuel Oil
MLCPE	-	Ministry of Lands, Country Planning and the Environment
MMR	-	Ministry of Mineral Resources
MTA	-	Ministry of Transport and Aviation
MTI	-	Ministry of Trade and Industry
MW	-	Megawatt
NCP	-	National Commission for Privatization
NPA	-	National Power Authority

NEPAD	-	New Partnership for Africa's Development
OMC	-	Oil Marketing Companies
OP	-	Office of the President
PRU	-	Petroleum Resources Unit
PU	-	Petroleum Unit
PV	-	Photo voltaic
PRSP	-	Poverty Reduction Strategy Paper
RETs	-	Renewable Energy Technologies
SLNP	-	Sierra Leone National Petroleum
SSL	-	Statistics Sierra Leone
UNDP	-	United Nation Development Programme
UNECA	-	United Nation Economic Commission for Africa
UNIDO	-	United Nation International Development Organization
W	-	Watts
WAGP	-	West Africa Gas Pipeline
WAPP	-	West Africa Power Pool
WB	-	World Bank

## EXECUTIVE SUMMARY

Lack of modern energy is a major impediment that has hitherto hampered the development of Sierra Leone. And yet activities and development in the sector have been haphazard and have failed to meet the requirements of the various demand sub-sectors. A first step in addressing the energy situation is the drawing up of a comprehensive policy that lays down the Government's position on energy issues, and that will form the basis for Government action in this sector.

Most of the energy production and use in Sierra Leone is concentrated in the household sub-sector, where biomass, in the form of fuelwood and charcoal is used for cooking and kerosene is used for lighting. Traditional biomass accounts for over 80 per cent of total energy used in the country. Modern energy services, electricity, petroleum products, including LPG, and non-biomass renewables, represent only a small percentage of energy used in the country. Almost 80 per cent of the electricity used is in the industrial and mining sub-sectors, while about 50 per cent of petroleum use is in the transport sub-sector. The country possesses vast potential in renewable energy in the form of biomass from agricultural wastes, hydro and solar power, which remain virtually untapped. Oil exploration activities are being undertaken, but to date no discovery has been made.

In recognition of the fact that access to modern energy is a prerequisite for achieving development goals, the policy objective and ultimate goal of the Government of Sierra Leone is:

***To ensure the provision of modern energy services for increased productivity, wealth creation and improved quality of life for all Sierra Leoneans.***

This document contains the policies that the Government intends to take to achieve this goal, while safeguarding the environment.

The energy supply sub-sectors covered by this policy are electricity, petroleum and renewable energy, including hydropower. In these sub-sectors, the focus is on increasing the supply of modern energy supplies for Sierra Leone. In order to address the problem of limited access to electricity in the country, the policy is geared towards increasing supplies, through a comprehensive reform of the power sector, including liberalization of the sub-sector, attracting private investments and involvement and putting in place more effective mechanisms for monitoring and control.

The upstream of the petroleum sub-sector focuses on oil exploration, while the downstream addresses measures to reduce costs, while ensuring security of supply. For renewable energy, the policy is aimed at further exploiting the vast renewable energy potential in hydropower and solar energy, as well as in using agricultural wastes to provide much needed modern energy.

The energy demand sub-sectors are household, agriculture and fisheries, commercial and services, industrial, mining and transport. First and foremost, the policies in the demand sub-sectors address the need for increasing access, improving efficiency, promoting the use of more efficient and cleaner energy sources and equipment, as well as of widely available renewable energy resources. For the household sub-sector,

emphasis is on the promotion of LPG as a cooking fuel as well as wider dissemination of fuel-saving stoves, and the adoption of renewable technologies. For agriculture and fisheries the need for the provision of energy sources including renewable energy sources to stimulate mechanization is addressed. In the commercial sub-sector, focus is on more efficient energy devices for communal cooking and heating and for lighting. Access to electricity is the major consideration for the industrial and mining sub-sectors, while for the transport sub-sector, fuel economy; alternative fuels and environmental concerns are given considerable attention.

In addition to these sub-sectors the policy also addresses the cross-cutting issues that are important to consider in dealing with energy, in general. These are: energy and gender; research and development; human resources capacity building and development; information and awareness creation; energy efficiency and rural energy.

Firstly, consideration to gender issues is necessary, in order to avoid the adverse effects that actions taken to address energy issues could have on women, and to ensure that women's valuable inputs are fed into all stages of decision making and application of energy solutions. Secondly, research and development is vital in order to determine the technological solutions that are appropriate to the needs of the country. Thirdly, the lack of human capacity in the various energy fields is apparent and should be given attention. Fourthly, there is a general dearth of information and lack of awareness on energy issues in the country. The policy addresses this through the promotion of awareness campaigns and the setting up of an Energy Information Centre within the Ministry of Energy and Water Resources. Fifthly, the policy deals with the huge problem of energy inefficiency, which has been observed in all the demand sub-sectors, and measures to improve efficiency are included.

Last, but not least, in view of the energy problems of the rural areas, which currently lack electricity and which depend on traditional biomass sources for energy, and recognizing the key role that energy can play in alleviating poverty in these areas, the policy includes a separate section on rural energy. This includes steps to be taken to set up a rural electrification programme.

A strategic plan to implement these policies, from which bi-annual action plans has been developed and published separately.

Currently, a number of Government ministries and departments<sup>1</sup> have responsibilities relating to energy. However, the Ministry of Energy and Water Resources has an overarching responsibility for the energy sector, and will play a coordinating role in the implementation of this policy. In order to do so, the capacity of the Ministry needs will be strengthened to provide the required expertise needed in the energy sector. A professional division within the Ministry is thus considered crucial for the effective and comprehensive implementation of this policy.

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<sup>1</sup> Apart from the Ministry of Energy and Water Resources, other government ministries include: Ministry of Agriculture Forestry and Food Security (biomass), Ministry of Trade and Industry (petroleum marketing and sales), Ministry of Finance and Development (fiscal issues), Ministry of Mineral Resources (extraction of minerals), Ministry of Transport and Aviation (transportation), Ministry of Lands and Environment (Environmental issues) Petroleum Resources Unit within the Office of the President (petroleum exploration) and the Ministry of Fisheries and Marine Resources (fish production).

## I. INTRODUCTION

### a. The need for an Energy Policy

1. The role that energy plays in the alleviation of poverty and in economic development is well known. Indeed, it can be argued that, without the sustained and concerted effort to provide modern energy to all segments of the population, development goals will not be reached. It is thus discouraging that the country still lacks clear comprehensive policies and strategies for the energy sector.

2. A number of attempts have been made since 2001 to develop an energy policy, but these efforts were not pursued and the Cabinet and Parliament of Sierra Leone have yet to adopt and publicize a National Energy Policy, which will govern the process of energy provision and use in the country<sup>2</sup>. The CEMMAT Group study was quite comprehensive and pooled together the inputs of various stakeholders in fora organized for the purpose. Recently, the Ministry of Energy and Power drafted a policy document but it was not yet sent to Cabinet.

3. In recognition of the importance of energy in the nation's development, the President of the Republic of Sierra Leone, His Excellency Dr. Ernest Bai Koroma has declared energy as one of his highest priorities. The Ministry of Energy and Water Resources, is aware that the expectations of the President will not be met, unless and until a clear and comprehensive policy is established, on the basis of which, action will be taken to address the energy needs of the country. It is in this light that a small team of Sierra Leonean energy practitioners to elaborate an updated energy policy, which takes into account and builds on all the past efforts undertaken within the country to develop policies and strategies in the energy sector. This team examined the available documentation, sought updated data from various sources within the country and put together this document.

### b. Energy Policy Context

#### *i. Existing Socio-Economic Policies*

4. It is a well known fact that energy can play a crucial role in underpinning efforts to achieve poverty reduction and sustainable development. Lack of access to adequate, affordable, reliable, safe and environmentally benign energy is a severe constraint on development.

5. In order to address the current socio-economic situation, Sierra Leone has drawn up a number of policy documents, which lay out the vision, policies, priorities and strategies required for the socio-economic development of the country. Energy features

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<sup>2</sup> Documents prepared include: *Action Plan for the Energy Sector (Ministry of Energy and Power, September 2001)*; *Draft National Energy Concept Paper (Ministry of Energy and Power, October 2001)*; *The Energy Policy for Sierra Leone (CEMMATS Group Ltd, with ECA Funding, December 2004)*; *Energy Sector Strategy (Ministry of Energy and Power, March 2007)*; *Statement of Energy Sector Policy and Strategic Plan for the Electricity Sub-Sector (Ministry of Energy and Water Resources, December 2008)*

both directly and indirectly in the second generation Poverty Reduction Strategy Paper (PRSP). Focus on the Energy Sector includes:

- improving thermal generation;
- exploiting hydro potential;
- exploring other energy potential;
- upgrading and expanding national transmission and distribution network;
- improving energy sector governance;
- integrated energy approach.

6. These improvements in the energy sector are required in order to meet the objectives in the other key areas of the PRSP, which include agricultural production to enhance food security, youth employment, improvement of health and nutrition services and basic education. Similarly, the Millennium Development Goals will only be made possible in Sierra Leone if energy services are improved. Although there is no specific MDG goal for the energy sector, it is clear that energy has a key role to play in the achievement of most, if not all of the MDGs. First and foremost, the reduction of poverty can be achieved through providing modern energy for increased food production and for the development of enterprises and businesses that will provide employment. In addition, access to safe water can be enhanced through the provision of energy for pumping water, as well as to support water purification technology. Furthermore, in order to reduce maternal and child mortality, energy resources are required for refrigeration of vaccines and other medicines, for sterilization of equipment and for running of medical facilities.

7. Finally, educational opportunities to achieve universal primary education can be much increased if schools could be provided with lighting that would make available longer hours for study. It would also provide access to distance learning possibilities for children and youth. Gender equality and the empowerment of women can be enhanced if alternative sources of fuel for cooking can be found and if energy efficiencies can be achieved through the introduction of improved cooking devices. These would relieve women of the arduous task of collecting firewood over long distances. Cleaner sources of cooking fuels will also protect women from the harmful gases which are by-products of traditional cooking methods. The appropriate choice of energy source can contribute in no small way, to protecting the environment and ensuring environmental sustainability.

## ***ii. Environmental Issues***

8. Sierra Leone has signed and ratified the Kyoto Protocol, and although, as a non-Annex I party to the protocol, is not bound by specific targets, Sierra Leone is committed to taking steps to reduce environmental pollution<sup>3</sup>. Energy is one sector that has a number of implications for the environment. The extensive dependence on wood fuels to meet energy needs has led to massive deforestation, which has severe environmental implications. The exploitation of hydro power sources also has to take into account environmental issues, while the composition and quantities of emissions from fuel combustion lead to environmental pollution. In order to safeguard the

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<sup>3</sup> With 0.1 per cent of the World's population, Sierra Leone accounts for 0.0 per cent of global emissions – an average of 0.2 tonnes of carbon dioxide per person. These emission levels are below those for Sub-Saharan Africa, which is 1.0 tonnes per person. (UNDP 2008 Human Development Report).



environment, a comprehensive environmental policy for Sierra Leone, is now being drawn up by the Sierra Leone Environmental Protection Agency (SLEPA)..

### ***iii. International Linkages to the Energy Sector***

9. In recognition of the importance of energy to the achievement of development goals, African Heads of State agreed in Lusaka, Zambia to create the African Energy Commission (AFREC). The mandate and architecture of the Commission seek to integrate African energy efforts, strengthen regional co-operation and provide policy-makers with the tools to accelerate the penetration of modern energy access across the continent. Also, the New Partnership for Africa's Development (NEPAD) offers an immense opportunity to integrate Africa's energy to enhance energy trade, thus optimizing the development and use of resources and providing cost-effective energy services. The Energy Plan of the New Partnership for Africa's Development (NEPAD) envisages the setting up of regional and sub-regional grids. The NEPAD Energy Plan also foresees the harnessing of natural gas supplies, much of which is currently being flared and yet could be productively used for power generation. In 2005, to foster energy investments in African countries, the Forum for Energy Ministers of Africa (FEMA) was formed. As an active member of African Union, Sierra Leone should ensure that they are active members of these organizations.

10. Within the West African sub region, Sierra Leone is a member of ECOWAS, which is promoting sub-regional energy cooperation and integration. The ECOWAS sub-region is characterized by a large and unmet demand, which is being exacerbated by electricity supply problems in Nigeria. All ECOWAS countries see benefits from regional (and subsequently inter-regional) co-operation in the development of cost effective electricity infrastructure and energy trading networks in order to increase energy supply and enhance energy security within the region. At the sub-regional level, the West African Power Pool (WAPP) and the West African Gas Pipeline (WAGP) projects also offer considerable opportunities for interconnections and inter country trade in energy. The West African grid network will initially run from Nigeria to Cote d'Ivoire, and eventually cover all ECOWAS countries and form the basis of the West African Power Pool (WAPP). The West Africa Gas Pipeline, which now provides natural gas from Nigeria to Benin, Togo and Ghana is expected to run up to Senegal. Sierra Leone should take steps to ensure connection to this pipeline, in order to have access to this valuable source of energy, thus augmenting and diversifying its sources of energy.

11. The proposed energy policy must address energy issues that are in consonance with the 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. The ECOWAS Energy Protocol which was recently drawn up aims at getting members to have the stable, equitable, favorable and transparent conditions needed for investments in the energy sector. The Protocol also aims at ensuring that members have the necessary domestic laws to protect the rights of investors and their investments.

### c. Energy Production and Utilization

12. Energy statistics are difficult to obtain in Sierra Leone. The only complete data on energy consumption patterns was given in a 1986 World Bank Report and is as shown below. This is over 20 years old we must try to include a more recent data even if it estimates.

**Table 1: Structure of Energy Consumption**

Sector	Fuelwood	Charcoal	Petroleum	Electricity	Total%
Agriculture	—	—	6%	—	1%
Mining	—	—	6%	38%	2%
Industry	3%	10%	15%	40%	5%
Transport	—	—	49%	—	6%
Household	96%	90%	24%	22%	86%
<b>Total</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>	<b>100%</b>
<b>Total Energy Use in 1986 ('000toe)</b>	<b>735</b>	<b>39</b>	<b>118</b>	<b>19</b>	<b>911</b>
<b>Total Energy Use in 2008<sup>4</sup> ('000toe)</b>	<b>1136</b>	<b>61</b>	<b>183</b>	<b>30</b>	<b>1410</b>

**(Source: Task Team Estimates & World Bank 1986)**

13. As can be seen from this table, fuelwood is the main source of energy, representing 86 per cent of energy used. In households, fuelwood 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. Of the approximate total of 800 toe<sup>5</sup> used by households, 92 percent is fuelwood, 4.8 per cent is charcoal, 2.7 percent is kerosene, 0.4 per cent is electricity and 0.1 percent is LPG.

14. Biomass (fuelwood and charcoal) use is estimated to be 1197 toe, and may increase with the increase in population. This would put the nation's dwindling forest under pressure, which could culminate in extensive deforestation, with negative consequences on climate change, agriculture and water resources, if no significant action is taken. At present biomass use is limited to fuelwood and charcoal, although there is great potential for the use of agricultural wastes that could provide over 2000 GWh of electricity annually.

15. Electricity production is considerably below the levels required to meet requirements for socio-economic development of the country. In 2002, total electricity production was 142GWh, but this dropped to only 45GWh in 2007. Even though the availability has improved since 2007, as a result of the introduction of emergency

<sup>4</sup> Interpolated from 1986 figures

<sup>5</sup> Tonnes of oil equivalent

measures by the government total electricity consumption in 2008 was 157GWh (which represents 24 KWh per capita), or only 3.4 percent of the projected 4,660 GWh required for a population of 5.4 million to meet basic human needs.<sup>6</sup> Efforts at expansion of electricity supply nationwide therefore need to be intensified.

16. Petroleum is used mainly for electricity power generation and transport. Sierra Leone depends only on imports to meet its requirement of petroleum products. Total imports of petroleum according to data from the Petroleum Unit, was 226,416 metric tones in 2008. Petroleum importation is a big burden on the country's foreign exchange situation and therefore, reducing dependence on imported petroleum is a serious policy issue that will be pursued. It is not yet quite clear as to how the petroleum Exploration and Development programme in Sierra Leone will in the long term reduce this dependence.

17. The country has vast hydro power potential that remains virtually untapped. Of a total estimated capacity from large rivers of about 1,500MW only 6MW operates at present. Production will reach 56MW by the end of the year, when the Bumbuna hydropower station starts operation. In spite of the solar power potential, the use of solar power is extremely low in the country.

#### **d. Challenges and Opportunities in the Energy Sector**

##### **i. Challenges**

- (a) Ensuring adequate, reliable, affordable and cost effective power supply within the country;
- (b) Improving energy efficiency and conservation in all sub-sectors
- (c) Improving accessibility to electricity supply, particularly in the rural areas;
- (d) Providing adequate energy for socio-economic activities as included in various policy documents: PRSP, Vision 2025 and the Millennium Development Goals (MDGs)
- (e) Putting in place effective institutional framework to ensure the smooth supply of energy, including coordination, monitoring and evaluation, supervision and control;
- (f) Attracting private investors to the energy sector;
- (g) Ensuring continuity of supply in case of emergencies;

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<sup>6</sup> This is based on a calculation of 100W electricity supply capacity per capita. Developing Nations, and particularly the poorest ones consume far less energy per capita than developed Nations. Based on this relationship, and on the energy requirements for basic household needs, REDDY estimates that about 100Watts per capita is required to achieve a reasonable quality of life corresponding to safe, clean, and efficient cooking with a LPG like fuel and home electrification for lighting, fans, a small refrigerator, and a television. It should be noted that this 100Watts per capita is only about one tenth of the level required to support a Western European living standard with modern energy sources and energy efficient converter. SOURCE: Energy and Basic Human needs, updated September 23, 2008, UNDP, 2002 -REDDY.

- (h) Selection of appropriate technology options for the energy sector;
- (i) Meeting the energy requirements of women.

## **ii) Opportunities**

18. For a number of reasons, it is felt that the opportunities exist now, more than ever before, to address policy issues relating to energy. First and foremost, the political will is present at the highest level of Government, in recognition of the importance of energy for the achievement of the development goals. In addition, as a country recovering from conflict, there is a general acknowledgement by all stakeholders, including development partners, that great strides need to be taken to get the country back on track and this involves restoring and increasing energy capacity including taking steps to implement the Power Sector Master Plan, which was drawn up in 1996, and which revealed vast hydropower potential, which could not at the time be pursued as a result of the war. Furthermore, the recognition of the international community of the climate change phenomenon has led to greater attention being paid to issues relating to cleaner energy development and could lead to additional resources to support energy programmes. Finally, developments in the West African Sub-region provide an opportunity for Sierra Leone to benefit from energy resources within the sub-region, such as provided by the West African Power Pool and the West African Gas pipeline.

## **iii) Mission Statement of Ministry**

Develop policies and programmes for the provision of energy (electrical or otherwise) and safe drinking water on a constant and sustainable basis to the entire population of Sierra Leone

### Activities of Ministry

- Electricity Generation and Distribution
- National Power Authority (NPA)
- Guma Valley Water Company (GVWC)
- Sierra Leone Water Company (SALWACO)
- Development of Hydroelectric projects
- Development of Dams and other Water Supply Schemes
- Protection and Management of Water Resources
- Alternative Energy Sources
- Rural Electrification
- Radiation Protection
- Storage of Petroleum Products

## II. SECTORAL AND SUB-SECTORAL POLICIES

### a. Energy Supply Sub-Sectors

#### i. *Electricity Sub sector*

19. Sierra Leone's electricity supply has been characterized by poor investments in generation, transmission and distribution resulting in very low generating capacity, rising high transmission and distribution losses (about 45% system losses in 2008), poor revenue collection and restricted distribution systems in major towns. In 1991, the country's installed generating capacity was about 120 MW of which 116 MW was from thermal power plants, and 4MW was from the hydro plant at Dodo in the Eastern Province. Of the total installed capacity, only 76 MW was actually available. NPA operated 33.4 MW in the Western Area, and 14.5 MW in isolated provincial towns. In addition, there were some 28 MW of captive capacity in the mining sector. In 2009, some of the big mining companies have closed down and most of the provincial stations are in a state of disrepair. National Electricity Production was 142 (GWh) in 2002 and 157 (GWh) in 2008 whilst National Electricity Consumption was 91 (GWh) in 2002 and 89 (GWh) in 2008). Also, the overstaffing as the Kwh per employee ratio is extremely high. Restructuring the sector to address these issues is needed.

#### *Operations of the National Power Authority (NPA) in the Western Area*

20. The electricity supply and service in the Western Area continues to be inadequate and inefficient. Installed capacity in 2008 was 39.2 MW generations by NPA, 25MW by two Independent Power Producers (IPPs) and production is 138.5 GWh which is totally inadequate, systems breakdowns are frequent leading to constant load shedding<sup>7</sup>. The Transmission and Distribution lines operate on 11,000 volts medium voltage and 415 volts low voltage in the Western Area. Network efficiency is low and the electricity tariff is one of the highest in the West African sub region, about US\$0.45 per unit based on a recent tariff revision in 2008.

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

21. The BKPS has a mixed hydro-thermal operation. The thermal power station at Bo has an installed capacity of 5 MW and the hydropower station at Dodo of 6 MW. The BKPS operates a 33kV sub-transmission line with 11kV and low voltage local distribution. Most of the consumers are Household consumers. BKPS faces the same problems with its commercial operations as NPA.

#### *Provincial Stations*

22. These are a range of island generation and local distribution networks in the Provinces. Most of these power stations and networks are now in a state of total disrepair, and the cost required to get them back to their pre-1994 levels is estimated at over US\$13 million. Currently, about 2MW total installed capacity is available in Makeni, Pujehun, and Moyamba townships.

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<sup>7</sup> This does not include auto-generation, which is estimated at 50MW total installed capacity.

### *Bumbuna Hydroelectric Project*

23. The first phase of the Bumbuna Hydroelectric Project is now about 98% complete<sup>8</sup>. 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. The completion of the first phase of the Bumbuna project which is 50MW and 161kv Transmission line (250km) will be by the end of 2009.

### *Power Sector Reform*

24. 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 encourage private sector participation.

25. The present decentralisation of the government's functions creates possibilities and opportunities for the governance of electricity services in decentralised entities. First and foremost, technical and human inefficiencies in the state owned utility should be addressed. In addition, the high tariffs being charged at present will not be sustainable in the long run. Furthermore, efforts need to be intensified to produce electricity from renewable energy sources. Finally, international and regional initiatives such as the West African Power Pool (WAPP) also provide opportunities for increasing access to energy resources.

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<sup>8</sup> The Bumbuna Hydroelectric Project has four phases aiming to provide a total generating capacity of 305MW. The first phase will provide 50 MW when completed.

## **POLICY STATEMENTS**

- **GOSL will explore all avenues to ensure reliable power supplies to all energy demand sub-sectors.**
- **GOSL will establish an adequate and transparent, legal and regulatory framework in a Reformed Power Sector structure that is conducive to private sector participation in the development of the energy sector.**
- **GOSL will encourage the entry of multiple players into the generation and distribution market. Generation and Distribution of electric power shall be fully open to private and public investors as Independent Power Producers.**
- **GOSL will develop a national grid that will extend the transmission line throughout the country, and to the sub-region.**
- **GOSL will undertake the development of mini/micro hydro sites and other renewable energy technologies, through public/private partnership arrangements.**
- **GOSL will encourage and consider proposals by local authorities to provide and distribute power and will propose parameters for local governments.**
- **GOSL will set up effective systems for tariff fixing, billing and collection of payments, to ensure sustainability of electricity supply.**
- **GOSL will establish feed-in tariffs to enable provision of electricity from extra generating capacity in mining companies and other industries, as well as from private individuals.**
- **GOSL will take legislative steps to criminalise electricity theft.**
- **GOSL will actively pursue regional co-operation and integration in investment matters.**

### ***ii Petroleum Sub-Sector***

#### *Upstream Petroleum Exploration*

26. Crude oil and coal (lignite) are the prospective fossil fuel sources in Sierra Leone. As far as Petroleum Exploration and Development is concerned, earlier work done by Mobil and Amoco gives a good indication of petro-geology in the deep waters off shore of Sierra Leone, but no significant discoveries have yet been made. Exploration activities have intensified lately, with an area of approximately 32,000 sq km being allocated and subdivided by the government into seven blocks SL01 and SL07, for exploration

purposes.<sup>9</sup> The agreement for blocks SL01 to SL02 was signed between the Government and Young Energy Price in 2008 and they have yet to acquire data on these blocks. #8 Investments and Oranto Limited have already carried out 3D seismic data acquisition on blocks SL04 and SL05 respectively in June 2008. Processing and interpretation of this data by a UK firm TGS-NOPEC, is ongoing. Drilling by Anadako is expected in July 2009.

27. Earlier exploration work on coal (lignite) revealed a high percentage of clay deposits, which make its exploitation uneconomic. However a new mining company African Minerals is carrying out more investigative work, with the view to use it for power generation in their iron-ore mining operations. However, the environmental consequences of its use may deter further developments.

#### *Downstream Petroleum Marketing*

28. Currently, all petroleum products (petrol, diesel, kerosene, liquefied petroleum gas and marine fuel oil) used in the country is imported in refined form, as the only oil refinery in the country is no longer functional. On average, some 200,000 metric tonnes are imported annually and petroleum marketing and sales is done mainly by three major companies.<sup>10</sup>

29. The operations of the petroleum industry can be enhanced with the introduction of measures that can guarantee price stabilisation and continuity of supplies, including syndication in the ordering of petroleum products, acquisition of strategic stocks, stocks management and forward planning and sourcing of quality products.

30. According to figures provided by the Government Petroleum Unit, projected importation of petroleum products for 2008-2025 was based on assumed industry volume growth by 10, 15 and 17.5 per cent respectively. This assumption will cause 33, 52 and 62 per cent volume growth respectively, representing low, medium and high growth patterns. We can however compare this with IEA predictions of a 60 per cent increase in World Energy Demand by 2030, with fossil fuels continuing to dominate the energy mix with oil and gas accounting for 35 percent and 25 percent respectively of this increase. IEA further predicted that for a developing country, such as Sierra Leone, demand will grow to about 40 percent by 2030, comprising of an annual growth of 3.4 percent up to 2030. In conclusion, IEA predictions above seem to match the average of the growth pattern in the Petroleum Unit's assumption and will be used to do the projected importation plan.

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<sup>9</sup> Exploration is to be done by Young Energy Price; Frazimex, Nigeria; #8 Investments; Oranto Ltd, Nigeria and Repsol, Spain and Woodside Petroleum, Australia

<sup>10</sup> Sierra Leone National Petroleum Company (NP), Safecon and Total (formerly Mobil)



## **POLICY STATEMENTS**

### **Upstream**

- **GOSL will facilitate exploration and development of upstream activities.**
- **GOSL will encourage investment by international oil companies, with the setting up of Competitive Regulatory Regime in the conduct of upstream operations.**
- **GOSL will encourage regional and international co-operation in all aspect of upstream activities.**
- **GOSL will facilitate investigations into Natural gas exploration and exploitation.**
- **GOSL will utilize best international and regional practices in the operations of upstream petroleum exploration and development, including those relating to respect for land rights, protection of the environment, security and safety.**

### **Downstream**

- **GOSL will ensure that Oil Marketing Companies (OMC's) operate under national and international guidelines, appropriate to petroleum industry operations.**
- **GOSL will create an enabling environment for the OMC's to extend their distribution network to all corners of the country including remote areas.**
- **GOSL will create strategic stocks capacity to around six to eight weeks of national demand and support the acquisition of straight-run products to increase lifetime of product in strategic storage.**
- **GOSL will diversify its fuel resources by investigating alternatives such as natural gas and liquid bio-fuels.**
- **GOSL will commission a study to assess the economic viability of resuming refinery operations in Sierra Leone.**
- **GOSL will support schemes that will enhance syndication by the OMC's in ordering of petroleum products.**
- **GOSL will actively pursue regional cooperation and integration in investment matters.**
- **GOSL will provide incentives for the use of LPG and will encourage OMCs to upgrade their LPG installations for increased storage as well as to set up distribution and filling centres for increased access to LPG.**
- **GOSL will set and enforce safety regulations for the handling of petroleum products and equip the Fire Force to respond to emergencies relating to these products.**
- **GOSL will institute a coordinating mechanism to link the various players in the downstream petroleum sub-sector.**

### ***iii. Renewable Energy Sub-Sector***

31. Sierra Leone's energy demand is characterized by a low per capita consumption of petroleum and electricity energy and a high dependence on renewable energy including biomass fuels in the form of firewood, charcoal and bio-waste. Biomass will remain the main energy source for the foreseeable future. However, apart from biomass, there are other potential renewable energy sources available for exploitation. These include small-hydro, geothermal, wind and solar.

32. The country has vast renewable energy potential to complement and sustain its energy needs, but there have been several barriers in the way of harnessing these resources in a productive and meaningful way. There is neither the appropriate technology nor the indigenous capacity to design, manufacture, market, distribute, install and maintain renewable energy technologies (RETs). To compound the problem, there has been insignificant investment and interest shown by both the Government and commercial operators in the advancement of RETs.

33. There is a need to develop Government initiatives to overcome the economic, cultural and safety barriers to improve efficient conversion and end-use practices. In this way, the health hazards primarily affecting women and children will be minimized as well as guaranteeing protection of the environment.

34. Development of RETs should be mobilized by instituting the relevant legally-backed conceptual framework with the necessary administrative and financial resources to establish standards, guidelines and codes of practice and norms for the safe exploitation and use of RETs in an environmentally friendly fashion.

**35. Hydropower** is a major energy source, holding great promise for Sierra Leone, which possesses several rivers that could be exploited for electricity. According to the Power Sector Master Plan (1996), 27 potential hydropower sites with a total capacity of 1,513 MW have been identified. However, except for two sites (Bekongor and Bumbuna), all of the others suffer from water flow rate variations between the wet and dry seasons. Yiben II, Bekongor III, Kambatibo, Betmai III, Yiben I and Bumbuna Falls are the most attractive in terms of generation cost. These sources remain virtually untapped as of date.

36. To date, Sierra Leone has built two hydroelectric plants. These are the 2.4 MW Guma plant installed in 1967 in the Western Area, which was decommissioned in 1982, and a 6 MW run-of-the river hydro power plant, Dodo, located in the Eastern Province, some 380 km from Freetown and 69 km from the headquarter town of Kenema. This plant is functional and is operated by the BKPS and is a part of a regional grid connecting thermal power plants in Bo and Kenema.

37. Although many of the rivers investigated fall under the small to medium hydro system (i.e. 1 – 100 MW) there is a potential for pico to mini hydro systems (5 kW to 1MW). The Master Plan, however, is silent on potential resources under 2 MW. This is expected to be an area of huge potential for public-private partnerships and wider

investment by the private sector. On account of this dearth of data on such small capacities, between 2006 and 2007 the Ministry, in collaboration with GTZ – Sierra Leone, planned a basic study aimed at gathering hydrological data to feed into the design of small hydro projects with capacities of up to 1 MW. This study is yet to be executed.

38. There exists a well advanced plan for the construction of one Small Hydro Power Plant (1 MW) in Port Loko. The design has been completed and the project implementation will start soon. It is a project funded by the Chinese Government, UNIDO and GOSL. The government has recently signed an agreement with the Chinese government for the development of the Charlotte (2.2MW) and Makalie (0.5MW).

### **Biomass**

39. Biomass is the main source of energy in use in households in Sierra Leone, mainly in the form of fuelwood and charcoal, while the use of agricultural crop residues remains limited. Biomass for electricity generation would come from such residues, existing forests and deforested or otherwise degraded lands on which “energy plantations” can be cultivated. Of the residues, 656,400 tonnes of crop wastes (rice husk, rice straw, cocoa husk, etc.) are on average produced annually, with a total annual energy potential of about 2,706 GWh, or about 500 MW of potential capacity<sup>11</sup>. It should be noted that the amount of residue is expected to increase as the Agricultural sector grows. The Addax ethanol project in Makeni when completed is expected to produce and sell 100 MW for use outside the factory.

### **Solar Energy**

40. The country experiences sunshine for most part of the year and hence solar energy is in abundance. A more recent study estimated the average solar radiation at 1460 to 1800 kWh/ (m<sup>2</sup>/y)<sup>12</sup>, which indicates the huge potential for solar power in the country.

41. The potential for Solar PV or Solar Home Systems is great due to the solar radiation and very low access of electricity in the country. Pilot solar lighting has been demonstrated in about 4 villages in the hinterland by Competence Centre for Renewable Energy at Allen Town, Freetown. The most recent solar power facility was installed at Tombo Village.

42. The use of solar PV is limited in the country. Before the civil conflict in the country, solar PV was used extensively in the telecommunication industry at repeater stations. Currently, repeater stations and cell sites are using diesel generators. Few solar home systems are used for lighting and entertainment, and one institution is using it for water pumping.

The current installed capacity of solar PV in the country is about 25 kW.

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<sup>11</sup> Source: Swaray S.M. and Keili A (August 2004)

<sup>12</sup> These data need revision since computations were made from temperature and humidity measurements carried out at only 8 different sites across the country in 1996.

## **Wind Energy**

43. Data on wind speeds across the country is scant. Existing data on wind velocities indicate a country-wide average of between 3 m/s and 5 m/s. There is some indication that wind speeds of 12 m/s are possible in parts of the country, implying that wind energy could be a viable option in selected locations

44. With the low wind speed turbines now available in the market, there is a strong potential for the use of these systems in the rural areas especially in the north of the country. There is no known wind energy system in Sierra Leone.

## **POLICY STATEMENTS**

- **GOSL will continue to promote the development of the hydropower resources in the country, including development of micro hydro schemes.**
- **GOSL will take measures to reduce the rate of deforestation and land degradation and minimize threats on climate change in the use of biomass resources.**
- **GOSL will formalize the marketing of firewood and charcoal.**
- **GOSL will establish administrative institutions to preside over all aspects of RETs.**
- **GOSL will support research and development work in renewable energy matters, as well as linkages with countries active in RET research and development.**
- **GOSL will encourage agro based industries to produce electricity from their wastes.**
- **GOSL will ensure that environmental considerations are included in all renewable energy planning and implementation and will enhance co-operation with other relevant stakeholders.**
- **GOSL will remove barriers hampering the effective development, implementation and dissemination of RETs, including reduction of taxes and levies on RETs .**
- **GOSL will institutionalize and internationalize the supervision of RETs by setting up Mechanisms to exploit Climate Initiatives such as the Clean Development Mechanism (CDM) with other stakeholders to assess and package renewable energy projects geared towards sustainable development of the renewable energy sources.**
- **GOSL will seek national and international cooperation with relevant stakeholders to support the development and management of RETs in the country.**
- **GOSL will support training in RETs in tertiary and other learning institutions.**
- **GOSL will provide incentives for the importation and application of renewable equipment/devices.**
- **GOSL will encourage the development of RETs in remote and underdeveloped areas of the country.**

### **b. Energy Demand Sub-Sectors**

#### ***i. Household Sub-Sector***

45. In Sierra Leone, the main use of energy in the Household sub-sector is in cooking and in lighting. According to the results of the Sierra Leone Household Survey (2003/2004), most households use wood (88 per cent), charcoal (7 per cent) and

kerosene (1per cent) for cooking. For lighting and other household requirements, most households use kerosene (79%) and electricity (16%). In rural areas, 90% use kerosene for lighting while 37% in the urban areas use electricity for lighting purposes. Just over one percent of the needs in rural and urban areas are met through the use of stand-alone generators.

46. 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 use electricity especially for communal facilities. Policy measures should address the inefficient use of biomass and the proper development of alternative energy services. Policies that improve on efficiency and encourage the use of substitution fuels such as LPG should be pursued in urban households. LPG is not readily available and policies need to be put in place that will encourage its use. Many poor households using electricity pay scant attention to safety measures and use cheap electrical appliances with no recourse to efficiency and safety.

#### **POLICY STATEMENTS**

- **GOSL will encourage the use of efficient end-use technologies and good household practices.**
- **GOSL will encourage the use of alternative sources of energy for cooking, heating, cooling, lighting and other applications.**
- **GOSL will ensure the safety of household energy appliances through drawing up of regulation and setting of safety standards.**
- **GOSL will provide incentives for the development and importation of renewable energy technologies for household use.**

#### ***ii. Agriculture and Fisheries Sub-Sector***

47. The Sierra Leone economy is dominated by the agriculture sector, which accounts for 38.3 % and Fisheries accounts for 9.2% of the GDP<sup>13</sup>, employing 75 per cent of the country's labour force. Agriculture in Sierra Leone has remained traditional, non-mechanized and subsistence in nature, incapable of satisfying the food requirements of the country by a wide margin, and of improving the living standards of the broad mass of people.

48. 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 and fisheries production and add value to agricultural and fisheries 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 commercialized. Agricultural activities are mainly in rural areas where fuel availability is low and costs high.

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## **Policy Statements**

- **GOSL will promote measures that will ensure adequate energy supply to meet the increasing demand in the agriculture and fisheries sub-sector including energy supply to agro industries, as well as fish preservation and processing plants, thereby creating employment and economic growth.**
- **GOSL will create an enabling environment for all stakeholders engaged in research and development, the distribution and use of energy products and development of appropriate energy technologies for agriculture and fisheries.**
- **GOSL will devise a separate cost-effective tariff for the agricultural and fisheries sub-sector to encourage electricity consumption and the growth of the sub-sector.**
- **GOSL will promote the use of alternative energy sources, such as gasohol, bio-diesel and solar energy for use in the agricultural and fisheries sub-sector.**
- **GOSL will promote the exploitation of agricultural wastes to produce energy.**
- **GOSL will promote the mitigation of deforestation, through sustainable production methods for firewood and charcoal production.**
- **GOSL will promote the use of all energy sources for the development of irrigation**
- **GOSL will encourage the use of animal power in agriculture, in areas, in which there is cattle.**

### **iii Commercial and Services Sub-Sector**

49. The Commercial and Services sub-sector accounts for 31.2 per cent of GDP. The commercial sector that includes wholesale and retail shops, hotels, restaurants and recreation centres are also affected by electricity supply disruptions. The commercial and service sub-sectors depend on firewood, charcoal and kerosene for cooking and on electricity (grid or generators) for their other energy requirements. Liquid Petroleum Gas (LPG) is less than 1% share of energy for cooking. Restaurants and Hotels are responsible for over 60% of LPG consumed by the sector. "Cookeries", which are small local kitchens serving traditional dishes, take on the average about 5% share of LPG every year. Most of the energy used in these "chop-bars" comes from woodfuels (over 85%). Currently, the use of biogas is almost negligible.

## **POLICY STATEMENTS**

- **GOSL will promote energy efficiency and conservation measures in the sub-sector**
- **GOSL will continue to support the promotion of pre-paid meters in government buildings, commercial institutions and offices.**
- **GOSL will regulate the use of firewood and charcoal for cooking in restaurants, cookeries, canteens, especially those located in regional capitals.**
- **GOSL will promote the accessibility of LPG throughout the country**
- **GOSL will promote the use of alternative energy technologies such as biogas and solar energy in institutional kitchens, laboratories, hospitals, boarding schools barracks and other commercial and services institutions.**
- **GOSL will support the development of bio-diesel as a substitute for diesel for running grain mills and other cottage businesses.**

### ***iv. Industrial Sub-Sector***

50. Industry accounts for 5.4 % of the GDP. In Sierra Leone, small-scale industrial developments rely on power. Large industrial establishments as those in the Wellington industrial area of Freetown have been badly affected by shortage of power resulting in serious economic problems. Power shortages do not only disrupt current productive activities but threaten future industrial investments.

51. Overall, the demand for energy in the industrial sectors is mainly met by auto-generation and this has negative consequences on the country's balance of payment, as importation levels of petroleum products will increase to service the needs of auto-generation. Furthermore, most industries in Sierra Leone use electricity inefficiently. Industrial areas not connected to the grid or in which the availability of grid power is severely restricted, are faced with a host of environmental and safety problems related to the use of various types of fuel for auto-generation.

52. The quality of grid electricity to industrial centers is generally unreliable. Poor housekeeping as well as dominance of old energy-inefficient technologies and lack of replacement parts make the situation worse. Consequently, some industrial customers are disconnected for 12 hours and occasionally up to 18 hours per day. There is a high degree of suppressed demand and the National Power Authority (NPA) is a long way from meeting the increasing demand of industrial consumers.

53. The industrial sector is small in Sierra Leone and there has been very little investment in new industries. Efficiency of energy usage is low in most factories, 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.

54. Although NPA carries out cursory energy audits for large industries, this is not done in a concerted fashion and there are no awareness raising programmes. The industrial share of grid electricity is very small, being only a two fifth of the total energy consumed. The resulting weak industrial sector has resulted in the country importing most manufactured items resulting in huge imbalance between imports and exports.

#### **POLICY STATEMENTS**

- **GOSL will adopt measures to improve upon the supply, quality and cost effectiveness of energy supplied to the industrial sectors.**
- **GOSL will promote and regulate energy management practices and cleaner production methods.**
- **GOSL will encourage the efficient use of alternative energy sources.**
- **GOSL, through the regulatory bodies will ensure that energy audits are made mandatory for all formal industries.**
- **GOSL will support energy efficiency and conservation measures in industries.**
- **GOSL will support attractive feed-in tariffs to encourage industries capable of generating their own or part of their energy supplies, especially from renewable sources, to do so and feed excess power into the national or local grid.**

#### ***v. Mining Sub-Sector***

55. Mining of the country's vast mineral resources is the most productive sub sector of the economy and accounts for over 5.2 % of the GDP<sup>14</sup>. Most of its mining exports are at the primary stage because manufacturing activities are low. Sierra Leone's mining sector can be divided into the small scale and artisanal sector and the large scale sector. Power requirements are small in the small scale and artisanal sector, and this sector depends on small petrol or diesel generators for power. The large scale mining companies normally operate in remote environments and have to be self sufficient in the provision of infrastructural facilities including power. All of the major mining companies generate, transmit and distribute their own power using thermal power stations and power costs are usually a considerable portion of their operating costs. The mining

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<sup>14</sup> Bank of Sierra Leone 2005. Mining activities were drastically reduced as a result of the war.

companies have traditionally used more power than the majority of larger provincial towns. Sierra Rutile as an example had an installed capacity of 16.8 MW before the mine shutdown and has doubled their installed capacity (30MW) in renewed operation. Many logistical problems usually need to be overcome in the provision of power, a major problem being the procurement and transportation of fuel. Until a national grid is developed and major urban areas have considerably increased access to electricity, auto-generation will be a feature of the large scale mining industry. None of these companies supply power to outlying areas.

56. There is every reason to believe that in cases where the situation proves to be favourable, some of the large-scale mining companies could tap into a national grid. They could also help with energy needs of the neighbouring rural communities in which they are located. In future it could be contemplated that mining companies could develop surplus power from auto-generation, which will be sold to neighbouring communities or fed into the national grid.

57. The small scale and artisanal sectors are faced with a host of problems related to availability and pricing of fuels in remote areas and environmental considerations.

#### **POLICY STATEMENTS**

- **GOSL will encourage cooperation between mining companies and power utilities in jointly developing power generation facilities.**
- **GOSL, through a variety of mechanisms, will encourage mining companies to utilize renewable energy resources as much as possible in their energy supply programs.**
- **GOSL will encourage mining companies to cater for the electricity needs of neighbouring communities.**

#### ***vi. Transport Sub-Sector***

58. As in any small developing country with an open economy and little manufacturing, such as Sierra Leone, the transport sector plays a strategic role over and above its direct contribution of 7.61 per cent to the GDP. Transport enters as an intermediate input in the productive process, either directly or as a complement to other factors of production. 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.

59. River transportation is a common feature for coastal communities using ferries, canoes and small boats (Panpans). The road transportation system is dominated by

small cars, taxis and minivans, due to the fact that there is virtually no mass transit system. Inefficiencies in the transportation systems, high fuel costs, poor regulation and road congestion in urban areas are contributing to high transportation costs for the public, and this is further exacerbated by the poor state of the roads.

60. The high cost and inefficiency associated with the transport sub-sector accounts for a large portion of the total cost of production of most establishments in Sierra Leone. The efficiency and costs of operations at the ports and the logistic costs associated with ground transportation operations are important factors in the competitiveness of Sierra Leone products for both the domestic market and for exports.

61. Although some regulation is in place, inefficient practices abound in the sub-sector. The state of the roads as well as poor funding for road development and repairs are major problem that need attention. Fiscal measures that will encourage newer, more efficient transport systems and mass transit systems should be contemplated in this policy. Environmental problems could be addressed by several measures, which are aimed at more efficient fuels and transport systems.

#### **POLICY STATEMENTS**

- **GOSL will promote measures to encourage efficient mass transport systems and the greater participation of the private sector.**
- **GOSL will promote fuel efficiency and conservation programmes for the transport sector.**
- **GOSL will promote the evaluation of the potential of alternative fuels to supplement petroleum products.**
- **GOSL will provide incentives for the importation of new and more efficient vehicles.**
- **GOSL will pursue the introduction of the railway and permit private sector participation in its development.**
- **GOSL will encourage the improvement of inland water transport from the south to the west, and from the west to the north, along the Atlantic Ocean and Bonthe Island.**
- **GOSL will promote the use of more efficient transportation modes.**
- **GOSL will set and enforce standards for control of pollution from exhaust gas emissions.**

## **c. Cross-Cutting Issues**

### ***i. Energy Statistics***

62. Reliable statistics on energy are either not available, or difficult to obtain. It is surprising to note that even statistics on the importation and use of petroleum products are hard to come by. The non-availability of energy statistics needs to be addressed in coordination with Statistics Sierra Leone, to ensure adequate planning in the sector.

- **GOSL will ensure that reliable statistics on the energy sector are produced.**

### ***ii. Regulatory Framework for the Energy Sector***

63. In the absence of a legal and regulatory framework that governs the activities in the energy sector, the implementation of any energy policy is doomed to fail. Currently, there are little or no standards set or respected in relation to primary products, equipment, activities and *modus operandi* in the sector. Even in cases in which standards exist, these are not respected or monitored. The legal and regulatory framework, which NCP has been working on since 2002, needs to be finalized and adopted, as a matter of urgency.

- **GOSL will develop a legal and regulatory framework to govern activities in the energy sector.**
- **GOSL will set up a regulatory body that will monitor and control activities in the energy sector.**

### ***iii. Energy and Gender***

64. It is important to consider gender roles in any energy policy. Within households, women are first and foremost responsible for fetching fuels, cooking and other types of food processing for household use. The energy source used for these purposes is usually firewood, which is burnt inefficiently using the three-stone method and charcoal. When firewood and charcoal are burnt in closed locations, they emit harmful gases, which are inhaled by women, and which have been associated with respiratory track infections. And yet, there exist improved stoves and cooking devices which burn firewood and charcoal more efficiently, thus saving time and money, as well as cleanly, thus reducing the incidence of respiratory infections.

65. In addition, women are responsible for fetching water from streams and wells. The provision of modern forms of energy, such as solar or wind for water pumping, would render the task of pumping water less arduous and less time-consuming thus freeing time for other more productive activities. Furthermore, women need improved energy for their income-generating activities. In the rural areas, activities such as palm oil and palm-kernel oil production, gari processing, drying of foodstuffs, could all benefit from the introduction of energy saving technologies. Finally, family health and wellbeing could be

enhanced if energy could be provided to power communal public information systems that will educate women on good practices to be adopted.

#### **POLICY STATEMENTS**

- **GOSL will involve women in decision making on activities in the energy sector**
- **GOSL will institute gender impact assessments on all energy projects to ensure that they do not negatively impact on women**

#### ***iv. Energy and the Environment***

66. There is a close link between energy exploitation and use and the environment, in all the energy supply and demand subsectors. Environmental problems linked to energy include first and foremost, the vast deforestation caused by the massive dependence on fuelwood and charcoal at the household, commercial and industrial levels. In addition, the uncontrolled burning of combustibles and the use of inappropriate equipment and vehicles result in the emission of harmful gases, thus causing environmental pollution. Furthermore, the development of large hydropower schemes will necessitate the need for environmental considerations, in order to mitigate any negative environmental impact on life and property.

- **GOSL will take into account environmental considerations in the development of standards for the energy sector.**
- **GOSL will ensure that Environmental Impact Assessments are done as a prerequisite for the implementation of all Energy Projects.**

#### ***v. Research and Development***

67. It is important to strengthen the research institutions to enable them to perform research aimed at identifying the appropriate energy options and their applications to meet the specific requirements of the country. Areas of research should include, *inter alia*, the production of bio-fuels and alcohol from locally available sources, solar and wind power applications. Efforts should be coordinated through an Energy Research Centre, to be located at the University of Sierra Leone. Results of research will be presented at National Energy Seminars to be hosted by the Ministry of Energy and Water Resources, in collaboration with the Sierra Leone Institution of Engineers and an annual award for energy innovation will be awarded to researchers working in the energy field.

## **POLICY STATEMENT**

- **GOSL will support the setting up of an Energy Research Centre within the University of Sierra Leone and energy research and development capacity in other tertiary institutions.**
- **GOSL will support applications from these institutions for grants from donors to finance their research and development work.**
- **GOSL will support the development of strong links between research and development institutions in Sierra Leone and those in other countries, particularly those with advanced research and development capacities.**

### ***vi. Information and Awareness Creation***

68. A great deal needs to be done by way of promoting energy issues within Sierra Leone. For example the need for energy efficiency is not widely appreciated within the country. In addition the health implications of existing methods of using energy are not always well understood by users and policy makers. In order to promote actions which need to be taken by individual families and industry to conserve energy, and to improve the impact on health, public information campaigns will be launched to encourage the use of energy saving devices, such as improved stoves and energy efficient light bulbs and other equipment, as a first step.

69. Many Sierra Leoneans are interested in solar and other renewable sources of energy, but depend on anecdotal information as to their applications. There is a felt need to develop an energy information centre to which people will revert to get advice on energy options.

## **POLICY STATEMENT**

- **GOSL will set up an Energy Information Facility within the Ministry of Energy and Water Resources**
- **GOSL will set up an energy information portal at the MEWR, with link from the website of the Ministry.**
- **GOSL will launch public awareness programmes to sensitize the population on energy options, the need for energy efficiency and other energy issues.**

### ***vii. Human Resources Capacity Building and Development***

70. There is a general lack of capacities within the country to address the energy issues contained in this policy. In order to meet the objectives of the energy sector, there is a need to ensure that concerted and sustained efforts are made at all levels to ensure a cadre of trained personnel in the energy sector. School curricula will be

examined to ensure that basic information on energy is included at all levels. At the tertiary level, institutions, such as Fourah Bay College, the Njala University the Milton Margai Teachers' College and Technical Institutes should ensure that the appropriate emphasis is given to energy issues within their curricula.

71. Energy projects implemented by foreign entities, should include the training and building of local capacities to implement and replicate their activities. Fellowships and study tours need to be undertaken, in order to acquaint Sierra Leoneans with the latest applications and developments in the energy field around the world.

#### **POLICY STATEMENTS**

- **GOSL will ensure that an energy component is included in the curricula at primary and secondary institutions of learning**
- **GOSL will encourage and support short and long-term courses on energy at tertiary institutions**
- **GOSL will support formal and non-formal technical training for a cadre of energy technicians in the energy sector.**

#### **viii. *Energy Efficiency***

72. A review of the energy sector in Sierra Leone reveals that poor efficiency plagues almost every energy sub-sectors. The statistics are staggering: For instance, over 45 percent of the electricity generated in the Western area remains unaccounted for; while traditional methods of firewood and charcoal has efficiencies below 30 percent. Low efficiencies mean an unnecessary waste that could be ill afforded in a country, in which energy supplies are well below the suppressed demand.

73. Energy efficiency and conservation, besides saving energy will also be encouraged as a means towards cleaner production and pollution control measures in industries. There is a need for performance benchmarks and energy audits in the industrial and commercial/service sectors. The introduction of demand side management practices will create opportunities for energy savings in electricity sub-sector.

## **POLICY STATEMENTS**

- **GOSL will promote energy efficiency and conservation and the development of holistic programmes to address energy efficiency in all sub-sectors.**
- **GOSL will draw up and apply appropriate efficiency standards for goods imported to the country.**
- **GOSL will promote the use of energy efficient technology and equipment in all sectors of the economy.**
- **GOSL will support the establishment of demand side management practice in the energy sector**

### ***ix. Rural Energy Issues***

74. Rural Energy and Electrification form an integral part of Sierra Leone's overall rural transformation and poverty reduction strategy. Energy services have an impact on all rural economic activities, including agriculture, business, social services, gender equality and poverty.

75. Less than 1% of the rural population has access to electricity. About 90% of the population has very low purchasing power and depends mainly on wood-fuel for cooking and kerosene for lighting, which have negative consequences to the environment and to the quality of life, especially of the rural poor. Currently, the existing energy supplies especially electricity are delivered at very high cost. There is a lack of adequate investment and there is insignificant private participation in rural energy development. It is therefore, a national challenge to increase access to commercial energy in the rural areas and facilitate a diversification of energy services. There is severe need for energy supply to the rural population, especially to reduce the burden on women and children, and to reverse deforestation if energy efficiency is promoted in cooking and lighting. Radical improvement in household energy efficiency has enormous potential benefit for the population and modern energy services are an essential input for the development of commercial activities. Bearing in mind the fact that electricity is a key requirement for commercial activity, in cases where the supply of grid electricity is impractical, costly or delayed, alternative electricity supplies are required.

76. The utilisation of renewable energy, energy efficiency and conservation measures can play a major role in rural areas. The main objective should be to use cost effective sources of renewable energy, fashioned to community needs, in areas where conventional methods of electrification cannot be economically justified. The projects should seek to complement priority government programmes in education, health and sanitation.

77. Introduction of Liquid Petroleum Gas (LPG) as an alternative fuel for cooking is also a viable option. Addressing the problem of rural energy services requires a number of policy measures chief amongst which is to address institutional problems.



## **POLICY STATEMENTS**

- **GOSL will institute a Rural Electrification Strategy and Plan to address all aspects of rural electrification and power needs making use of the institutional structures of local councils and other stakeholders.**
- **GOSL will set up a Rural Electrification Fund that will be in accordance with best practices in the field.**
- **GOSL will support research and development of rural energy**
- **GOSL will promote the application of alternative energy sources other than fuelwood and charcoal.**
- **GOSL will promote entrepreneurship and private initiative in the production and marketing of products and services for rural and renewable energy**
- **GOSL will facilitate increased availability of energy services, including grid and non-grid electrification to rural areas**
- **GOSL will establish norms, codes of practice, standards and guidelines for cost effective rural energy supplies.**

### **3. IMPLEMENTATION OF THE ENERGY POLICY**

78. **The Ministry of Energy and Water Resources** has the responsibility for developing and implementing policies and supervises operations of the related Public Agencies in Energy and Water. The Ministry has set itself four objectives in support of the National Government Poverty Reduction Strategy 2008-2012: An Agenda for Economic and Social Empowerment. These are:

- To make the sector and its allied agencies more efficient;
- To reduce the energy sector demand on the national budget;
- To provide an enabling environment for the participation of both the public and private sectors;
- To develop and strengthen the regulatory framework for efficiency and competition.

78. As the Government entity with the responsibility for energy, the Ministry has a major role to play as custodian of this policy. However in order to enable the ministry to effectively carry out this role, its professional capacity in the energy field needs to be enhanced. It is for this reason that the Ministry foresees the setting up of a technical division to backstop the implementation of this policy.

79. In view of the cross-sectoral nature of energy issues, there are a number of government entities involved in the sector. The role of the MEWR as overall coordinator for the sector is vital and provisions should be made to rationalise responsibilities in the sector.

## Vision of the Ministry of Energy and Water Resources

***MEWR envisions itself as the professional government entity that will create an enabling environment for the provision of modern energy services for increased productivity, wealth creation and improved quality of life for all Sierra Leoneans.***

This policy will form the basis of a strategic plan and bi-annual action plans, which will be drawn up and closely monitored by the Ministry.

## APPENDIX II

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