

**GOVERNMENT OF SIERRA LEONE
MINISTRY OF ENERGY AND WATER RESOURCES**

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

PART II: ENERGY STRATEGIC PLAN

**Freetown
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ABBREVIATION AND ACRONYMS

BADEA	-	Arab Bank for Economic Development in Africa
BHP	-	Bumbuna Hydro-Electric Project
BKPS	-	Bo-Kenema Power Station
BSL	-	Bank of Sierra Leone
CDM	-	Clean Development Mechanism
CFL	-	Compact Fluorescent Lamps
EPA	-	Environmental Protection Agency
GDP	-	Gross Domestic Product
GOSL	-	Government of Sierra Leone
GTZ	-	German Technical Agency
GWh	-	Gegawatt
IPP	-	Independent Power Provider
JICA	-	Japanese International Cooperation Agency
LPG	-	Liquid Petroleum Gas
MAF	-	Ministry of Agriculture and Forestry
MEWR	-	Ministry of Energy and Water Resources
MEYS	-	Ministry of Education, Youths and Sports
MFAIC	-	Ministry of Foreign Affairs and International Cooperation
MIARD	-	Ministry Internal Affairs and Rural Development
MIC	-	Ministry of Information and Communications
MLCPE	-	Ministry of Lands, Country Planning and the Environment
MMR	-	Ministry of Mineral Resources
MOFED	-	Ministry of Finance and Economic Development
MOJ	-	Ministry of Justice
MRU	-	Mano River Union
MTA	-	Ministry Transport and Aviation
MTI	-	Ministry of Trade and Industry
MSWGCA	-	Minister of Social Welfare, Gender and Children's Affairs
NCP	-	National Commission for Privatization

NEP	-	National Energy Policy
NGO's	-	Non- Government Organizations
NPA	-	National Power Authority
NPGC	-	National Power Generation Companies
NTC	-	National Transmission Companies
OMC	-	Oil Marketing Companies
PO	-	Petroleum Office
PRU	-	Petroleum Resources Unit
PSR	-	Power Sector Reform
PURC	-	Public Utility Regulatory Commission
R & D	-	Research and Development
RET's	-	Renewable Energy Technologies
SEA	-	Strategic Environment Assessment
SHP	-	Small Hydro Potential
SSL	-	Statistics Sierra Leone
T & D	-	Transmission and Distribution
WAGP	-	West African Gas Pipeline
WAPP	-	West African Power Pool

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I. INTRODUCTION

This is the second part of the National Draft Energy Policy and Strategic Plan, which lays out a strategic plan for the implementation of the Energy Policy contained in Part 1. The strategic plan covers activities in the short-term (2010 to 2015), medium-term (2015 to 2020) and long term (2020 to 2025), and is based on the policy statements given in Part 1.

The document starts by defining the broad objectives and strategies for the Ministry of Energy and Water Resources (MEWR). These objectives are mostly cross sectoral and summarize the sub-sectoral objectives and strategies to be undertaken. Sub-Sectoral objectives, strategies and activities are provided for the supply sectors of electricity, petroleum and renewables, while those for the demand sub-sectors cover the household, agriculture and fisheries, commercial and services, industrial, mining and transport sub-sectors.

In view of the cross-cutting role that energy plays in all development sectors, there is a wide range of activities covered in this document. For this reason, and given the limited resources within the Ministry of Energy and Water Resources in particular, and the country, in general, the activities are prioritized in the plan. Under this system, activities which cover pressing needs, such as access to electricity are given the highest priority.

The strategic plan also indicates timeframes for the implementation of activities and identifies the government bodies responsible for action, under the leadership of the Ministry of Energy and Water Resources.

The Strategic Plan will form the basis for biennial Work Plans that would form the programme of a newly-created professional Division within the MEWR.

II. BROAD OBJECTIVES AND STRATEGIES OF THE MINISTRY OF ENERGY AND WATER RESOURCES

Objective One: To provide reliable and affordable power supplies to stimulate the economic development of Sierra Leone, through the consolidation, improvement and expansion of existing power supply infrastructure

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

(a) Increase the electricity generating capacity to address the progressive deterioration over the years, as well as to meet the growing demands, through:

- the rehabilitation of existing viable thermal generating plants
- exploitation of the vast hydro-power of the country, including completion of all phases of the Bumbuna Hydro-Electric Project (BHP)
- exploitation of other energy resources such as biomass resources and solar power
- encouragement of greater public-private partnership for energy provision
- Increase standby generating capacity using all forms of energy including fossil based systems

(b) Upgrade and expand transmission and distribution systems and extending electrical grid supplies to rural areas, wherever feasible.

(c) Undertake a thorough reform of the Power Sector.

Objective Two: To increase access to modern energy supplies for poverty reduction in off-grid areas.

Strategies

To meet this objective the Government, through the Ministry of Energy and Water Resources will:

(a) Provide incentives for the development of mini-hydro power generating capacities for decentralized supplies in off-grid areas

(b) Provide incentives for the setting of small-scale decentralized solar power supplies to meet the basic needs of lighting, refrigeration and media and information technology in the rural areas

Objective Three: To improve the efficiency of energy use

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

- (a) Take measures to reduce energy losses through the rehabilitation of power transmission and distribution systems and also through human theft;
- (b) Promote the use of energy efficient equipment and technologies;
- (c) Encourage the use of equipment for power factor correction in industries and homes;
- (d) Promote the development and Introduction of improved fuel-saving kerosene, charcoal and wood stoves;
- (e) Launch an awareness campaign to sensitise consumers of the importance of energy efficiency and its relationship to productivity and economy of scale of investment.
- (f) Promote capacity building on energy auditing and efficiency analysis.
- (g) Introduce an **Energy Efficiency and Conservation Act** – that would spell out mandatory energy management practices, building codes, requirements on energy efficiency levels of energy consuming equipment, energy audit regimes for formal industries and commercial entities.

Objective Four: To increase and diversify sources of energy supply in order to ensure security of supply

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

- (a) Identify and promote location-specific viable energy supplies, such as biomass resources from bio-fuel plantations, oil palm and sugar industries; solar energy for street and security lighting, telecommunications, essential supplies in hospitals and clinics and in limited households as well as wind energy for water pumping in selected areas.

(b) Promote the creation of a central electricity grid that will benefit from supplies from various generating plants within the country, as well as cross border supplies from the Mano River Union countries and the West African Power Pool (WAPP)

(c) Intensify efforts for oil exploration and development in Sierra Leone

Objective Five: To protect the environment, through the use of low carbon and renewable energy resources and the application of clean technologies

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

(a) Reduce harmful vehicle emissions, through the introduction of unleaded gasoline and low-sulphur diesel and enforcement of emission pollution standards

(b) Promote the development and dissemination of improved stoves that reduce emission of harmful gases, through improved combustion as well as reduce fuel use, thus reducing deforestation

(c) Provide support for the importation of LPG, in order to promote its widespread use

Objective Six: To enhance private sector involvement in energy infrastructure development and service delivery;

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

(a) Introduce legislation to attract private sector interest in the energy sector

(b) Encourage private sector involvement in energy supply and distribution

Objective Seven: To strengthen human resource capacity and research and development in energy

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

- (a) Support the training of Sierra Leoneans in all energy related fields of study
- (b) Support the creation of an energy research and development capacity within the University of Sierra Leone
- (c) Seek collaboration with regional and international research organizations working on energy.

Objective Eight: To improve governance of the energy sector, to address, in an integrated manner, the key issues that will guide the effective implementation of the energy policy.

Strategies

To meet this objective, the Government, through the Ministry of Energy and Water Resources will:

- (a) Set up institutions for energy regulation, monitoring, coordination and control, that will eventually crystallize into a National Energy Commission;
- (b) Set up the power sector reform structure
- (c) Coordinate and consolidate the energy-related activities of various government entities currently dealing with energy;
- (d) Set up a professional department within the Ministry to undertake energy planning and monitor the implementation of the Energy Policy.

Objective Nine: To promote energy integration as part of the economic integration of West African States.

Strategies

To meet this objective the Government, through the Ministry of Energy and Water Resources will:

- (a) Seek to be included in sub-regional projects, such as the West African Power Pool (WAPP) and the West African Gas Pipeline (WAGP)
- (b) Promote interconnection of grids of Mano River Union Countries

Objective Ten: To address the energy needs of women

Strategies

- (a) Support will be given to the Beijing Platform of Action on energy matters and all other energy initiatives geared to consolidate the position and status of women in society
- (b) Women will be involved in decision making, and their capacity in the energy sector will be enhanced;
- (c) Women will be involved in the conceptualization, development and implementation of energy policies, projects and programmes;
- (d) Reviews will be conducted on the gender sensitivity of the existing policies and develop national energy policies that are gender sensitive and that fully acknowledge the role of women in energy development;
- (e) Ensuring integrated and sustainable energy development and utilization that will impact positively on women's lives in terms of their health, income generation, status and overall welfare;
- (f) Rural electrification schemes to benefit women will be prioritized and encouraged

III. LEGAL AND INSTITUTIONAL FRAMEWORK

Primary Objective: To put in place the legal and institutional framework required for the implementation of the Energy Policy and Strategic Plan.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To equip the Ministry of Energy and Water Resources with the expertise required for the implementation of the National Energy Policy	a. Provide the expertise required within MEWR to follow up on the energy objectives as elaborated in this strategic plan.	i. Setting up, within MEWR of a professional energy division that will consist, <i>inter alia</i> , of the following sections: <ul style="list-style-type: none"> • Petroleum Unit • Electricity Unit • Renewable Energy Unit 	1	MEWR	Q3 2009
2. To ensure coordination of the various entities working on energy issues within the country	a. Provide a forum for cooperation and coordination;	i. Setting up of an inter-ministerial energy coordination committee, with participation of other stakeholders ii. Regular bulletins on work being undertaken by various entities. iii. Undertaking of a study on the optimum arrangements for addressing issues within the various Government entities	1 2 1	MEWR MEWR MEWR	Q3 2009 2010/ 2025 2009
3. To ensure that the necessary regulatory mechanism is in place to implement this policy.	a. Ensure regulation in the energy sector, through the setting up of an entity that will draw up and monitor standards and norms for energy provision.	i. Drawing up of the terms of reference for the energy component of the Public Utility Regulatory Commission; ii. Setting up of the Public Utility Regulatory Commission	1	MEWR NCP	Q1 2010
4. To provide the necessary legislative framework for the	a. The professional Energy Division within MEWR will work with the Legal Department and	i. Setting up of a team within the Ministry of Energy and Water Resources to review all existing Acts, identify gaps and examine	1	MEWR MOJ	2010/ 2015

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
implementation of the Energy Policy	NCP to draft Acts for approval by Parliament.	new areas for which legislation is required for the implementation of the policy.			

IV. SUB SECTORAL OBJECTIVES STRATEGIES AND ACTIVITIES

a. ENERGY SUPPLY SUB-SECTORS

i. ELECTRICITY SUB-SECTOR

Primary Objective: To provide reliable and affordable power supplies to stimulate the economic development of Sierra Leone, through the consolidation, improvement and expansion of existing power supply infrastructure

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To undertake a reform of the power sector to remove institutional bottlenecks in the provision of electricity.	<ul style="list-style-type: none"> a. Review of all available documentation on power sector reform; b. Restructure of the existing power supply authorities (NPA and BKPS) c. Review the 1996 Master Plan of the Power Sector; d. Unbundle the entire electricity sub-sector and establish 	<ul style="list-style-type: none"> i. Development of the Power Sector Reform Strategy for the sector and establish a regulatory agency. ii. Provision of material for the relevant sections of the Public Utility Regulatory Commission (PURC) Act iii. Finalisation and approval of the NPA Master Plan (JICA) iv. Implementation of the Power Sector Reform 	1	MEWR	Q3 2009/2015

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	relevant companies for the various entities (Generation, Transmission and Distribution)				
2. To increase the electricity generating capacity to meet the growing demands.	<ul style="list-style-type: none"> a. Rehabilitate existing viable thermal generating plants b. Exploit the vast hydro-power of the country, including completing of all four phases of the Bumbuna Hydro-Electric Project (BHP) c. Exploit other energy resources such as biomass resources and solar power 	<ul style="list-style-type: none"> i. Stage One (1) is an expansion plan based on Bumbuna Hydro Power Phases1&11, JICA Thermal Gen-Sets, BADEA Thermal Gen-Sets, Bekongo Hydro Power, IPP's Thermal plants and Mini-hydro which will give a total installed capacity of 627MW, resulting in a total electricity production of 5,550 GWh per annum by 2015. ii. Stage Two (2) is an expansion plan based on Bumbuna Hydro Power Phases1,11 & 111, JICA Thermal Gen-Sets, BADEA Thermal Gen-Sets, Bekongo Hydro Power, IPP's Thermal plants, Mini-Hydro, Natural Gas Plants, 2% Renewable Energy, which will give a total installed capacity of 800MW, resulting in a total electricity production of 7,000GWh per annum by 2020. iii. Stage Three (3) is an expansion plan based on Bumbuna Hydro Power Phases1,11 ,111 & 1V, JICA Thermal Gen-Sets, BADEA Thermal Gen-Sets, Bekongo Hydro Power, IPP's Thermal plants, Mini-Hydro, Natural Gas Plants, 2% Renewable Energy, which will give a total installed capacity of 1250MW, resulting in a total electricity production of 10,200GWh per 	<ul style="list-style-type: none"> 1 2 3 	<ul style="list-style-type: none"> MEWR MEWR MEWR 	<ul style="list-style-type: none"> 2009/2015 2015/2020 2021/2025

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		annum by 2025.			
3. To encourage greater involvement of the private sector for power provision	<p>a. Create incentives to attract private sector investment including, wherever relevant and appropriate, access to loans on concessionary terms, financial instruments, government guarantees and or grants for infrastructure investment.</p> <p>b. Facilitate the entry of multiple players into the generation market by encouraging private and public investors to take advantage of the opening up of the generation market</p>	<p>i. Setting up of NPGC, NTC and distribution Companies;</p> <p>ii. Inclusion of incentives in the Power Sector Reform Act.</p>	1	MEWR	Q3 2009/2015
4. To upgrade and expand transmission and distribution systems.	<p>a. Reinforce and Extend the Medium and Low Voltage Distribution Network in Freetown area</p> <p>b. Expand, repair and rehabilitate the entire T&D system to create fully integrated nationwide network.</p> <p>c. Continue developments under the WAPP initiative</p>	<p>i. Completion of Interserve Network Upgrading</p> <p>ii. Publication by PURC of standards of performance, codes of practice and regulations of electric transmission.</p> <p>iii. Setting up of an Independent System Operator and Transmission Utility.</p> <p>iv. Transfer of assets of the transmission network of Bumbuna Hydro Power (BHP) to the New Electricity NTCs.</p>	1	MEWR	2009/2015
		<p>v. Undertaking of feasibility study to establish T&D requirements for interconnection with neighbouring countries facilitating purchase of energy from generators outside Sierra Leone through the West Africa Power Pool</p>	2	MEWR	2010/2012

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		(WAPP) vi. Full integration into WAPP, purchasing and selling power on demand	2	MEWR	2012/2025
5. To set up a Rural Electrification Scheme	a. Develop and implement a Rural Electrification Strategy and Plan b. Funds provided by the government specifically for rural electrification through cooperation with local councils c. Funds solicited from donors and other agencies specifically for rural electrification	i. Completion and endorsement by Cabinet and Parliament of a Rural Electrification Strategy and Plan.	1	MEWR	Q3 2009
		ii. Creation and capacity building of a Rural Electrification Agency	2	MEWR	2012/2025
		iii. Establishment of a Rural Electrification Board, a Rural Electrification Fund and a transparent mechanism for funds disbursement.	2	MEWR	2012/2025
6. To ensure appropriate tariffing and effective bill collection for power use.	a. Set up appropriate and effective electricity tariffing system b. Increase collection points for electricity bill payments c. Monitor and bring to justice cases of electricity theft	i. Development of a revised tariff system	1	MEWR/NCP	2010
		i. Setting up of a network of collection points for payment of electricity bills	2	MEWR	2010
		a. Incorporation of electricity theft into the police and legal systems	2	MEWR/MOJ	2010

ii. PETROLEUM SUB-SECTOR

UPSTREAM

Primary Objective: To accelerate the rate of petroleum exploration to ascertain its potential and to promote its development with the aim of achieving an adequate production economically to meet the local needs for Sierra Leone's development and for export, if possible.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
1. To create an environment for both national and international oil companies to invest in the exploration, appraisal, development and/or production of hydrocarbon potential commensurate with international oil industry practice.	a. Review and amend exploration and production laws and regulations to make them as attractive as possible for investors.	i. Formulation of core regulatory regime and expedite action on approvals.	1	PRU/MOJ	2009/2012
	b. Adequately strengthen the Petroleum Resources Unit to carry out its mandates within the law and in the supervision of the sector.	i. Putting in place of an efficient administrative system with relevant support from the GOSL. ii. Facilitation of acquisition of geological and geophysical data for assessing the petroleum potential of the country.	2	PRU/PO	2010/2015
	c. Put measures in place to ensure that petroleum wealth supports economic growth and social development.	i. Provision of exploration levy in the petroleum pricing and this should be easily and directly accessible to support social developmental projects.	1	PRU/PO	2009

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>d. Minimize and mitigate the possible environmental impact of petroleum operations.</p> <p>e. Promote improved employment practice and also encourage participation of women in the petroleum sector.</p> <p>f. Look after the welfare and benefits of individuals and communities participating in and affected by petroleum production.</p> <p>g. Ensure safety and security</p>	<p>i. Undertaking of full scale Environmental Impact Assessment to unearth the full cycle impact of exploration activities from commencement to conclusion.</p> <p>ii. Synchronization of environmental provisions under the petroleum laws with the Environmental Protection Agency.</p> <p>i. Support and enhancement of capacity building and gender equality for the sector to meet its equal opportunity challenges.</p> <p>i. Establishment of an account into which an investor shall contribute a pre-determined proportion of its revenues occurring from its operations to handle issues such as compensation, restore affected areas, remove causes of danger in the environment in accordance with the regulations.</p> <p>ii. Structuring the above account as a decommission account and establishing a joint trusteeship of the company, to be managed by GOSL.</p> <p>i. Setting up of a system to map out</p>	<p>1</p> <p>2</p> <p>3</p> <p>1</p> <p>1</p> <p>1</p>	<p>PRU/MLE/PO</p> <p>PRU/MLCPE</p> <p>PRU/MLCPE</p> <p>PRU/OP</p> <p>PRU/OP</p> <p>PRU/OP</p>	<p>2010/2015</p> <p>2010/2015</p> <p>2012/2015</p> <p>2009/2012</p> <p>2009/2012</p> <p>2010</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	in the upstream petroleum sub-sector	boundaries demarcation for upstream oil exploration. ii. Creation of a network to monitor safety to all petroleum pipelines.	3	PRU/OP	2015

DOWNSTREAM

Primary Objective:

To ensure adequate and reliable supply of high quality petroleum and allied products for all the demand sectors country wide at internationally competitive prices to meet the economic and social needs of Sierra Leone within appropriate health, safety and environmental standards.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
1. To provide sufficient and reliable supply of quality petroleum products for all sectors of the country.	a. Government Regulating Agencies to ensure that standards and codes are followed by the OMC's in the ordering, storage and distribution of petroleum	i. Provision of support by the Government to the Petroleum Unit, Standards Bureau and Machinery Inspectorate to carry out their respective mandates of enforcing standards for petroleum products.	1	MTI/PU	2009/2015

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>products.</p> <p>b. Provide all towns and settlements with population of more than 10,000 inhabitants with fuel dispensing outlets.</p> <p>c. Monitor OMC's stock balances and replenishment arrangements, to prevent stock run-out.</p> <p>d. Pump price of products will be within an allowable price band provided by the government and based on the full cost recovery by the OMC's.</p>	<p>i. Encouragement of OMC's, both major and minor to construct dispensing outlets to meet this need.</p> <p>i. Submission by OMC's of weekly stock figures and details of new orders to Petroleum Unit to enable it to assess continuity of supply</p> <p>i. Fixing by PU in collaboration with OMCs, of the economic price of products delivered at the pumps on the basis of the economic and social circumstances.</p>	<p>3</p> <p>1</p> <p>1</p>	<p>MTI</p> <p>MTI/PU</p> <p>MTI/MOFED</p>	<p>2015/2020</p> <p>2009/2025</p> <p>2009</p>
<p>2. To achieve a strategic stock capacity for refined products.</p>	<p>a. Strategic stocks fund will be maintained as a permanent line item in the petroleum price build-up.</p> <p>b. Look into the acquisition of storage capacity for all petroleum products</p>	<p>i. Utilization of this fund in the development of the strategic stock capacity and management.</p> <p>i. Exploration of the possibility to acquire and develop any government-owned depot and arrange to erect new ones for strategic stocks.</p>	<p>2</p> <p>2</p>	<p>MTI/MOFED</p> <p>MTI/PU/MOJ</p>	<p>2009</p> <p>2010/2015</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>c. Re-engineer piping and pumping systems from the strategic stocks depot to link up with other terminals.</p> <p>d. Take advantage of favorable market prices to make strategic stock purchases.</p> <p>e. Procure straight-run gasoline and other products will be procured for strategic stocks instead of cracked gasoline /products.</p> <p>f. Explore the possibility of selling strategic stocks to boost OMC's stocks and also to regional spot-markets.</p>	<p>i. Undertaking of the relevant study for this project.</p> <p>i. Exploration of market prices for the least-price option in the procurement of strategic stocks.</p> <p>i. Supply of straight-run gasoline and other products for strategic stocks whenever available in the market to increase their lifetime in storage, as compared to cracked gasoline/products.</p> <p>i. Complementation of the stock of OMC's with the view to keep prices economically and socially viable whilst maintaining supplies to the market and also offload excess stocks into the regional market to earn foreign exchange revenue.</p>	<p>2</p> <p>3</p> <p>3</p> <p>3</p>	<p>MTI/PU</p> <p>MTI/PU</p> <p>MTI/PU</p> <p>MTI/PU/MOFED</p>	<p>2010/2012</p> <p>2015/2020</p> <p>2015/2020</p> <p>2015/2020</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
3. To allow alternative complementation fuels to penetrate liquid fuels.	a. Produce alcohol and plant oil (jathropa) for commercial blending of gasohol and bio-diesel to complement gasoline and diesel use in vehicles.	i. Undertaking of the relevant studies for the cultivation and processing of bio-fuel plants such as jathropa, sugar-cane and cassava for the production of alcohol for gasohol and bio-diesel.	2	MEWR/MAF	2015
		ii. Enacting of suitable land use laws to identify and provide land areas for the cultivation of bio-fuel plants.	2	MEWR/MAF/MOJ	2015/2020
		iii. Provision by OMC's of dispensing pumps at filling stations to gradually introduce bio-fuels, first under a voluntary program and later make use mandatory nationwide.	3	MEP/MTI	2020/2025
4. To encourage importers to syndicate to order petroleum products and institute regional cooperation to benefit from the regional energy resources	a. Create incentives to attract OMC's to go into syndication.	i. Creation of incentives that will ensure economic and full cost recovery of products ordered for OMC's to benefit from syndication.	1	MTI/MDF	2010
	b. Coordinate production and supplies from regional refineries to help promote free	i. Coordination with the regions' pool to have knowledge of production and shipping plans.	2	MTI/PU	2010

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>flow of products.</p> <p>c. Harmonize fiscal policies and also to improve technical and economic performance.</p>	<p>i. Collaboration with other Regional governments, international organizations and private companies to promote a Private Sector Regional Integration project to benefit from the region's energy pool.</p>	3	MEWR/MTI/MOF	2012
5. To expand the use of LPG as complementation to wood fuel.	<p>a. Develop statutory regulations for the operation of LPG outfits in all consuming sectors.</p> <p>b. Government and OMC's collaborate to set up national LPG promotions programs to raise awareness on its safe use.</p> <p>c. Government to provide certification of LPG operators, installation and dispensing facilities.</p> <p>d. Support local production of LPG cylinders for local manufacturers to expand their production capacities to meet</p>	<p>i. Undertaking of the relevant study that will see the development of regulations for all LPG operations.</p> <p>i. Development and public dissemination of programmes to cover areas such as safety, training and handling and general use.</p> <p>i. Setting up and enforcing of operational standards for safety, training and handling, installation and repairs for consumers, service operators and bulk LPG facilities.</p> <p>i. Enforcement of prescribed international specifications that both imported and local-manufactured cylinders should meet before allowing into the market.</p>	2 3 2 2	MEWR/MTI MEWR/MTI MEWR/MTI MEWR/MTI	2010/2015 2010/2015 2012/2015 2012/2015

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>corresponding demand.</p> <p>e. Follow similar pattern for price build-up for LPG as for other petroleum products and include in the petroleum products pricing formula.</p> <p>f. Provide storage capacity to store bulk quantities for local consumption.</p>	<p>i. Recommendation to remove some levies to make price more affordable.</p> <p>i. Encouragement of OMC's and local distributors to gradually increase their storage capacities and dispensing outlets and also upgrade existing installations to meet corresponding demand.</p>	<p>2</p> <p>3</p>	<p>MEWR/MTI</p> <p>MTI/PU</p>	<p>2010/2015</p> <p>2012/2020</p>
<p>6. To institute energy efficiency and conservation measures to reduce petroleum products consumption.</p>	<p>a. Taking steps to reduce emission levels to safeguard the environment.</p> <p>b. Develop town planning system that reduces miles travelled by vehicles.</p>	<p>i. Greater penetration of bio-diesel and gasohol and improvement of the class and condition of vehicles imported into Sierra Leone.</p> <p>i. Improvement of services in all communities, so that peoples' homes are much closer to their regular destinations.</p> <p>ii. Undertaking of relevant studies for mass-transit system of transportation.</p>	<p>3</p> <p>2</p> <p>3</p>	<p>MTA/MTI</p> <p>MLCPE/MIARD</p> <p>MTA/MLCPE</p>	<p>2015/2025</p> <p>2020/2025</p> <p>2015/2025</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>c. Expand the use of alternatives and non-petroleum fuels in the energy supply resources.</p> <p>d. Monitor fuel usage in large thermal generating plant.</p> <p>e. Develop and implement energy audit systems.</p> <p>f. Enact laws that will allow for a small surcharge for utility, petroleum and LPG consumers.</p>	<p>i. Develop hydro electricity for the mining industries, biomass waste for agricultural processes and natural gas for thermal generation.</p> <p>i. Improve on combustion processes by providing good quality fuels and proper setting-up of combustion equipment.</p> <p>i. Putting in place of measures to determine energy use patterns that will achieve energy savings.</p> <p>ii. Provide incentives for reduced consumption and penalties for waste.</p> <p>i. Use of funding provided to support public programmes for energy efficiency, renewable energy and related research and development.</p>	<p>3</p> <p>1</p> <p>2</p> <p>2</p> <p>3</p>	<p>MEP/MMR/MAF/MEWR</p> <p>MEWR</p> <p>MEWR</p> <p>MEWR</p> <p>MEWR/MTI/MOF</p>	<p>2015/2025</p> <p>2009/2025</p> <p>2012/2015</p> <p>2012/2015</p> <p>2012/2015</p>
7. To promote security and safety in the petroleum downstream sub-sector	<p>a. Training of Fire Force to respond to emergencies relating to petroleum products</p> <p>b. Ensure security of petroleum installations</p>	<p>i. Develop a training course on responding to emergencies caused by petroleum products.</p> <p>i. Development of a plan for security and policing of petroleum installations</p>	<p>1</p> <p>1</p>	<p>PU/FF</p> <p>PU/MOJ</p>	<p>2010</p> <p>2010</p>

iii. RENEWABLES SUB-SECTOR

Primary Objective: To exploit and manage the supply of renewable energy sources in the country's energy supply to achieve appreciable penetration levels by year 2025 in a sustainable, economic and environmentally friendly manner.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
1. To exploit the country's small hydro electric potential (SHP) to serve the communities in which they are installed.	a. Develop some micro-hydro sites as a pilot project to prove the viability and feasibility of the technology.	i. Development and upgrading of SHPs at Portloko, Moyamba, Orogun, Kenema (Dodo) and Guma Dam to enable them serve their communities and make them an integral part of the national grid.	1	MEWR	2009/2015
		ii. Execution of the GTZ/Ministry of Energy and Water Resource joint collaborative studies on the feasibility of small hydro projects with capacities up to one megawatt.	1	MEWR	2010/2025
2. To develop fuel wood plantations as a means of meeting the critical and expanding energy requirements.	a. Provide for firewood and charcoal demand through properly managed wood-fuel plantation.	i. Creation of public awareness of forest conservation issues to make people aware of the implications of their present practice and the needs and benefits of adopting modern methods to sustain forest resources.	2	MEWR/MAF	2010/2012
	b. Determine appropriate fuel wood processing and	i. Infrastructural development of road and sea transportation for rural and urban wood	3	MEWR/MTA/MAF	2010/

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	<p>distribution system.</p> <p>c. Regulate and control the traditional energy sector.</p>	<p>distribution.</p> <p>ii. Private Sector- run fuel wood processing and distribution centers with greater participation of rural communities.</p> <p>i. Improvement of forest sector planning and monitoring by installing adequate systems for data collection, storage and retrieval, creation of data bank of clear information on forest land ownership and tree tenure as a pre-requisite for investment in woodlot management and reforestation.</p> <p>ii. Reduction of the destruction of the mangrove forests/coastal woodlands caused by the huge demand of mangrove fuel woods production for the fishing industry.</p> <p>iii. Payment of surcharge by logging companies and local wood producers for the areas allocated to them for exploitation.</p> <p>iv. Adoption of short-rotation fuel wood plantations to improve soil erosion and reduce the environmental problems.</p> <p>v. Putting of wood fuel marketing through a formal market system incorporating the</p>	<p></p> <p>2</p> <p>3</p> <p>1</p> <p>2</p> <p>2</p>	<p></p> <p>MAF/ MEWR</p> <p>MEWR/ MAF</p> <p>MAF/MOF</p> <p>MEWR/ MAF</p> <p>MAF</p>	<p>2015</p> <p>2012/ 2015</p> <p>2012/ 2015</p> <p>2010/ 2012</p> <p>2012/ 2025</p> <p>2010/ 2015</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		<p>wood cutters, fuel wood depot operation, charcoal producers and sellers.</p> <p>vi. Identification of tree species recommended for fuel wood and charcoal production and arrange for their cultivation.</p>	2	MEWR/MAF	2012/2025
3. To establish suitable institutional frameworks for the employment of RETS for the sustainable development	<p>a. Coordinate an efficient national programme to manage forestry energy resources.</p> <p>b. Involve and empower associations of village women's group.</p>	<p>i. Expansion of linkages within the different national institutions and stakeholders through improved information exchange.</p> <p>ii. Review of institutional capacities, strengthen and empower where necessary.</p> <p>iii. Planning and programming will be jointly carried out with increased and expanded participation with other institutions and NGOs with similar programmes.</p> <p>i. Organization of women's groups as partners to help in reforestation operations and to cooperate with technical services associated with maintenance, irrigation, fire</p>	<p>2</p> <p>2</p> <p>2</p> <p>3</p>	<p>MEWR/MAF/MOF/MTA</p> <p>MEWR</p> <p>MEWR</p> <p>MAF/MEWR</p>	<p>2012/2015</p> <p>2012/2015</p> <p>2012/2020</p> <p>2012/2015</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	c. Institute appropriate norms, codes of practice, guidelines and standards for RETs.	<p>prevention, open exploitation, conservation and development.</p> <p>i. Government support for the development of the necessary RETs regulatory framework that will be geared towards its sustainable development.</p>	3	MEWR	2012/2015
4. To undertake research and development to increase the use of RETs.	a. Draw up a comprehensive national RETs plans for households and institutions.	<p>ii. Undertaking of surveys to address issues related to shortages and inefficient use of modern energy services.</p> <p>iii. Development of a phased plan to bring RETs into the national energy mix.</p> <p>iv. Addressing of energy conservation and environmental issues alongside the development and implementation of any RETs programmes.</p> <p>v. Development of R&D goals relating to</p>	2 3 2	MEWR MEWR/MAF/MMR MEWR/MAF	2012/2015 2015/2020 2010/2012

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		biomass, rural energy, energy end-use, affordability and pricing mechanism.	3	MEWR/ MAF/MOF	2012/ 2020
5. To allow agro-based industries to go into co-generation.	a. Agro-based industries that generate wood wastes and combustible residues to use them for power production and process heat for their operations.	i. Undertaking of relevant studies for the detailed treatment of wastes and residues co-generation in agro-based industries.	3	MEWR/ MAF	2012/ 2015
	b. Make use of the expected national increase in all forms of agricultural residues for electricity generation.	i. Undertaking of relevant studies to convert this energy potential into useful electrical energy especially for the surrounding communities.	3	MEWR/ MAF	2012/ 2020
6. To give full attention to the environmental implications of energy production.	a. Government to support environmental management practices and cleaner production methods in industries.	i. Coordination by the various organs of government and energy producers of all RETs produced energy and associated environmental issues	2	MEWR/ MAF	2015/ 2025
		ii. Undertaking of Strategic Environmental Assessment (SEA) for all RETs programmes to mitigate potential environment impacts before field	2	MEWR/ MAF	2015/ 2025

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		<p>implementation.</p> <p>iii. Development of systems to audit industries capable of generating own or part of their energy from RETs.</p> <p>iv. Institution of control on the use of fuel wood and its derivatives as a means of reducing the effects of erosion, desertification, carbon dioxide and green houses gases emission.</p> <p>v. Monitoring of international developments and participation in global climate change response plans to balance environmental responsibilities with development interests.</p>	<p>2</p> <p>2</p> <p>2</p>	<p>MEWR/ MAF/ MMR</p> <p>MAF/ MEWR</p> <p>MEWR/ MAF/MLCPE</p>	<p>2015/ 2025</p> <p>2012/ 2025</p> <p>2010/ 2015</p>
7. To devise programmes to remove barriers to full-scale harnessing of RETs resources.	a. Develop government initiatives to overcome the economic, cultural and safety barriers to improve conversion and end-use practices.	<p>i. Undertaking of studies to determine the appropriate technology and the indigenous capacity to design, manufacture, market, distribute, install and maintain RETs.</p> <p>ii. Partnering of Government with commercial operators to improve the level of interest and investment in the advancement of RETs.</p> <p>iii. Development of the relevant legally-backed conceptual framework with the necessary</p>	<p>3</p> <p>2</p> <p>2</p>	<p>MEWR/ MAF</p> <p>MEWR/MOFED/MTI</p> <p>MEWR</p>	<p>2015/ 2020</p> <p>2012/ 2015</p> <p>2015/</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
		<p>administrative and financial resources for the safe exploitation and use of RETs in an environmentally friendly fashion.</p> <p>iv. Involvement of stakeholders in the process of identification of barriers and methods to remove them.</p> <p>v. Provision of favorable duties and tariffs for the importation and dissemination of RETs</p>	<p>3</p> <p>1</p>	<p>MEWR/MLCPE MAF</p> <p>MEWR/MTI/NCP</p>	<p>2020</p> <p>2012/ 2015</p> <p>2010</p>
<p>8. To encourage the setting up of a Clean Development Mechanism (CDM) entity</p>	<p>a. Forge international linkages with organization of similar aspirations where the country could source assistance to develop its RETs programmes.</p>	<p>i. International and regional cooperation will be sought especially in areas of investment and donor support in RETs.</p> <p>ii. The CDM entity, together with other stakeholders' entity will assess, evaluate and package RETs projects as sustainable development initiatives to attract support under the Kyoto Protocol and other international agencies interested in the development of RETs.</p> <p>iii. Prioritize RETs packaged projects in line with best international practice; bearing in mind those that stand a greater chance of attracting climate change related funding</p>	<p>2</p> <p>2</p> <p>2</p>	<p>MEWR/MOFED/ MFAIC</p> <p>MEWR/MFAIC</p> <p>MEWR</p>	<p>2012/ 2020</p> <p>2012/ 2020</p> <p>2012/ 2020</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	b. Target RETs that are specifically geared towards sustainable development and poverty alleviation.	i. Promotion of cultivation of energy forest plantations, re-introduction of improved charcoal stove programme and improved charcoal production techniques as greenhouse gas abating technologies.	3	MEWR/MAF	2012/2020
9. To set up clearly defined targets, investment plans and financing mechanism for RETs.	<p>a. Promote the use of Solar Photovoltaic Technology in the rural and remote areas for water heating, industrial process heat and electricity generation.</p> <p>b. Look into the possibility for the use of wind energy in the rural areas.</p> <p>c. Review the potential of producing biogas from agro-based/waste disposal sites to use for energy production</p>	<p>i. Undertaking of the relevant study for this project to include and build upon the pilot solar lightening demonstration already done for four villages including Tombo.</p> <p>i. Undertaking of the relevant study on the potential for wind energy especially in the north of the country.</p> <p>i. Undertaking of the relevant study to determine the viability of this project.</p> <p>ii. Packaging of the project to have a sanitation/agricultural outlook that produces</p>	<p>1</p> <p>2</p> <p>2</p> <p>3</p>	<p>MEWR</p> <p>MEWR</p> <p>MEWR/MAF</p> <p>MEWR/MAF</p>	<p>2012/2015</p> <p>2012/2015</p> <p>2015/2020</p> <p>2020/2025</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		fertilizer and energy as outputs			
10. To support the development and management of RETs through international collaboration	<p>a. Identify factors that have helped the development of RETs in other countries of similar cultural background with a view to apply these factors to promote the development and management of RETs.</p> <p>b. Government will consider the provision of incentives for the development and use of RETs equipment.</p> <p>c. Seek donors support.</p>	<p>i. Exploring of the possibilities to build on existing collaborative activities and experiences between the country and research/ implementing/funding institutions.</p> <p>ii. Tapping from experiences gained from case studies in other RETs participating countries for the dissemination and promotion of RETs.</p> <p>i. Study of the merits of selected economic instruments such as subsidies, tax reductions and duty-exemptions, etc and assess the role of existing instruments in either promoting or inhibiting RETs implementation in Sierra Leone.</p> <p>ii. Government-supported market incentives to encourage commercial development and deployment of RE technologies.</p> <p>i. Encouragement of NGO's role in the promotion and implementation of RETs.</p> <p>ii. Taking of steps to improve knowledge skills</p>	<p>1</p> <p>2</p> <p>3</p> <p>3</p> <p>1</p>	<p>MEWR/MFA</p> <p>MEWR</p> <p>MEWR/MOFED</p> <p>MEWR/MOFED</p> <p>MEWR/MOFED</p>	<p>2010/2015</p> <p>2012/2015</p> <p>2015/2025</p> <p>2015/2025</p> <p>2010/2015</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
		and confidence on the part of project partners/donors so that they can identify situations in which RETs can contribute to energy needs.	1	MEWR	2010/2015
11. To develop curricular support in schools and tertiary institutions.	<ul style="list-style-type: none"> Discourage the poor academic consideration of RETs caused by its limited skills base. 	<ul style="list-style-type: none"> i. Government to include the development of RETs curricular in schools and other institutions of learning. ii. Setting up of a technology information exchange on RETs and development of curricular and information programs on RETs for schools through collaboration with external development agencies. 	2 2	MEWR/MYES MEWR/MEYS/MFAIC	2012/2015 2012/2015

b. ENERGY DEMAND SUB-SECTORS

i. HOUSEHOLD SUB-SECTOR

Primary Objective: To increase access to reliable, affordable and sustainable energy services for Household in order to improve the operations and welfare of households.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
1. To address household energy supply in a comprehensive way	a. Review and promote alternative energy supplies and cost-effective energy options for the household sub-sector	i. Drawing up of a comprehensive Household Energy Plan that will cover all household energy needs.	1	MEWR	Q3 2009
		ii. Setting up of demand-side management activities for the household sector.	1	MEWR	2020
2. To provide alternative fuels for cooking and other heat applications	b. c. Reduce the average fuelwood and charcoal energy intensity per	i. Introduction of a programme for the introduction of improved energy-saving wood and	1	MEWR	Q1 2010

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDING DATE
	<p>household.</p> <p>d. Increase kerosene and LPG consumption by households.</p> <p>e. Provide incentives to petroleum companies to improve on the distribution and sale of LPG.</p> <p>f. Promote local production of LPG cylinders and burners.</p> <p>g. Promote local production of solar thermal water heaters for household use.</p>	<p>charcoal stoves</p> <p>i. Granting of license by PURC for more LPG filling plants to be opened in-country;</p> <p>i. Investigation of local production of domestic LPG cylinders.</p> <p>i. Design of financial packages to support fabrication of LPG burners and kerosene stoves.</p> <p>i. Setting up of a pilot scheme for solar water heaters, as part of the Household Energy Plan.</p>	<p>1</p> <p>1</p> <p>1</p> <p>1</p> <p>2</p>	<p>MEWR</p> <p>MEWR</p> <p>MEWR</p> <p>MEWR</p> <p>MEWR</p>	<p>2010</p> <p>2015</p> <p>2015</p> <p>2015</p> <p>2010</p>
<p>3. To provide reliable energy supplies for non-heat applications in the household sector</p>	<p>a. Provide centralized and decentralized power supplies to households in the rural areas</p> <p>b. Promote solar electricity systems to provide essential power (for refrigerators, television and radio sets, etc.) for</p>	<p>See activities under “Rural Electrification”.</p> <p>i. Setting up of a solar electricity household demonstration project.</p> <p>ii. Preparation of proposals for pilot projects for the</p>	<p>2</p>	<p>MEWR</p>	<p>2010/2025</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
	households.	introduction of solar household systems.			
4. To promote the efficient use of energy in households	a. Awareness raising on need for energy efficiency.	i. Drawing up and launching of an energy efficiency campaign	1	MEWR	2010
	b. Promotion of energy-saving devices such as energy-saving light bulbs, refrigerators, freezers and other household appliances.	i. Drawing up by PURC of technical specifications for electrical appliances imported into the country to ensure that their energy requirements do not exceed a certain norm.	1	MEWR	2010/2015

ii. AGRICULTURE AND FISHERIES SUB-SECTOR

Primary Objective: To increase the use of modern energy in agriculture and fisheries that will increase their production, so as to achieve the country's food supply security objectives.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/ENDED DATE
1. To readily provide petroleum products in the agriculture and fisheries sector	a. Promote the uninterrupted supply of petroleum products in the Agriculture and Fisheries Sector.	i. Setting up of a system that will provide filling points near areas of activities and at the same time provide controls to prevent over-pricing of fuels in these areas.	2	MEWR/MAF/MFD	2012/2020
2. To increase electricity penetration in the agriculture and fisheries sector	a. Provide incentives to the agriculture and fisheries sub-sector for the use of electricity, in areas reached by grid supplies.	i. Development by PURC of feed-in tariff for decentralized power generation ii. Setting up by PURC of a special attractive tariff for the use of electricity for irrigation, sea product preservation and poultry production.	2	MEWR	2012-2020
3. To introduce alternative energy supplies for the agriculture and fisheries sub-sector	a. Introduce the production of bio-diesel	i. Setting up of a demonstration project for bio-diesel production	2	MEWR/MAF	2010/2012
	b. Encourage drying of exportable farm and sea produce with solar dryers.	i. Development and demonstration of the use of solar energy for commercial drying of pepper, maize, paddy rice, and sea produce.	2	MEWR/MAF	2012/2020
	c. Replace the use of diesel for irrigation with Hydro electricity and mechanical wind pumps.	i. Undertaking of feasibility studies for rural areas close to hydro resources	2	MEWR/MAF	2012/2020
	d. Encourage large-scale commercial poultry farmers to meet their electricity needs from biogas, using the droppings from the birds.	i. Setting up of a demonstration and pilot projects at poultry farms	2	MEWR/MAF	2012/2020

iii. COMMERCIAL AND SERVICES SUB-SECTOR

Primary Objective: To promote the use of clean, affordable and efficient energy supplies by the commercial and services sub-sector

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To reduce the fuelwood consumption by the commercial and services sub-sector.	i. Promote improved wood and charcoal for commercial cooking facilities in canteens, chop bars and restaurants, especially those located outside towns and regional and district headquarters.	i. Identification of improved wood and charcoal stoves for institutional use and local manufacturers for such stoves.	1	MEWR/MTI	2010/2012
		ii. Setting up of standards by PURC for improved fuelwood and charcoal stoves for commercial cooking facilities such as canteens, chop bars, restaurants, located outside towns, regional and district capitals	1	MEER/MTI	2010/2012
	ii. Provide incentives for local production of institutional fuel-saving stoves.	i. Provision of technical support for local production of institutional fuel-saving stoves.	2	MEWR	2010/2012
2. To introduce	a. Increase LPG penetration.	i. Granting of licenses by PURC for LPG	1	MEWR/MTI	2010/

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
alternative cooking fuels for use by the commercial and services sub-sector	b. Introduce biogas for cooking in hotels, restaurants and institutional kitchens.	<p>dispensers to be opened in-country;</p> <p>ii. Investigation of local production of domestic LPG cylinders.</p> <p>iii. Design of financial packages to support fabrication of LPG burners and kerosene stoves.</p> <p>i. Feasibility studies on the use of biogas generated from non-medical waste at major hospitals and for hotels and other cooking fuel</p> <p>ii. Identification of government institutions, schools, and barracks for demonstrational and promotional projects.</p> <p>iii. Contracting of expertise from the University Departments of Engineering and Agriculture, which has biogas facilities in the past for nationwide promotion.</p> <p>iv. Drawing up of similar demonstration programme for bio-diesel development.</p> <p>v. Seeking of counterpart and funding support from donor agencies.</p>	2	MEWR	2015
3. To improve efficiency of electricity supply to the commercial and services sub-sector	a. Promote the use of energy saving devices	<p>i. Launch of an awareness campaign on the efficiency of energy use</p> <p>ii. Introduction of Compact Fluorescent Lamps (CFL) promotional projects to the campus of the two public universities and the five public polytechnics as first phase.</p>	1	MEWR	2010/2025

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
	<ul style="list-style-type: none"> b. Minimise Power loses due to Electricity theft. c. Improve on the Revenue collection 	<p>Subsequent phases will cover the rest of the tertiary institutions and later replicated Nationwide.</p> <ul style="list-style-type: none"> iii. Drawing up by PURC of technical specifications for electrical appliances imported into the country to ensure that their energy requirements do not exceed a certain norm. i. Institution of a loss Reduction programme i. Expand and install pre-paid meters instead of credit meters in all commercial and service sectors. 	1		
4. To diversify energy supplies for the commercial and services sub-sector	<ul style="list-style-type: none"> a. Increase penetration of solar energy in hotels, restaurants and institutional kitchens using solar water heaters. b. Promote the use of solar electricity in remote areas. 	<ul style="list-style-type: none"> i. Setting up of a demonstration project for solar water heaters and solar electrification at Connaught Hospital and a number of institutions. i. Development of pilot projects for solar Electricity in remote areas. 	1 2	MEWR MEWR	2010-2015 2010-2015

iv. INDUSTRIAL SUB-SECTOR

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

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To ensure adequate and reliable electricity supply to industries	(See Electricity sub-sector strategies) a. Increase total power supply to industrial sector to meet their needs,	(See electricity sub-sector activities) i. Development of an effective load distribution programme to increase their total power supply.	1	MEWR	2009Q4 - 2025
2. To ensure efficient use and clean electricity supply to the industrial sector	a. Improve power factor in the industrial sector b. Training and other incentives will be given to industries in order for them to adopt more efficient energy end-use technologies.	i. Launch of an awareness campaign for efficiency in industries i. Drawing up by MEWR of energy efficiency and conservation awareness programmes in industries ii. Introduction of power factor correctors iii. Setting up of Training Programme	1	MEWR	2010-2025
3. To set up a	i. Make energy audits mandatory	i. Setting up by PURC of a protocol for	1	MEWR	2010-

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
regulatory mechanism for electricity use by industries	<p>for industries and regulate energy efficiency and conservation measures.</p> <p>ii. Introduce pollution charges in high-energy intensity industries.</p> <p>iii. Provide cost recovery and sustainable bulk electricity price to all primary industries to maximise wealth creation.</p> <p>iv. Improved co-ordination between institutions concerned with energy, industry and environmental issues PURC and the Environmental Protection Agency to coordinate energy and environmental issues in industries.</p>	<p>energy auditing for the industries.</p> <p>i. Setting up by PURC of code of performance and monitoring of compliance by industries;</p> <p>i. Institution by PURC of feed-in tariffs to encourage industries that are capable of generating own or part of their energy especially from renewable sources such as biomass or wastes to energy.</p> <p>ii. PURC and the utilities work out an electricity price range for sustainable operation of industries in the country</p> <p>i. Setting up of a coordination mechanism for Institution dealing with Energy, Industry and Environmental issues</p>	<p>1</p> <p>2</p> <p>1</p>	<p>MEWR</p> <p>MEWR</p> <p>MEWR</p>	<p>2015</p> <p>2009Q4-2015</p> <p>2010/2015</p> <p>2010/2012</p>
4. To promote industrial involvement in the development and use of alternative energy products and	a. Develop local market for the industrial use of natural gas when the WAGP project is complete, including displacing all fuel oil use.	<p>i. Feasibility studies for the provision of Natural Gas through WAGP.</p> <p>ii. Sensitization of the public on the use of Natural Gas for cooking, heating and Industrial use.</p>	<p>2</p> <p>2</p>	<p>MEWR</p> <p>MEWR</p>	<p>2012/2015</p> <p>2012/2015</p>

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
technologies.					

v. MINING SUB-SECTOR

Broad Objective: To facilitate access by mining companies to reliable energy that will result in increased efficiency and output.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To diversify the energy mix used by mining companies.	a. Encourage mining companies to have an increased energy mix in energy generation and distribution.	i. Setting up of incentive schemes to encourage Mining companies will increased their energy mix in generation and distribution.	1	MEWR/MMR	Q4 2009/2012

2. To encourage the supply of power to communities in the vicinity of mining operations	<ul style="list-style-type: none"> Encourage mining companies to provide and possibly sell power to communities in the environs of their mining areas. 	i. Setting up of guidelines for Mining Companies to provide and sell power to communities in the environs of their mining areas	1	MEWR/MMR/MIALG	Q4 2009/2012
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vi. TRANSPORT SUB-SECTOR

Broad Objective: To promote optimum, efficient and environmentally friendly transport systems that will optimize the utilization of petroleum fuels, and reduce the dependence on imported fossil fuels for transport.

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To encourage fuel efficiency measures in the transport sector.	a. Formulate fiscal and transport policies to promote energy conservation and efficiency.	i. Review and revision of the criteria used for the determination of import duties and taxes, in order to ensure that incentives are provided for the importation of new and/or energy efficient vehicles, and for the importation of vehicles for mass transit.	1	MEWR/MTA	2009Q4 - 2012
	b. Promote nationwide mass transit systems in Sierra Leone.	i. Feasibility studies on the re-introduction of a railway system in Sierra Leone ii. Introduction of Bonth, Freetown and	2	MEWR/MTA	2010 - 2015

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
		<p>Kambia sea transport over the Atlantic Ocean for both commercial and recreational (tourist) purposes.</p> <p>iii. Procure new ferries and build more landing jetties in major towns along the Rivers</p> <p>iv. PURC to organise public education and demonstrations to the motoring public on energy efficiency in the transport sub-sector.</p>	1	MEWR/MTA	2012-2025
2. To promote the use of alternative fuels in the transport sub-sector	a. Explore the feasibility of local production of alternative fuels such as bio-diesel and gasohol in the transport sector.	i. Setting up of a pilot and demonstration projects on alternative fuel production and use.	2	MEWR/MTA	2010/2015
3. To protect the environment from pollution as a result of vehicle emissions	a. Explore the feasibility of introducing measures for pollution control, including using environmentally friendly fossil fuels e.g. unleaded gasoline, low sulphur diesel and importation of more efficient vehicles.	i. Drawing up and enforcement by PURC of pollution standards for vehicle emissions	1	MEWR/MTA/MLCPE	2009Q4-2015

c. CROSS-CUTTING ISSUES¹

SUB-SECTORAL OBJECTIVES	STRATEGIES	ACTIVITIES	PRIORITY	RESPONSIBLE FOR ACTION	START DATE/END DATE
1. To maintain reliable statistics on energy resources and utilization in Sierra Leone.	a. Identify simplified ways of collecting energy statistics;	i. Setting up of a system for the collection and analysis of energy data	1	MEWR/SSL	2010/2015
2. To set up of a regulatory framework for the energy sector.	a. Put in place the necessary framework for proper handling of the energy sector.	i. Completion of the terms of reference for the Public Utility Regulatory Council (PURC)	1	MEWR/NCP	2009
		ii. Setting up of the PURC	1	MEWR	2010
3. To address the energy needs of women.	a. Support the energy issues in the Beijing Platform for Action	i. Review of the Beijing Platform for Action to identify concrete actions required in the Energy Sector	1	MEWR/MSWGCA	2010
	b. Involve women in energy policy development and decision making	i. Nominate women to all bodies dealing with Energy	1	MEWR/MSWGCA	2010/2025
	d. Ensure the gender sensitivity of ongoing and planned energy projects.	i. Undertake Gender Impact Assessment on all planned Energy Projects	1	MEWR/MSWGCA	2010/2025
4. To address the	a. Take measures to decrease	i. Setting up and enforcing of environmental	1	MEWR/EPA/	2010/

¹ Activities are included in the sub-sectoral plans and only those in which activities will be grouped for action are included in this table.

address the negative impacts of activities in the energy sector.	environmental pollution in the demand sub-sectors	standards for equipment and technologies.		MTI	2025
	b. Introduction of improved stoves that reduce the emission of harmful gases. c. Carry out environmental assessments of all energy projects.	i. Preparation of environmental standards for improved stoves ii. Undertake Environmental Impact Assessment for all energy projects	1	MEWR/EPA/MAFFS MEWR/EPA	2010 2010/2025
5. To promote research and development work on energy	a. Identify areas of research and development and seek funding for R & D.	i. Setting up of a Research and Development Centre for Energy at the University of Sierra Leone	3	MEWR/MEYS/USL	2015
		ii. Establishment of Energy Research and Development within relevant tertiary institutions and vocational training institutions		MEWR/MEYS/USL/NU/MMTC/VT Institutions	2010/2025
6. To sensitize the public on the need to take action to improve efficiency of energy use in all energy sub-sectors.	a. Identify various target groups and identify the messages to be transmitted	i. Launch public awareness campaigns to cover areas such as: • energy efficiency • energy alternatives	1	MEWR	2009/2025
7. To develop human Resources Capacity in the Energy Sector	a. Review curricula at the primary, secondary and tertiary levels and draw up syllabi and modules for Energy studies at all three levels	i. Introduction of Energy Studies at the primary, secondary and tertiary levels ii. Provision of Energy Studies as an option in vocational training institutions	2	MEYS, MEWR, USL, NU, MMTC, Vocational Training Institutions	2010/2015
8. To ensure that energy is used efficiently in all the demand sub-sectors.	a. Develop capacity building on energy efficiency and conservation activities	i. Development of an Energy Efficiency and Conservation Act – that would spell out mandatory energy management practices, building codes, requirements on energy efficiency levels of energy consuming equipment, energy audit regimes for formal industries and commercial entities such as hotels	1	MEWR/MOJ/MTI	2010

		should be instituted to give legal support to energy efficiency initiatives			
		ii. Promotion of Energy audits in the industrial and commercial/service sectors.	2	MEWR/MTI	2015/2025
		iii. Adoption of energy demand management in middle and high-income households.	2	MEWR	2015
		iv. Establishment of collaboration between Sierra Leone Standards Board and PURC to develop minimum energy efficiency standards and labels for energy consumption of appliances imported or manufactured for use in Sierra Leone. These include lighting, air conditioners, refrigerators and deep freezers, industrial electric motors.	1	PURC/SLSB	2010
		v. Introduction of the Energy Efficiency labelling to cover home and commercial appliances notably; refrigerators, freezers, electric fans and television sets.	2	PURC/SLSB/MTI	MEWR/PURC
		vi. Create tax incentives to financiers of energy efficiency projects and dealers in energy efficiency devices and appliances	2	MEWR/NCP/MTI/MFED	2010/
	b. Mandate New Energy Commission to intensify capacity building of Energy Service professionals both at the formal and informal levels to produce the required expertise needed for building an energy efficient economy.	i. Train Industrial energy managers of national and regional, particularly, under the ECOWAS protocol and WAPP.	2	MEWR/MTI	
		ii. Setting up of public education programmes on Energy Efficiency strategies and practices.	2	MEWR	
		iii. Set up a network of local energy advisory units in the district assemblies to advise consumers on	2	MEWR/MIARD	

		energy efficient technologies and practices.			
9. To actively address rural Energy Issues	a. Draw up and implement a comprehensive Rural Energy Programme	<ul style="list-style-type: none"> i. Disseminate improved wood and charcoal stoves ii. Undertake forestry programmes in rural area iii. Effectively manage forest products iv. Ensure provision of petroleum products in rural areas v. Promote use of gasohol and biofuels vi. Set up a rural electrification scheme 	<ul style="list-style-type: none"> 1 1 1 1 2 1 	<ul style="list-style-type: none"> MEWR/MIARD MEWR/MIARD /MAFFS MAFFS MEWR/MTI/PU MEWR MEWR/MIARD 	<ul style="list-style-type: none"> 2010/2025 2010/2025 2010/2025 2010/2025 2010/2025 2010

V. STRATEGIC TARGETS FOR THE ENERGY SECTOR

ASSUMPTIONS:

1. Electricity:

- I. That the installed capacity is 643 MW by 2015, 813 MW by 2020 and 1194MW by 2025
- II. That the indigenous hydro potential is significantly tapped
- III. That there are programmes to tap the new renewables such as biomass (agro waste) and solar

2. Energy for cooking, heating, cooling and drying:

- I. That there exists programmes to promote the use of modern fuels (LPG and kerosene) for cooking and improved cook stoves
- II. That Solar dryers are promoted in the agric sector

3. Petroleum:

- I. That the demand for Sierra Leone (a developing country) will grow at an annual rate of 3.4% up to 2030
- II. That the price of petroleum will continue to increase
- III. There is the intension to promote biofuels (biodiesel and gasohol)

4. Energy efficiency:

- I. That there are energy efficiency standards
- II. That there are programmes to promote the use of energy efficient appliance in all the demand sectors

SHORT TERM [2010 – 2015]

	BASELINE	Domestic	Comm./Service	Agriculture	Industry	Mining	Transport
Electricity	<ul style="list-style-type: none"> i. The current national access is 7 – 8 % ii. Penetration of solar PV is almost zero 	<ul style="list-style-type: none"> i. 30% access ii. 90% uninterrupted electricity supply ii. To achieve 1% penetration of solar home systems 	<ul style="list-style-type: none"> i. 100% access ii. 90% uninterrupted electricity supply ii. To achieve 1% penetration of solar PV in hotels, guest houses, and restaurants 	<ul style="list-style-type: none"> i. 40% access ii. 90% uninterrupted electricity supply ii. To achieve 1% penetration of solar PV for lighting and 1% solar water pumping for irrigation 	<ul style="list-style-type: none"> i. 100% access ii. 90% uninterrupted electricity supply ii. Providing a cost recovery and sustainable electricity price 	<ul style="list-style-type: none"> i. 100% access ii. 90% uninterrupted electricity supply ii. Providing a cost recovery and sustainable electricity price 	<ul style="list-style-type: none"> i. Installation of traffic lights in the Western Area Bo, Kenema and Makeni
Energy for Cooking, Heating, Cooling and Drying	<ul style="list-style-type: none"> i. Share of wood is 86% ii. Use of energy efficient cook stove is insignificant ii. Share of kerosene is 2.7% v. LPG share 0.1% 	<ul style="list-style-type: none"> i. To reduce the share of fuelwood by 10% ii. Increase the penetration of energy efficient cook stove to 5% iii. Increase the share of kerosene to 30% iv. Increase the share of LPG to 5% 	<ul style="list-style-type: none"> i. To reduce fuelwood share to 50% ii. Increase the penetration of energy efficient cook stoves by 5% iii. Increase LPG share by 30% iv. Achieving 1% penetration of SWHs in hotels, guest houses and restaurants 	<ul style="list-style-type: none"> i. To achieve 1% penetration of solar dryers for crop drying ii. 50% penetration of refrigeration systems for food and vaccines preservation 			
Petroleum	<ul style="list-style-type: none"> i. No strategic stock at present ii. No bio-fuels and complementation of 	<ul style="list-style-type: none"> I. Achieve strategic stock capacity of refined products for 6 – 8 weeks of national demand 	<ul style="list-style-type: none"> I. To achieve strategic stock capacity of refined products for 6 – 8 weeks of national demand 	<ul style="list-style-type: none"> I. Achieving 1% penetration of bio-fuels for motive power II. Achieving strategic stock capacity of refined products 	<ul style="list-style-type: none"> I. Achieving a strategic stock capacity of refined products for 6 – 8 weeks of national demand 	<ul style="list-style-type: none"> I. Achieving a strategic stock capacity of refined products for 6 – 8 weeks of national demand 	<ul style="list-style-type: none"> I. Allowing 2% alternative complementation fuels II. Achieving a strategic stock capacity of refined

	fuels			for 6 – 8 weeks of national demand			products for 6 – 8 weeks of national demand
Energy Efficiency	<ul style="list-style-type: none"> i. No efficiency standards for electrical appliances and equipments ii. No monitoring of power factors 	<ul style="list-style-type: none"> I. To achieve 30% penetration of energy efficient refrigerators, freezers and air conditioners, cook stoves and CFLs II. Operating at 90% power factor 	<ul style="list-style-type: none"> I. To achieve 40% penetration in terms of air conditioning and ventilation, hot water supply and lighting. II. Operating at 90% power factor 	<ul style="list-style-type: none"> I. Operating at 90% power factor 	<ul style="list-style-type: none"> I. To achieve 40% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 90% power factor 	<ul style="list-style-type: none"> I. To achieve 40% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 90% power factor 	<ul style="list-style-type: none"> I. Achieving 20% penetration of mass transportation II. Achieving 20% importation of energy efficient vehicles

MEDIUM TERM [2016 – 2020]

	BASELINE	Domestic	Comm./Service	Agriculture	Industry	Mining	Transport
Electricity		<ul style="list-style-type: none"> i. 50% ii. 95% uninterrupted electricity supply ii. To achieve 3% penetration of solar home systems 	<ul style="list-style-type: none"> i. 95% uninterrupted electricity supply ii. To achieve 5% penetration of solar PV in hotels, guest houses and restaurants. 	<ul style="list-style-type: none"> i. 70% ii. 95% uninterrupted electricity supply ii. To achieve 10% penetration of solar PV for lighting and 10% solar water pumping for irrigation 	<ul style="list-style-type: none"> i. 95% uninterrupted electricity supply 	<ul style="list-style-type: none"> i. 95% uninterrupted electricity supply 	<ul style="list-style-type: none"> i. Installation of traffic lights in all district headquarter towns.
Energy for Cooking, Heating, Cooling and		<ul style="list-style-type: none"> i. To reduce the share of fuelwood by 20% 	<ul style="list-style-type: none"> i. To reduce fuelwood share to 20% 	<ul style="list-style-type: none"> i. To achieve 3% penetration of solar dryers for crop drying 			

Drying		<ul style="list-style-type: none"> ii. Increase the penetration of energy efficient cook stove to 10% iii. Increase the share of kerosene to 60% iv. Increase the share of LPG to 10% v. 0.25% penetration of solar water heater 	<ul style="list-style-type: none"> ii. Increase the penetration of energy efficient cook stove to 10% iii. Increase LPG share by 50% iv. To achieve 1% penetration of biogas in hotels and restaurants v. To achieve 3% penetration of solar water heaters in hotels, guest houses and restaurants 	<ul style="list-style-type: none"> ii. 100% penetration of refrigeration systems for food and vaccines preservation 			
Petroleum		<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand 	<ul style="list-style-type: none"> i. To achieve 10% penetration for motive power ii. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand 	<ul style="list-style-type: none"> i. Allowing 10% alternative complementation fuels ii. Achieving a strategic stock capacity of refined products for 8 –10 weeks of national demand
Energy Efficiency		<ul style="list-style-type: none"> I. To achieve 60% penetration of energy efficient refrigerators, freezers and air conditioners, cook stoves and CFLs II. Operating at 95% power factor 	<ul style="list-style-type: none"> I. To achieve 80% penetration in air conditioning and ventilation, hot water supply and lighting. II. Operating at 95% power factor 	<ul style="list-style-type: none"> I. Operating at 95% power factor 	<ul style="list-style-type: none"> I. To achieve 80% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 95% power factor 	<ul style="list-style-type: none"> I. To achieve 80% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 95% power factor 	<ul style="list-style-type: none"> I. Achieving 40% penetration of mass transportation II. Achieving 40% importation of energy efficient vehicles

LONG TERM [2021 – 2025]

	BASELINE	Domestic	Comm./Service	Agriculture	Industry	Mining	Transport
Electricity		<ul style="list-style-type: none"> i. 75% ii. 98% uninterrupted electricity supply iii. To achieve 5% penetration of solar home systems 	<ul style="list-style-type: none"> i. 98% uninterrupted electricity supply ii. To achieve 10% penetration of solar PV in hotels, guest houses and restaurants. 	<ul style="list-style-type: none"> i. 100% ii. 98% uninterrupted electricity supply iii. To achieve 15% penetration of solar PV for lighting and 15% penetration of solar water pumping for irrigation 	<ul style="list-style-type: none"> i. 98% uninterrupted electricity supply 	<ul style="list-style-type: none"> i. 98% uninterrupted electricity supply 	<ul style="list-style-type: none"> i. Installation of traffic lights in all major towns other than headquarter towns.
Energy for Cooking, Heating, Cooling and Drying		<ul style="list-style-type: none"> i. To reduce the share of fuelwood by 30% ii. Increase the penetration of energy efficient cook stove to 15% iii. Increase the share of kerosene to 80% iv. Increase the share of LPG to 15% v. 1% penetration of solar water heater 	<ul style="list-style-type: none"> i. To reduce fuelwood share to 10% ii. Increase the penetration of energy efficient cook stove to 15% iii. Increase LPG share by 80% iv. To achieve 2% penetration of biogas in hotels and restaurants v. To achieve 5% penetration of solar water heaters in hotels, guest houses and restaurants 	<ul style="list-style-type: none"> i. To achieve 5% penetration of solar dryers for crop drying 			
Petroleum		<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined 	<ul style="list-style-type: none"> i. To achieve 15% penetration for motive power 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined 	<ul style="list-style-type: none"> i. Achieving a strategic stock capacity of refined 	<ul style="list-style-type: none"> i. Allowing 15% alternative complementation

	BASELINE	Domestic	Comm./Service	Agriculture	Industry	Mining	Transport
		products for 10 –12 weeks of national demand	products for 10 –12 weeks of national demand	ii. Achieving a strategic stock capacity of refined products for 10 –12 weeks of national demand	products for 10 –12 weeks of national demand	products for 10 – 12 weeks of national demand	fuels ii. Achieving a strategic stock capacity of refined products for 10 –12 weeks of national demand
Energy Efficiency		I. To achieve 80% penetration of energy efficient refrigerators, freezers and air conditioners, cook stoves and CFLs II. Operating at 98% power factor	I. To achieve 100% penetration in air conditioning and ventilation, hot water supply and lighting. II. Operating at 98% power factor	I. Operating at 98% power factor	I. To achieve 100% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 98% power factor	I. To achieve 100% penetration for motors and drives, refrigeration, and chilled and cooling water II. Operating at 95% power factor	I. Achieving 60% penetration of mass transportation II. Achieving 60% importation of energy efficient vehicles