



# **National Energy Efficiency Action Plan (NEEAP)**

## **REPUBLIC OF SIERRA LEONE**

**Period [2015-2020/2030]**

**Within the implementation of the  
ECOWAS Energy Efficiency Policy (EEEP)**

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## 1 INTRODUCTION

The ECOWAS Commission has developed the ECOWAS Energy Efficiency Policy (EEEP), which includes targets, measures, standards and incentives for energy efficiency (EE), to be implemented at both regional and national levels. It was adopted by the ECOWAS Heads of State and Government in July 2013. According to the EEEP, all fifteen ECOWAS countries shall, by the end of 2014, adopt five-year rolling NEEAPs that will contribute to the achievement of the regional ECOWAS targets in the next two decades.

The NEEAPs have been prepared by the ECOWAS Member States in accordance with a template provided by ECREEE. The NEEAPs include baseline data on the status of energy efficiency development, and propose attainable and energy efficiency targets, including gender disaggregated indicators, based on national potential and socio-economic assessments. Moreover, an overview of concrete laws, incentives and measures to be implemented by the country to achieve the targets will be included. The implementation of the NEEAPs will be monitored by the Ministry of Energy and ECREEE, on behalf of the ECOWAS Commission, during a continued consultative process. The NEEAP template was prepared with technical assistance of ECREEE and UNIDO. The NEEAP development process has been supported by a broad range of partners, such as the GEF Strategic Programme for West Africa, GIZ, the Governments of Austria and Spain.

## 2 SUMMARY OF NATIONAL ENERGY EFFICIENCY POLICY

According to the national energy profile studies conducted by the Ministry of Energy and the UNDP in 2012, the growth in the demand for fuel-wood and charcoal is estimated at 3% per annum. Electricity demand, on the other hand, is growing between 6%-7% annually, while consumption of petroleum products is estimated to increase at about 5% per annum. Losses in energy production, transmission, and use are also as high as 22% per year, on average. System losses in electricity distribution are about 25%, while wastage in the end-use of electricity is estimated at about 45% in 2013. Reduction of losses in energy supply and more efficient use of energy would also reduce demand for energy and delay investment in energy supply infrastructure. Previous efforts by the Ministry of Energy and other agencies to promote energy efficiency and conservation in homes and industries have not resulted in sustained adoption of energy efficiency and conservation in the country, owing to a number of financial and institutional obstacles.

In addition, according to various internal reports from the energy, agriculture, transport, environment and infrastructure sectors, energy utilization in Sierra Leone is far from efficient, due to the following reasons:

- i. Forest and woodland reserves are being depleted for heating and cooking purposes, using stoves with less than 30% efficiency;
- ii. Soil erosion, desertification and micro-climate change;
- iii. Emissions from inefficient transport vehicles are sources of hazard in cities;
- iv. Inefficient electrical appliances (lighting, refrigeration, air conditioning, motors, fans, etc.), especially in the residential, commercial and industrial sectors, in the face of inadequate supply, have aggravated the demand-supply imbalance;
- v. Serious pollution due to inefficient use of fossil fuels is affecting our major cities, leading to negative consequences for agriculture, water supply, forest resources, sea level rise, health, etc.
- vi. Energy efficiency regulations are currently absent;
- vii. Construction of energy inefficient buildings;
- viii. Non-payment of electricity bills by customers.

This energy efficiency policy is designed to pave the way for detailed legislation, policies and regulations. Furthermore, the dependence on petroleum products can be reduced through the improvement of efficiency, aggressive research, development and demonstration, human resources development, etc. Consequently, the overall energy efficiency policy objectives may be summarized as follows:

- i. To ensure the development and prudent exploitation of the nation's energy resources, with diversified energy resource options, in order to enhance energy security and self-reliance, as well as to achieve an efficient energy delivery system, with an optimal energy resource mix;
- ii. To enhance energy security by reducing energy imports, reduce domestic demand to maximise exports, increase reliability and control energy growth;
- iii. To accelerate the acquisition and diffusion of technology, managerial expertise and indigenous participation in the energy efficiency sector industries, for stability and self-reliance;
- iv. To ensure a comprehensive, integrated and well-informed energy efficiency sector, with plans and programmes for effective development;
- v. To ensure effective coordination and collaboration among all players in energy efficiency activities in Sierra Leone;
- vi. To reduce adverse impacts of energy utilization on the environment;
- vii. To increase energy efficiency in industry and thus reduce the production cost of energy-dependent goods and services;
- viii. To guarantee efficient, location-specific and cost-effective consumption patterns of improved energy efficiency;
- ix. To develop the nation's energy efficiency resources, through the establishment of appropriate financing mechanisms that support private investment in the subsectors;
- x. To incentivize consumers to voluntarily manage and optimize their energy consumption;
- xi. To support a sustained and comprehensive public education and awareness creation campaign on the methods and benefits of energy conservation;
- xii. To promote the establishment of energy efficiency centres;
- xiii. To eliminate energy losses due to consumers' unwillingness to pay for services. .

The National Energy Efficiency Policy (NEEP) will focus on removing the obstacles that have constrained the promotion and implementation of energy efficiency and conservation measures. The strategic policy measures required to achieve this goal comprise fiscal incentives, awareness creation, institutional and human resource capacity development, and financial intermediation in the core areas of industry, utilities, transport, residential, cooking and public.

Therefore the National Energy Efficiency Policy:

- i. Declares energy efficiency as a large, low cost, and underutilized energy resource offering savings on energy bills, improved industrial competitiveness, and lower air pollution;
- ii. Recognizes that poverty mitigation and environmental protection are hindered by the continued predominance and inefficient use of petroleum products, inefficient lighting and electric motive equipment in meeting our energy needs;
- iii. Incorporates provisions for energy efficiency activities into state policy statements and plans, and recognizes the importance of enabling framework conditions for private investment in energy efficiency;
- iv. Requires the preparation of a National Energy Efficiency Action Plan and sets a timeframe for implementation;
- v. Recommends that signatory parties to this policy should collaborate in the preparation of the action plans;
- vi. Makes mandatory the continuous monitoring and reviewing of the implementation and effectiveness of these action plans, under the national policy statement;
- vii. Facilitates the establishment of a framework for sustainable financing of energy efficiency projects and programmes in Sierra Leone.

### 3 ENERGY EFFICIENCY POTENTIAL

Brief description of the energy efficiency potential in Sierra Leone by sectors/fields as provided in table 1 below.

**Table 1**

	Energy savings potential (GWh/year) 2013 (Reference year)	Energy savings potential (GWh/year) 2020	Energy savings potential (GWh/year) 2030
<b>Efficient Lighting</b>			
On-grid lighting	5	105	266
Off-grid lighting	0.1	31	67
<b>Efficiency in buildings</b>			
Public buildings(including appliances)	0	5.4	25
Residential buildings (including appliances)	0	44	50
Commercial buildings (including appliances)	0	13	29
<b>Electrical appliances</b>			
Refrigerators	0	6	8
Air conditioning	0	3	6
Electric water heating	0	2	5
Washing machines	0	0.3	3
Total (appliances only)	0	11.3	22
<b>Industry</b>			
Industry	0	36	78
<b>Electricity Sector</b>			
Electricity generation	0	5	23
Electricity transmission	0	11	46
Electricity distribution	0	112	173
Total energy efficiency potential (GWh)	5.1	362.3	757

## 4 SUMMARY OF TARGETS

The status of energy efficiency in 2013 and the targets for Sierra Leone, intended to be achieved by 2020 and 2030 as a contribution to the attainment of the ECOWAS Energy Efficiency Policy targets (see targets in the EEP document), are presented below. The targets indicated in this section have been approved by the respective institutions in Sierra Leone.

### 4.1 Targets for energy efficient lighting

**Table 2**

	2013	2020	2030
Penetration rate of on-grid, energy efficient lights (%)	0.6	60	100
Penetration rate of off-grid, energy efficient lights (%)	10.3	70	100
Percentage of high efficiency public street lights that (%)	10.3	85	100

### 4.2 Targets for high performance electricity distribution

**Table 3**

	2013	2020	2030
Total losses in the power system, including technical and non-technical losses, in both transmission and distribution (% of power available: generation + balance of imports and exports).	45	15	9
Transmission losses (%)	6	3	2
Total distribution losses (%)	39	12	7
Technical losses (%)	18	11	7
Non-technical losses (%)	27	4	2

### 4.3 Targets for energy efficiency standards and labelling

**Table 4**

	In force since 2013 (reference year)	By 2020	By 2030
Total number of energy efficiency standards in force in the country	12	52	110
Number of efficient lighting standards (on-grid/off-grid and street lighting)	4	12	38
Number of appliances standards in force (refrigerators, air conditioners, washing machines, electric water heaters, fans, transformers, etc ,...)	8	40	72
Total number of energy efficiency labels in force	15	55	143
Number of efficient lighting labels (on-grid/off-grid and street lighting)	5	15	48

Number of appliances labels in force (refrigerators, air conditioners, washing machines, electric water heaters, fans, transformers, etc ,...)	10	40	95
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#### 4.4 Targets for energy efficiency in buildings

**Table 5**

	2013	2020	2030
Percentage of new large private buildings that implement energy efficient building designs and methods	N/A	20	50
Percentage of new public buildings that implement energy efficient building designs and methods	N/A	55	90
Percentage of renovated private buildings that implement energy efficiency designs and methods	N/A	30	60
Percentage of renovated public buildings that implement energy efficiency designs and methods	N/A	60	90

#### 4.5 Target for energy efficiency in industries

**Table 6**

	2013	2020	2030
Percentage of industries that implement energy efficiency measures (%)	N/A	65	100
Percentage of energy saving in industry (%)	N/A	21	75

## 5 GENERAL INDICATORS

The table below shows the data on Sierra Leone's population, population growth rate and family size for 2010, 2011 and 2012.

**Table 7**

	2010	2011	2012
Population number	5,746,000	5,890,000	6,037,000
Population growth rate (%)	2.4	2.4	2.4
Family size	6	6	6

## 6 MACRO-ECONOMIC INDICATORS

The table below describes the macro-economic indicators of Sierra Leone for the periods of 2006 to 2010 and 2015 to 2030.

Table 8

Indicator	Data from the past, where available					Targets for the future, where pertinent (define years)			
	Year 2006	Year 2007	Year 2008	Year 2009	Year 2010	Year 2015	Year 2020	Year 2025	Year 2030
Primary energy intensity (Total primary energy consumption KWh/GDP)	8.6	7.47	6.72	6.81	6.77	10.97	11.45	11.73	12.3
Final energy consumption per capita (kWh/capita)	3,108	3,024	3,072	2,988	3,035	4,872	6,480	8,976	11,148
Annual electricity consumption (kWh/capita)	7.82	7.21	28.04	26.28	34.33	162.13	911.28	995.13	1,078.29
Electricity intensity (final electricity consumption kWh/GDP)	0.0237	0.021	0.078	0.073	0.093	0.289	0.888	1.052	1378
Electrification rate (%) (the ratio between the population served and the area's total population)	8	8	8	8	8.2	19	44	72	92

## 7 NATIONAL ENERGY EFFICIENCY TARGETS AND TRAJECTORIES

### 7.1 Efficient lighting - targets and estimated trajectories by 2020-2030

Table 9: National 2020 and 2030 targets and estimated trajectories for lighting

	2010	2013*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Percentage of on-grid, energy efficient non-directional household lights sold per year **	0.2	0.6	5	10	30	40	50	60	65	70	75	80	85	90	92	96	98	100
– If available, estimate of electricity savings for on-grid household lighting (GWh/year) ***	1.5	5	22	59	69	81	93	105	110	144	150	153	160	175	180	191	263	266
Percentage of off-grid, energy efficient non-directional household lights sold per year **	0	10.3	12	15	30	45	60	70	75	78	80	85	88	90	95	97	98	100
– If available, estimate of kerosene savings for off-grid household lighting (million litres/year) ***	0	6	7	9	10	12	13	14	15	17	18	20	21	23	27	28	29	30
Percentage of high efficiency public street lights	0	10.3	25	35	50	60	70	85	86	87	88	89	90	92	94	96	98	100

Total number of high efficiency (CFL or LED) lighting devices sold or distributed during the year	1,000	150,000	350,000	500,000	700,000	820,000	1,100,000	1,500,000	1,700,000	1,900,000	2,000,000	2,050,000	2,100,000	2,130,000	2,250,000	2,300,000	2,400,000	2,500,000
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\*\* The EEEP sets the regional objective of phasing out incandescent bulbs by 2020.

## 7.2 High performance electricity distribution - Targets and estimated trajectories by 2020-2030

Table 10: National 2020 and 2030 targets and estimated trajectory for losses in the electricity sector

	2010	2013*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total losses in the power system, including technical and non-technical losses, in both transmission and distribution (% of power available: generation + balance of imports and exports).	48	45	38	29	25	22	18	15	15	14	14	13	13	12	12	11	10	9
Transmission losses	8	6	5	5	4	4	4	3	3	3	3	3	3	2	2	2	2	2
<b>Total distribution losses **</b>	40	39	33	24	21	18	14	12	12	11	11	10	10	10	10	9	8	7
Technical losses in distribution	19	18	16	14	13	13	12	11	11	10	10	9	9	9	9	9	8	7
Non-technical losses in distribution	29	27	22	15	12	9	6	4	4	4	4	4	4	3	3	2	2	2
Electricity savings (in GWh/year)	1.5	3	27	89	99	107	119	128	134	144	158	163	174	180	186	190	216	242

\*\* The EEEP sets a regional target of reducing distribution losses to below 10% by 2020

### 7.3 Energy efficiency standards and labelling - Targets and estimated trajectories by 2020-2030

**Table 11: National 2020 and 2030 targets for energy efficiency labels**

	2010	2013	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total number of energy efficiency standards in force in the country	0	12	16	26	26	26	52	52	52	74	74	74	88	88	88	110	110	110
Number of efficient lighting standards (on-grid/off-grid and street lighting) in force	0	4	6	6	6	6	12	12	12	24	24	24	28	28	28	38	38	38
Number of domestic appliances standards in force (refrigerators, air conditioners, washing machines, electric water heaters, fans, transformers, etc ,...)	0	8	10	20	20	20	40	40	40	50	50	50	60	60	60	72	72	72
Total number of energy efficiency labels in force	0	15	16	32	42	42	55	55	55	95	95	95	111	111	111	143	143	143
Number of efficient lighting labels (on-grid/off-grid and street lighting) in force	0	5	6	12	12	12	15	15	15	30	30	30	36	36	36	48	48	48
Number of domestic appliances labels in force (refrigerators, air conditioners, washing	0	10	10	20	30	30	40	40	40	65	65	65	75	75	75	95	95	95

machines, electric water heaters, fans, transformers, etc ,...)																		
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#### 7.4 Energy efficiency in buildings - Targets and estimated trajectories by 2020-2030

**Table 12: National 2020 and 2030 targets and estimated trajectories for energy efficiency in buildings**

	2010	2013*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Number and type of new private buildings	0	0	0	1,200	1320	1452	1597	1756	1931	2124	2337	2570	2828	3110	3421	3764	4140	4554
Percentage of new large private buildings that implement energy efficient building designs and methods, according to the national building code.	0	0	0	10	13	15	18	20	23	26	30	33	36	40	42	45	48	50
Energy saving potential of new private buildings (GWh)	0	0	0	25	35	45	51	57	59	62	64	66	68	70	72	74	76	79
Number and type of new public buildings	0	0	0	20	40	60	80	100	120	140	160	180	200	220	240	260	280	300
Percentage of new public buildings that implement energy efficient building designs and methods, according to the national	0	0	0	35	40	45	50	55	60	65	70	75	80	82	84	86	88	90

building code.																		
Energy saving potential of new public buildings (GWh)	0	0	0	1	2	3	4	5.4	10	12	14	16	18	21	22	23	24	25

### 7.5 Energy efficiency in industry - Targets and estimated trajectories by 2020-2030

Table 13

	2010	2013*	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Number and type of industries	0	0	265	301	341	385	434	487	546	611	682	760	846	941	1,045	1,160	1,286	1,424
Energy saving potential (GWh)	0	0	0	8	12	21	29	36	40	46	50	52	55	60	63	67	70	78
Percentage of industries that implement energy efficiency measures (%)	0	0	10	25	35	40	55	65	68	72	75	78	80	85	90	92	96	100
Percentage of energy savings in industry (%)	0	0	0	10	12	15	18	21	23	27	34	38	42	53	63	68	71	75

## 8 NATIONAL PUBLIC INSTITUTIONS INVOLVED IN NEEAP IMPLEMENTATION

The Ministry of Energy's Directorate of Energy of the Republic of Sierra Leone is the national authority responsible for the follow-up of the National Energy Efficiency Action Plan.

**Ministry of Energy** - Traditionally, the MoE dealt mainly with issues related to electricity. However, in recent years, the Ministry's focus has been extended and other energy issues are being addressed. The Directorate of Energy (DoE) was established by an act, in 2010, under the Ministry of Energy. The DoE was set up to conduct strategic planning on energy security and access issues and was mandated to introduce new energy sources and ensure efficient utilization of energy resources. To further implement its objective, the DoE formed the renewable energy, energy efficiency and rural electrification units in 2013 to address the issues of renewable energy and energy efficiency and rural electrification. The units are charged with the responsibilities of organizing and conducting research and development in energy, energy efficiency and rural electrification.

**Ministry of Finance and Economic Development** – Responsible for the provision of financial support needed to manage the Ministry of Energy's administration and programmes. MoFED is deeply involved in the pricing of petroleum products, especially for the transport sector. Liquid petroleum products provide a significant revenue stream for the national budget. MoFED plays a supportive role in fiscal matters.

**Electricity and Water Regulatory Commission** – Responsible for regulating the management and operations of the electricity generation and transmission company and the electricity distribution and supply authority.

The Sierra Leone Electricity and Water Regulatory Commission Act of 2011<sup>1</sup> establishes a Commission that regulates the provision of electricity and water services and provides for matters incidental thereto, with the power to regulate rates and charges, licensing and related matters. The Commission issues licenses for electricity and water investments and operations. The Commission is a body corporate with financial and operational autonomy.

The Commission includes a combination of private and public parties from the Institution of Engineers, the Labour Congress, the Sierra Leone Protection Agency, and four other persons appointed by the President, who will also appoint a chairman. The Chairman and members must have recognized expertise<sup>1</sup> and should not have a personal interest, direct or indirectly, through a member of their family or business party.<sup>1</sup>

The Commission is responsible for issuing, renewing, amending and revoking licenses; registering and monitoring compliance of licensees; monitoring standards and ensuring (i) consumer protection; and (ii) fair competition.<sup>1</sup> It shall set and review rates considering the criteria set forth in section 11 (2) and maintain a public register.<sup>1</sup> Part IV of the financial provisions includes sources of funding: (i) government subventions; (b) payments due to the Commission and (c) monies accruing to the Commission; (d) grants, donations and other contributions; (e) annual level not exceeding 1% of the gross operating revenue and (f) a government levy on electricity and water determined by the Parliament.

Licenses are regulated in Part V. Sect. 29, which stipulates that “*No person shall: (i) sell, provide, arrange or otherwise supply access to electricity and water services; (ii) construct, install or operate any facility for the sale, provision or supply of electricity and water services; (...) unless that person holds a license granted by the Commission*”. Sect. 30 to 37 regulate the decision making process to grant, suspend or cancel a license.

Part VI regulates inspections and inspectors, who shall be appointed and coordinated by the Commission.

The scope of the licenses refer to the “*selling, provision, arrangement or supply*” of electricity. Crop production for bioenergy purposes could be considered outside of the scope of this act. However, the Act provides a good example of a collective decision making commission and license scheme that could serve as a basis for bioenergy investments. The inclusion of private parties, some directly appointed by the President, may open the door for vested interests.

**Electricity Generation and Transmission Company** – Responsible for managing the power generating stations and transmission lines in the country.

The National Electricity Act established the Electricity Generation and Transmission Company, the Electricity Distribution and Supply Authority, and provides for other related matters. The company's main function is to generate and transmit electricity and sell it to the Authority, subject to a power purchase agreement to be approved by the Commission.<sup>1</sup>In particular, its function is to (a) construct electricity generation stations, including hydro-electric schemes, (b) carry on business generally associated with electricity generation and transmission, including the West Africa Power Pool, (c) remain informed regarding developments relating to the generation of electricity, (d) advise the Minister on all matters relating to the construction of generating stations, and the generation and transmission of electricity and such other incidental duties. In addition, the company may be directed by the minister on matters of policy.<sup>2</sup>The Company has a board of directors comprised of a professional as Chairman, the Permanent Secretary of the Ministry, the Financial Secretary, a representative each of the Ministry of Marine Resources, Sierra Leone's Institute of Engineers, Sierra Leone's Chamber of Commerce, Industry and Agriculture, and the Company's Director-General .

**Electricity distribution and supply authority** – Responsible for managing the distribution networks and sale of electricity in the country. The National Electricity Act established the electricity generation and transmission company, the electricity distribution and supply authority, and provides for other related matters. The electricity distribution and supply authority is established<sup>3</sup> with a board of directors with representation and membership similar to that of the Commission, but with the addition of a representative from each of the associations of consumers and manufacturers.<sup>4</sup> The board has the control and supervision of the Authority.<sup>5</sup>The Authority distributes, supplies, sells, purchases, imports and controls electricity, establishes uniform standard voltage throughout its area of supply, secures the supply of electricity at reasonable prices, promotes and encourages the economic and efficient use of electricity, and undertakes incidental responsibilities.<sup>6</sup> The Authority shall purchase the electricity through PPAs approved by the Commission and shall supply to users, subject to a contract on terms set by the Authority.

The Minister may give general directions to the Authority on policy matters (s. 38).

Part VIII provides for the duties of independent power producers who shall sell power to the Authority, subject to the PPA as approved by the Commission: constructing generating stations including hydroelectric schemes; keeping itself informed of developments relating to generation of electricity from natural resources available within the state, with particular reference to the implications for the state in such developments and doing other things associating with their businesses.

By section 55(1)(a), the minister may, by order published in the gazette, compulsorily acquire private land or rights over and under private land for use by the authority or the company, subject to the payment of adequate compensation to the owner of the land. Such compensation is payable in the first instance by the government of Sierra Leone, who shall be reimbursed by the Authority or the Company, as the case may be (b). The Company or Authority has the right to lop or cut trees, shrub or hedges which obstruct or interfere with its operations, and shall give not more than fourteen days' notice to the occupiers of the land.<sup>7</sup>The company or authority may enter any land over which it had acquired rights.<sup>8</sup>

**Environmental Protection Agency (EPA)** - EPA is responsible to ensure that environmental impact assessment measures are adhered to in energy related programmes. The EPA works closely with MoE in designing the GEF funded projects and work to enhance their capacity in the coordination and networking of clean technology, and to develop baseline data inventory monitoring system.

**Ministry of Justice and the Attorney General** – This Ministry is responsible for issuing legal opinions, vetting contracts and advising GoSL on all legal matters.

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<sup>1</sup> Section 11.

<sup>2</sup> Section 12.

<sup>3</sup> Section 25(1).

<sup>4</sup> Section 26(1).

<sup>5</sup> Section 28(1).

<sup>6</sup> Section 34.

<sup>7</sup> Section 58 (1 ).

<sup>8</sup> Section 59.

**Ministry of Trade and Industry** - oversees upstream and downstream activities on petroleum resources - exploration and marketing. The Ministry of Trade and Industry oversees the quality of service and safety standards within the petroleum sector. Petroleum marketing and sales are handled through the Petroleum Unit (PU). It has the responsibility of supporting energy markets infrastructure and production and to explore the feasibility of “greening up” the value chain of the cottage industry that utilize large amount of firewood such as fish smoking, cassava gari production, bakery and brick/ceramic production.

**Ministry of Agriculture, Forestry and Food Security, Forestry Division (FD)** – continues to play a leading role in the fuelwood sector, both in terms of policy formulation and regulation. Holds a key role in matters related to bioenergy and crop-related energy issues. It is responsible for promoting micro-nursery and community forestry, through tree replanting and farmers managed agroforestry, to ensure that there is sustainable supply of renewable biomass, which will alleviate the pressure on natural forests.

**Ministry of Local Government and Rural Development** - The present decentralisation of the government’s functions creates possibilities and opportunities for the governance of energy services in decentralised entities. The Ministry is responsible for supporting rural electrification programmes and to coordinate, implement and evaluate energy projects.

**Ministry of Transport and Aviation** – Responsible for coordinating energy use in the transport sector.

**Ministry of Works, Housing and Infrastructure** – Responsible for developing codes, regulations and to coordinate energy structured buildings.

**Table 14**

	<b>National Public Institution</b>	<b>Responsibilities</b>
1	Ministry of Energy/EGTC/EDSA/EWRC	Energy policy, regulation, power project and operations
2	Ministry of Trade and Industry/SB/SLIEPA	Standards, codes, certifications and testing of ICS, motors, light, petroleum products etc.
3	Ministry of Works, Housing and Infrastructure Development	Energy efficient buildings, codes, standards etc.
4	Ministry of Finance and Economic Development/NRA	Financing, funds, Duty Free concession
5	Ministry of Transport and Aviation/SLRTA	Vehicle examination for low carbon emission, more buses and road lanes
6	Environmental Protection Agency	Green House Gas emission checks, mitigation
7	Ministry of Agriculture, Forestry and Food Security/Forest Division/National Protected Areas Authority (NPAA)	Forest management for wood fuel production and tree planting, agricultural and animal residues
8	Ministry of Local Government and Rural Development/ Councils	Municipal waste to energy, efficient street lights
9	Ministry of Justice and the Attorney General	Preparation of legal instruments

**Note:** International institutions like the World Bank, Food and Agricultural Organisation, Africa Development Bank, Islamic Development Bank; International and Local Non-Governmental Organisations, the aforementioned partner or fund energy projects. Private energy enterprises sell energy products of different types. There are both local and private companies engaged in the installations of renewable outfits, .g. e.g. the barefoot women solar engineers association of Sierra Leone, managing a solar technician

training centre for the installation of solar home systems in inaccessible areas of our rural community; this is a showcase of the Government initiative to electrify the rural communities, so as to raise their living standards for a brighter future. The Government Technical Institute has a renewable or alternative energy studies department conducting training and replicating some of the technologies in the renewable energy field

**Table 15: shows the statistics of existing national public institutions and national public institution to revisit status and to establish status for the 2010-2030 period**

	2010	2013	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Existing national public Institutions	13	13	17	17	19	19	19	22	22	22	24	24	24	27	27	27	29	29
National public institutions to revisit status	1	-	-	-	2	-	-	2	-	-	1	-	-	1	-	-	2	-
National public institutions to establish	-	4	-	2	-	-	3	-	-	2	-	-	3	-	-	2	-	-

## 9 MEASURES FOR ACHIEVING THE TARGETS

The measures to achieve the energy efficiency targets described below are either planned or have already been adopted.

### 9.1 Efficient lighting initiative

Key measures undertaken as part of the efficient lighting initiative include actions in the four components of the lighting initiative, namely:

- Minimum energy performance standards;
- Supporting policies and measures;
- Monitoring, verification and enforcement;
- Environmentally sound management.

#### 9.1.1 Minimum Energy Performance Standards (MEPS)

Projects on lighting MEPS (on-grid and off-grid) validated by ECOWAS experts should be adopted and applied in each ECOWAS member state. The process to harmonize and adopt these MEPS is underway.

**Table 16**

No	1
Measure (title)	<b>Adoption of Minimum Energy Performance Standards (MEPS) for on-grid and off-grid lighting devices</b>
Type of measure*	Energy efficiency policy/tool, awareness raising/information
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	<b>2015 to 2016</b>
Description of the measure	<ul style="list-style-type: none"> <li>• Adopt and enforce Minimum Energy Performance Standards (MEPS) in Sierra Leone: <ul style="list-style-type: none"> <li>○ Conduct national consultations with policy makers and other stakeholders;</li> <li>○ Pursue the ECOWAS Standardisation Process (Ecosham);</li> <li>○ Adopt ECOWAS Harmonised MEPS on efficient lighting and publish in the national official journal ;</li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>○ Set up a national standards and labelling technical committee.</li> <li>● Phase out of inefficient lighting products.</li> </ul>
Target group	Equipment manufacturers, retailers, end users
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI)
Sector	Trade & Industry, Works & Infrastructure and Standards Bureau,

### 9.1.2 Supporting policies and measures

Supporting policies and measures:

**Table 17**

No	2
Measure (title)	Supporting energy efficient lighting policies and measures through awareness raising campaigns targeting final consumers
Type of measure*	Awareness raising
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>● Conduct public awareness campaigns and demonstration programmes on energy efficient lighting: <ul style="list-style-type: none"> <li>○ Inform consumers and other stakeholders of the social, economic and health advantages of efficient lighting;</li> <li>○ Create public awareness of the mandatory labels of on-grid and off-grid efficient lighting products;</li> <li>○ Distribute free (or subsidised) on-grid and off-grid lighting products to selected communities (with disposal of old lamps);</li> <li>○ Develop social housing projects with efficient lighting;</li> <li>○ Develop and adopt fiscal instruments to reduce prices for on-grid and off-grid efficient lighting.</li> </ul> </li> </ul>
Target group **	End users, planners, retailers, energy suppliers
Implementing body/parties	Ministry of Energy, Ministry of Trade & Industry, Ministry of Works, House & Infrastructure
Sector ***	Energy, residential, trade & industry

- Create public awareness of the benefits of on-grid and off-grid efficient lighting:
  - Organize public education and awareness campaigns on the advantages and benefits of efficient lighting in national and local languages, on radio and television, on posters and in newspapers, and at local events;
  - Organize special education programs for the youth, in schools, on the advantages and benefits of efficient lighting, through radio and television programs, and posters.
- Demonstrate to stakeholders the advantages and benefits of efficient lighting (compared to incandescent lamps):
  - Implement free - or at a subsidized cost - distribution of on-grid and off-grid lighting products to carefully selected communities (with retrieval and destruction of replaced incandescent lamps);
  - Facilitate development of financing schemes to cover the upfront cost of on-grid and off-grid lighting products (e.g. on-bill financing);
  - Facilitate bulk procurement of on-grid and off-grid lighting products (e.g. by reducing import duties);
  - Promote installation of efficient lighting in all new government social housing projects.
- Create public awareness of the mandatory labels of on-grid and off-grid efficient lighting products:
  - Educate the public and explain the information displayed on the mandatory labels of on-grid and off-grid efficient lighting - in national and local languages, on radio and television, on posters and in newspapers, and at local events;
  - Organize special training programs for relevant staff of the Standards authority and Customs agency on the interpretation of the mandatory labels of on-grid and off-grid efficient lighting;
  - Organize special training programs for relevant staff of the Standards authority and accredited institutions on the test methods for on-grid and off-grid efficient lighting.
- Develop and adopt fiscal instruments to reduce prices of on-grid and off-grid efficient lighting:
  - Conduct baseline market studies and cost-benefit analyses on on-grid and off-grid efficient lighting products in all ECOWAS countries, to gather data for consultations with policy makers;
  - Conduct consultations with policy makers (including parliamentary select committees) on the establishment of fiscal instruments (including incentives and reduced taxes) to reduce prices of on-grid and off-grid efficient lighting products;
  - Adopt reduced taxes (including import duties, GST) for on-grid and off-grid efficient lighting products;
  - Adopt incentive schemes (including tax holidays) to support local manufacture of on-grid and off-grid efficient lighting products.

### **9.1.3 Monitoring, verification and enforcement**

The establishment of a system for monitoring, verification and enforcement includes testing and certification, market studies, etc.

**Table 18**

No	3
Measure (title)	Establish a system for Monitoring, Verification and Enforcement (MV&E) of Minimum Energy Performance Standards (MEPS) for lighting systems
Type of measure*	Capacity building
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015-2017
Description of the measure	<ul style="list-style-type: none"> <li>• Establish National Registries for on-grid and off-grid lighting products;</li> <li>• Create and make functional a national registry for lighting products;</li> <li>• Create and make functional regional registries for lighting products;</li> <li>• Collate data on lighting products – country of origin, importers, quantity, quality, technical data sheets;</li> <li>• Monitor the import/export of efficient lighting products into Sierra Leone (with periodic checks) &amp; set penalties for non-compliance with standards and labelling requirements;</li> <li>• Conduct regular census of importers, wholesalers and distributors of efficient lighting products;</li> <li>• Conduct periodic checks on importers, wholesalers and distributors of efficient lamps – covering: <ul style="list-style-type: none"> <li>○ Inventory of the types of lamps on the market;</li> <li>○ Verification of the presence or absence of valid labels;</li> <li>○ Verification of the technical characteristics of the lamps as registered;</li> <li>○ Verification of conformity to minimum energy efficiency standards on the lamps.</li> </ul> </li> </ul>
Target group **	
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI) and Ministry of Works, House & Infrastructure (MoWHI)
Sector ***	Energy, trade & industry and residential

#### 9.1.4 Environmentally sound management

Measures for an environmentally sound management focus on collecting and safely disposing of used lighting fixtures.

Table 19

No	4
Measure (title)	Environmentally sound management through the implementation of a collection and disposal system for energy efficient light bulbs
Type of measure*	Capacity building, awareness raising/information.
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2030
Description of the measure	<ul style="list-style-type: none"> <li>• Create public awareness of the environmentally sound collection and disposal of on-grid and off-grid efficient lamps and batteries: <ul style="list-style-type: none"> <li>○ Organize public education and awareness campaigns on the rationale behind and methods for environmentally sound collection and disposal of used lamps and batteries in national and local languages, through radio, television, posters/leaflets, newspapers, SMS, at social events, markets, and through celebrities;</li> <li>○ Organize special education programmes for the youth in schools.</li> </ul> </li> <li>• Conduct national consultations with policy makers and other stakeholders: <ul style="list-style-type: none"> <li>○ Consultations with utilities, selected shops, schools and other stakeholders on the development of national regulations for environmentally sound disposal of spent efficient lamps and batteries, including: <ul style="list-style-type: none"> <li>▪ Development of national collection systems for spent efficient lamps and batteries;</li> <li>▪ Involvement of informal sector in spent lamps collection;</li> <li>▪ Incentives for consumers and spent lamp collectors.</li> </ul> </li> <li>○ Application of Extended Producer Responsibility principle;</li> <li>○ Setting up Collection &amp; Recycling Service Organisations (CRSOs).</li> </ul> </li> <li>• Develop and adopt national regulations for environmentally sound disposal of spent on-grid and off-grid efficient lamps and batteries: <ul style="list-style-type: none"> <li>○ Implement ECOWAS Regional Regulation for environmentally sound disposal of spent efficient lamps and batteries, application of Extended Producer Responsibility principle and setting up CRSOs;</li> <li>○ Develop and adopt national regulations or integrate the ECOWAS Regional Regulation in the existing regulation on disposal of hazardous waste;</li> <li>○ Design a national collection system for spent efficient lamps and batteries with: <ul style="list-style-type: none"> <li>▪ Involvement of the informal sector in collecting spent lamps;</li> <li>▪ Incentives for consumers and spent lamp collectors.</li> </ul> </li> </ul> </li> </ul>

	<ul style="list-style-type: none"> <li>• Implement a national collection systems for spent on-grid and off-grid efficient lamps and batteries: <ul style="list-style-type: none"> <li>○ Adopt and implement a national collection system for spent efficient lamps and batteries.</li> </ul> </li> <li>• Develop and establish a commercially viable recycling and disposal facility: <ul style="list-style-type: none"> <li>○ Establish Collection and Recycling Service Organisations;</li> <li>○ Invite bids and select consultants for development of technical specifications, design and the business plan of a commercially viable recycling and disposal facility for spent on-grid and off-grid efficient lamps and batteries;</li> <li>○ Invite bids and select a contractor to build and operate a regional recycling and disposal facility for spent on-grid and off-grid efficient lamps and batteries;</li> <li>○ Commission a regional recycling and disposal facility(ies) for spent on-grid and off-grid efficient lamps and batteries.</li> </ul> </li> </ul>
Target group	End users, public administration, equipment manufacturers, retailers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI), Environmental Protection Agency (EPA), Ministry of Agriculture, Forestry & Food Security (MoAFFS), Ministry of Lands, Country Planning & Environment (MoLCPE)
Sector	Environmental Protection Agency (EPA), Trade & Industry City Councils and Energy Sector

## 9.2 Standards and labelling initiative

Key measures undertaken as part of the energy efficiency standards and labelling initiative include, among others:

### 9.2.1 Policies and tools

**Table 20**

No	1
Measure (title)	Market assessment of key-energy using appliances
Type of measure*	
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Market Assessment:</li> </ul>

	<ul style="list-style-type: none"> <li>○ Collection and analysis of data on pricing and sales, market penetration, leading brands, baseline performance of energy-using equipment, efficiency improvement potential, usage characteristics, etc.;</li> <li>○ Collection of additional market data and baseline usage, as well as performance data for selected product categories, as necessary, to make informed decisions on efficiency performance levels, for instance through field surveys (e.g. end-use metering studies) and laboratory testing;</li> <li>○ Conduct consumer research on efficiency label design options. Evaluate local/regional socio-cultural factors.</li> <li>● Develop standards and labels together with ECOWAS: <ul style="list-style-type: none"> <li>○ Conduct national consultations with policy makers and other stakeholders;</li> <li>○ Pursue the ECOWAS Standardisation Process (Ecosham);</li> <li>○ Adopt ECOWAS Harmonised MEPS on efficient appliances and publish them in the national official journal;</li> <li>○ Set up a national standards and labelling technical committee;</li> <li>○ Design and implement complementary policies, regulatory and educational measures that support the enforcement of standards and labelling programmes.</li> </ul> </li> <li>● Impact Assessment: <ul style="list-style-type: none"> <li>○ Impact assessment of the costs and benefits of the proposed standards (energy and money savings, environmental benefits etc.) and assessment of energy efficiency improvement potential for selected appliances.</li> </ul> </li> <li>● Diffusion of EE appliances: <ul style="list-style-type: none"> <li>○ Develop and introduce programs to encourage or require public-sector and large-scale private-sector procurement of energy efficient products.</li> </ul> </li> </ul>
Target group **	Public administration, equipment manufacturers, retailers
Implementing body/parties	Ministry of Energy (MoE) and Ministry of Trade & Industry (MoTI)
Sector ***	Energy, Trade & Industry

### 9.2.2 Capacity building

**Table 21**

No	2
Measure (title)	Capacity Building
Type of measure*	
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned

Time frame (start year – end year)	2015 – 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Identify the needs for technical support by local manufacturers of lighting products, ovens, fans and motors</li> <li>• Training and information workshops to educate and build capacity among stakeholders: <ul style="list-style-type: none"> <li>○ Training workshops to build capacity on standards and labelling in the national standards bodies and energy authorities;</li> <li>○ Training workshops in certification procedures, compliance monitoring, and enforcement programs;</li> <li>○ Training of importers, retailers and other relevant stakeholders such that they actively support the initiative.</li> </ul> </li> <li>• Strengthen and enhance national institutions. Institutions must have a mandate, an adequate budget, well-trained staff, and sufficient resources to effectively oversee the development and implementation of the programmes. In this context, the cooperation between energy authorities and authorities in charge of standards shall be strengthened;</li> <li>• Develop capacity-building materials for S&amp;L program managers and stakeholders;</li> <li>• Develop concepts for a communication and outreach strategy based on international experience and best practices, with a particular focus on disseminating information about the benefits of using new products, instead of second-hand ones;</li> <li>• Design and conduct awareness raising campaigns for national authorities, manufacturers, distributors, specialized professionals such as engineers and technicians and the general public;</li> <li>• Consult with political bodies and utilities on drafting incentives schemes to promote the purchase of energy-efficient appliances.</li> </ul>
Target group **	Public administration, equipment manufacturers, retailers
Implementing body/parties	Ministry of Energy (MoE) and Ministry of Trade & Industry (MoTI)
Sector ***	Energy, Trade & Industry

### 9.2.3 Awareness raising

Table 22

No	3
Measure (title)	Awareness raising
Type of measure*	
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2020

Description of the measure	<ul style="list-style-type: none"> <li>• Develop concepts for a communication and outreach strategy based on international experience and best practices, with a particular focus on disseminating information about the benefits of using new products instead of second-hand ones;</li> <li>• Design and conduct awareness raising campaigns for national authorities, manufacturers, distributors, specialized professionals such as engineers and technicians and the general public: <ul style="list-style-type: none"> <li>○ For example, messaging may be directed to: governments, institutions, and other stakeholders about the benefits of S&amp;L, obligations and expectations about the process; to consumers to raise awareness and understanding of the efficiency label; and to manufacturers and importers to encourage a culture of compliance.</li> </ul> </li> </ul>
Target group **	Public administration, equipment manufacturers, retailers
Implementing body/parties	Ministry of Energy (MoE) and Ministry of Trade & Industry (MoTI)
Sector ***	Energy, Trade & Industry

#### 9.2.4 Financial/fiscal measures

Innovative instruments to finance energy efficient equipment shall be developed and introduced. These may include customer credit schemes, demand-side-management by utilities, changes to the tax systems, etc. to provide incentives for energy efficient products or increased duties for inefficient products.

**Table 23**

No	4
Measure (title)	Financial/Fiscal measures
Type of measure*	
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Consult with political bodies and utilities on drafting incentives schemes to promote the purchase of energy-efficient appliances;</li> <li>• Develop and introduce innovative instruments to finance energy efficient equipment. These may include customer credit schemes, demand-side-management by utilities, changes to the tax systems, etc. to provide incentives for energy efficient products or increased duties for inefficient products.</li> </ul>
Target group **	Public administration, equipment manufacturers, retailers
Implementing body/parties	Ministry of Energy (MoE) and Ministry of Trade & Industry (MoTI)
Sector ***	Energy, Trade & Industry

### 9.3 Energy efficient buildings initiative

Key measures undertaken as part of the energy efficient buildings initiative, include:

#### 9.3.1 Policies and tools on energy efficiency in buildings

**Table 24**

No	1
Measure (title)	Introduction of energy efficiency criteria into the national building code and establishing a link to ECOWAS directive for energy efficiency in buildings (EDEEB)
Type of measure*	Energy efficiency building policy/tool,
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2016
Description of the measure	<p>Develop and implement a national building code tailored to local conditions and construction practices, requiring or encouraging a high level of energy performance for new buildings; this should include minimum energy efficiency standards in buildings under the building permit procedure; tropical architecture criteria and the link to urban planning.</p> <p>The national building code should be developed in accordance with the ECOWAS Directive on Energy Efficiency in Buildings (EDEEB). Specifically, compatibility with the EDEEB should be ensured in at least the following aspects:</p> <ul style="list-style-type: none"> <li>• A common general framework to measure and calculate the energy performance of buildings;</li> <li>• Minimum requirements for new buildings' energy performance;</li> <li>• Minimum requirements for existing buildings' energy performance, subject to major renovation and requiring project approval;</li> <li>• Minimum requirements for renewable energy sources used in new and existing buildings, subject to major renovation and requiring project approval;</li> <li>• Buildings energy certification.</li> </ul>
Target group	End users, public administration, planners, architects, installers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI) and Ministry of Lands, Country Planning & Environment (MoLCPE)
Sector	Residential sector, service sector

**Table 25**

No	2
Measure (title)	Develop and implement a system to award energy performance certificates to public buildings in Sierra Leone
Type of measure*	Policy/tool
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Development of an accreditation process to accredit bodies that will issue the energy performance certificate;</li> <li>• Development of a standard for energy performance certificates, establishing reference values such as minimum energy performance requirements for relevant building categories;</li> <li>• Development of a national building energy performance register where an energy performance certificate is issued. Such information contained in the energy performance certificate will be required to be submitted to a national building energy performance register, to be established and maintained by the pertinent authority;</li> <li>• Regular inspection of air-conditioning and water heating systems in buildings;</li> <li>• Control systems for energy performance certificates and inspection reports.</li> </ul>
Target group	Manufacturers of construction materials, architects, engineers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI) and Ministry of Lands, Country Planning & Environment (MoLCPE)
Sector	Residential, service, construction sector

### 9.3.2 Capacity building on energy efficiency in buildings

**Table 26**

No	1
Measure (title)	Capacity building, institutional strengthening and training measures on energy efficiency for the buildings value chain
Type of measure*	Capacity building
Priority (1 to 5 from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year –end year)	2015 to 2020
Description of the measure	Training on energy efficiency in buildings, in order to ensure the availability of qualified staff to design, construct and operate energy efficient buildings.

	<ul style="list-style-type: none"> <li>• Development of qualification, accreditation and certification schemes for installers of energy-related building elements;</li> <li>• Capacity building and institutional strengthening for public authorities: <ul style="list-style-type: none"> <li>○ In order to ensure that public authorities make informed decisions and are in a position to design, develop, implement and monitor (inspection, certification, etc.) policies and programmes on energy efficiency in buildings;</li> <li>• Strengthening the capability of national authorities to enforce national standards and regulations in the buildings sector;</li> </ul> </li> <li>• Training for building professionals to comply with the energy efficiency standards in the building code, through use of bio-climatic technologies;</li> <li>• Development of local industries to produce building materials and equipment for high efficiency buildings;</li> <li>• Showcase bio-climatic architecture adapted to local climate conditions, through demonstration projects.</li> </ul>
Target group	End users, public administration, planners, architects, engineers, installers, manufacturers of construction materials
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI) and Ministry of Lands, Country Planning & Environment (MoLCPE)
Sector	Works & Infrastructures, City Councils and Trade & Industry

**Table 27**

No	2
Measure (title)	Promotion of the use of local materials in construction
Type of measure*	Capacity building
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Development of a catalogue of local building materials, construction, monitoring and evaluation of demonstration buildings;</li> <li>• Establishment of testing facilities to ensure that products comply with technical requirements.</li> </ul>
Target group	Manufacturers of construction materials, architects, engineers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI) and Ministry of Lands, Country Planning & Environment (MoLCPE)
Sector	Construction

**9.3.3 Awareness raising****Table 28**

No	1
Measure (title)	Create energy efficiency in schools
Type of measure*	Capacity building
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	Develop school curriculum on energy efficiency knowledge
Target group	Learning institutions, engineers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Education, Science & Technology, Schools, Colleges and Universities
Sector	Education sector

**Table 29**

No	2
Measure (title)	Develop a marketing and awareness raising programme
Type of measure*	Capacity building
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<p>Identify who the major stakeholders are, what their main concerns are and how they feel about energy efficiency programmes; Carry out the programme on marketing energy efficiency in buildings with actions such as:</p> <ul style="list-style-type: none"> <li>• Convince opinion makers to invest in their own energy efficient buildings (footballers, etc.);</li> <li>• Use the positive image of well-known personalities such as footballers or musicians, to promote energy efficiency;</li> <li>• Marketing of pilot projects that are accessible to the public;</li> <li>• Promote energy labelling of buildings to create awareness.</li> </ul>
Target group	Learning institutions, engineers

Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry, Ministry of Works, Housing and Infrastructure
Sector	Education sector, Works & Infrastructure

### 9.3.4 Financial instruments for energy efficiency in buildings, in order to facilitate investments in energy efficiency measures:

**Table 30**

No	1
Measure (title)	Establish financial instrument for energy efficiency in buildings
Type of measure*	Finance
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	Design and implementation of financial incentives for building owners at the national level: <ul style="list-style-type: none"> <li>• Technical assistance to key government bodies and actors in the financial sector.</li> </ul>
Target group	Financial institutions, investors, marketers
Implementing body/parties	Ministry of Finance and Economic Development, Ministry of Trade & Industry
Sector	Finance and Trade sector

## 9.4 Electricity distribution initiative

### 9.4.1 Measures to incentivise energy efficiency in electricity distribution include: policy and regulatory framework

With regard to the efficient distribution of electricity, diagnostic studies will be conducted to determine the level of losses, and identify key actions to reduce them.

**Table 31**

No	1
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Measure (title)	Introduction of improved management practices and technical measures to diminish losses in the electricity distribution system
Type of measure*	Energy efficiency policy/tool
Priority (1 to 5, from <b>highest to lowest</b> )	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2025
Description of the measure	<p>Introduction of:</p> <ul style="list-style-type: none"> <li>• Management practices related to billing and maintenance, such as optimised billing and regular inspection of lines;</li> <li>• Shortened billing cycle, including thorough tools that produce a bill immediately upon meter reading;</li> <li>• Regular inspection of lines to identify and remove illegal, unsafe connections, and to encourage all users become paying customers;</li> <li>• Regular preventive maintenance of all components of the distribution system, in order to assure reliable power supply. This includes, notably, upgrading of lines and transformers operating near capacity that show signs of weakness or that are outdated and inefficient;</li> <li>• Installation of pre-paid meters to improve bill collection and relations with customers;</li> <li>• Installation of high voltage distribution systems that improve power quality and reduce theft;</li> <li>• Power factor correction to reduce losses through the installation of capacitor banks on customer premises where they are needed.</li> </ul>
Target group **	End users, public administration, planners, installers, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Electricity & Water Regulatory Commission (EWRC), Electricity Distribution & Supply Authority (EDSA) and Electricity Generation & Transmission Company (EGTC)
Sector ***	Energy

#### 9.4.2 Capacity building

**Table 32**

No	2
Measure (title)	Promotion of the use of preventive maintenance of all distribution system components
Type of measure*	Capacity building
Priority (1 to 5, from highest to lowest)	1

Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	Upgrading of lines and transformers operating near capacity that show signs of weakness or that are outdated and inefficient.
Target group	Manufacturers of distribution materials, engineers
Implementing body/parties	Ministry of Energy (MoE), Electricity Distribution Service Authority and Electricity Generation Transmission Company
Sector	Energy

#### 9.4.3 Awareness raising

**Table 33**

No	2
Measure (title)	Stakeholders awareness
Type of measure*	Capacity building
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	Build awareness among stakeholders of the issues, opportunities and obstacles in improving power distribution.
Target group	Manufacturers of distribution materials, engineers
Implementing body/parties	Ministry of Energy (MoE), Electricity Distribution Service Authority and Electricity Generation Transmission Company
Sector	Energy

#### 9.4.4 Financial/fiscal measures:

**Table 34**

No	1
Measure (title)	Investment support to encourage power factor correction
Type of measure*	Finance

Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	Financial/Fiscal measures will include: <ul style="list-style-type: none"> <li>• Tariff measures to encourage power factor correction;</li> <li>• Support for investment in high efficiency power system equipment that improve power quality and reduce theft.</li> </ul>
Target group	Manufacturers of distribution materials, engineers
Implementing body/parties	Ministry of Energy (MoE), Electricity Distribution Service Authority and Electricity Generation Transmission Company
Sector	Energy

### 9.5 Energy efficiency in the industrial sector

Key measures to enhance energy efficiency in the industrial sector comprise:

#### 9.5.1 Energy efficiency policies and tools

**Table 35**

No	1
Measure (title)	National programs to implement an ISO-compatible Energy Management Standard (EnMS) for industry (ISO 50001)
Type of measure*	Energy efficiency policy/tool
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2025
Description of the measure	<ul style="list-style-type: none"> <li>• Develop and implement a national Energy Management Standard compatible with ISO-50001 in Sierra Leone: <ul style="list-style-type: none"> <li>○ Conduct national stakeholder consultations to develop an EnMS for industry in Sierra Leone.</li> </ul> </li> <li>• Implement pilot Energy Management Systems and System Optimization in industrial facilities;</li> <li>• Develop energy management benchmarking and award programmes;</li> <li>• Develop and implement measurement and verification of compliance with Energy Management Systems (EnMS):</li> </ul>

	<ul style="list-style-type: none"> <li>○ Create capacity within relevant organizations to develop and implement a M&amp;V programme of compliance with EnMS;</li> <li>○ Establish a recognition scheme for EnMS experts, organizations and companies compliant with ISO 50001;</li> <li>○ Launch an accreditation programme for Energy Management Systems (EnMS) in accordance with the ISO5001 standard;</li> <li>○ Establish (voluntary) reporting programmes on energy use in industry.</li> </ul> <ul style="list-style-type: none"> <li>● Introduce best-practice information, dissemination and recognition programmes for industrial energy efficiency.</li> </ul>
Target group	Industrial users, public administration, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Electricity & Water Regulatory Commission (EWRC), Electricity Distribution & Supply Authority (EDSA), Electricity Generation & Transmission Company (EGTC) and UNIDO
Sector	Industry

Table 36

No	2
Measure (title)	Energy efficient motors programme
Type of measure*	Energy efficiency policy/tool
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>● Implement a program for replacement of inefficient motors such as: <ul style="list-style-type: none"> <li>○ Old motors that have poor or no rewind records. Typically, efficiency is lost when motors are rewound without taking enough care of the magnetic core;</li> <li>○ Excessively oversized motors that run at 50% and below their rated load. Oversized electric motors are a result of plant designers and users requirement of safety factors to ensure plant availability;</li> <li>○ Replacing standard motors with energy efficient ones, giving users a better variable load handling ability.</li> </ul> </li> <li>● Motor users are required to return their old motor being replaced (with rotor and stator intact) to the motor suppliers;</li> <li>● Introduce subsidies for replacing old, inefficient electric motors with new efficient ones. Electric motor users in industry would receive an instant once-off rebate on the purchase price of a new efficient motor when purchasing it to replace an old inefficient motor;</li> <li>● These old motors are scrapped according to environmental regulations after which a disposal certificate is submitted to the programme management. This step ensures that these energy guzzling motors do not re-enter the market;</li> <li>● The programme will be offered to customers via the accredited suppliers on the programme. Local motor suppliers will be encouraged to register to participate in the energy efficient motors programme. The registration process verifies the supplier's product accreditation, technical specifications and financial position;</li> </ul>

	<ul style="list-style-type: none"> <li>Capacity building to industry personnel on energy efficient motors, adequate sizing and maintenance;</li> <li>Conduct random process compliance audits;</li> <li>Install a system for Monitoring and Verification (M&amp;V) of the savings achieved with the energy efficient motor programme in Sierra Leone.</li> </ul>
Target group	Industrial users, public administration, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Electricity & Water Regulatory Commission (EWRC), Electricity Distribution & Supply Authority (EDSA), Electricity Generation & Transmission Company (EGTC) and UNIDO
Sector	Industry

**Table 37**

No	1
Measure (title)	Establish a regulatory framework and energy management benchmark
Type of measure*	Policy
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>Enhanced regulatory framework facilitating increased implementation of energy efficiency in the industrial sector, in large as well as smaller industries;</li> <li>Implement energy management benchmarking and award programmes;</li> <li>Pursue voluntary energy efficiency agreements between industry and government, through agreed upon targets for energy savings;</li> <li>Promote the use of cogeneration;</li> <li>Develop an industrial energy database and energy consumption benchmarks: <ul style="list-style-type: none"> <li>Promote plant-level energy monitoring;</li> <li>Establish database on industrial energy use;</li> <li>Formulate energy consumption benchmarks for subsectors.</li> </ul> </li> </ul>
Target group	Industry
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry, Ministry of Works, Housing and Infrastructure
Sector	Energy, Industry and Works & Infrastructure sectors

**9.5.2 Capacity building for improving energy efficiency****Table 38**

No	3
Measure (title)	Capacity building on industrial energy efficiency
Type of measure*	Energy efficiency policy/tool
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Energy Management Systems (EnMS) Expert Training;</li> <li>• System Optimization (SO) Expert Training (steam, pumps, compressed air, etc.);</li> <li>• Development and provision of tools to assist industry in developing and implementing EnMS and system optimization projects;</li> <li>• Training of industry energy managers and engineers;</li> <li>• Provide incentives and qualify personnel for energy audits;</li> <li>• Establish cleaner production centres to facilitate the supply of clean and efficient energy services;</li> <li>• Develop and implement certification and accreditation schemes or equivalent qualification schemes (incl. if applicable, training programmes) for providers of energy services, energy audits and energy managers.</li> </ul>
Target group	Industrial users, public administration, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Electricity & Water Regulatory Commission (EWRC), Electricity Distribution & Supply Authority (EDSA), Electricity Generation & Transmission Company (EGTC) and UNIDO
Sector	Industry

**9.5.3 Awareness of energy efficiency****Table 39**

No	1
Measure (title)	Establish awareness raising programmes for energy efficiency
Type of measure*	Capacity building

Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Create awareness among SMEs and larger industries and policy makers of the benefits of energy efficiency in the industrial sector;</li> <li>• Raise awareness of sources of financing for industrial energy efficiency and EE project financing (e.g. organize seminars and networking meetings on local sources of financing for industrial energy management and energy optimization projects).</li> </ul>
Target group	Financiers, marketers, investors, banking Institutions, developers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry, Ministry of Finance and Economic Development, Electricity & Water Regulatory Commission
Sector	Energy, Trade & Industry, Finance, Regulators and Private sectors.

#### 9.5.4 Financial/fiscal mechanisms

**Table 40**

No	1
Measure (title)	Develop financial/Fiscal mechanism
Type of measure*	Fund raising and financing mechanism
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 to 2020
Description of the measure	<ul style="list-style-type: none"> <li>• Adapt fiscal mechanisms and energy tariffs to encourage energy savings;</li> <li>• Assist financial institutions and banks in the creation of financial instruments for industrial energy efficiency;</li> <li>• Promote energy service performance contracts (ESPC) through ESCOs: <ul style="list-style-type: none"> <li>○ Legislative or regulatory instruments that facilitate the implementation of energy saving performance contracts</li> </ul> </li> </ul>

	(ESPCs) by Energy Service Companies (ESCOs) can help overcome barriers to carrying out energy efficiency measures and provide risk-management. These instruments normally condition payments on a performance guarantee, thus reducing risk for the entity. One critical element in the implementation of ESPCs is capacity building of public agencies, local financial institutions and ESCOs.
Target group	Financiers, marketers, investors, banking Institutions, developers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry, Ministry of Finance and Economic Development, Electricity & Water Regulatory Commission
Sector	Energy, Trade & Industry, Finance, Regulators and Private sectors.

### 9.6 Cross-cutting measures

Cross-cutting (also called horizontal) measures (e.g. taxes, research and development, general information campaigns) include:

**Table 41**

No	1
Measure (title)	Private investment in energy efficiency
Type of measure*	Energy efficiency policy/tool, capacity building, awareness raising/information or financial/fiscal. Financial and fiscal measures included fiscal incentives, tax exemptions, soft loans, subsidies, rebates, investment deduction schemes
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 -2016
Description of the measure	Establish a level playing field for private sector investment in energy efficiency
Target group	Investors, end users, public administration, planners, architects, installers, equipment manufacturers, retailers, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Finance and Economic Development, Ministry of Works, House & Infrastructure (MoWHI), Environmental Protection Agency (EPA), Ministry of Agriculture, Forestry & Food Security (MoAFFS), Ministry of Lands, Country Planning & Environment (MoLCPE), Ministry of Information & Communication, Ministry of Education, Science & Technology, Ministry of Foreign Affairs, International Cooperation, Non-Government Organisations, Ministry of Health and Sanitation (MoHS), Ministry of Water Resources (MoWR) and Sierra Leone's Chamber of Commerce.
Sector	Energy and Finance

**Table 42**

No	2
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Measure (title)	Monitoring, enforcement and evaluation of energy efficiency activities
Type of measure*	Energy efficiency policy/tool, capacity building, awareness raising/information
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015-2016
Description of the measure	<ul style="list-style-type: none"> <li>• Develop a performance tracking scheme to monitor and evaluate energy efficiency works;</li> <li>• Penalize defaulters of energy efficiency actions.</li> </ul>
Target group	Investors, end users, public administration, planners, architects, installers, equipment manufacturers, retailers, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI), Environmental Protection Agency (EPA), Ministry of Agriculture, Forestry & Food Security (MoAFFS), Ministry of Lands, Country Planning & Environment (MoLCPE), Ministry of Information & Communication, Ministry of Education, Science & Technology, Ministry of Foreign Affairs, International Cooperation, Non-Government Organisations, Ministry of Health and Sanitation (MoHS), Ministry of Water Resources (MoWR) and Ministry of Justice (MoJ)
Sector	Energy

**Table 43**

No	3
Measure (title)	Competitive energy markets with appropriate regulation
Type of measure*	Energy efficiency policy/tool, capacity building, awareness raising/information or financial/fiscal. Financial and fiscal measures included fiscal incentives, tax exemptions, soft loans, subsidies, rebates, investment deduction schemes
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2018
Description of the measure	<ul style="list-style-type: none"> <li>• Develop an energy regulatory commission in the Ministry of Energy;</li> <li>• Develop a high efficiency standard in GoSL procurement to achieve value for money.</li> </ul>
Target group	Investors, end users, public administration, planners, architects, installers, equipment manufacturers, retailers, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI), Environmental Protection Agency (EPA), Ministry of Agriculture, Forestry & Food Security (MoAFFS), Ministry of Lands, Country Planning & Environment (MoLCPE), Ministry of Information & Communication, Ministry of Education, Science & Technology, Ministry of Foreign Affairs, International Cooperation, Non-Government Organisations, Ministry of Health and Sanitation (MoHS), Ministry of Water Resources (MoWR) and National Public Procurement Authority (NPPA)
Sector	Energy

Table 44

No	4
Measure (title)	Data collection and indicators
Type of measure*	Capacity building, awareness raising/information
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2017
Description of the measure	<ul style="list-style-type: none"> <li>• Establish a strong database unit in the Ministry of Energy;</li> <li>• Carry out a yearly data validation exercise nationwide; Develop an inter-departmental link with Statistics Sierra Leone.</li> </ul>
Target group	<i>Investors, end users, public administration, planners, architects, installers, equipment manufacturers, retailers, energy suppliers</i>
Implementing body/parties	Ministry of Energy (MoE), Ministry of Finance and Economic Development (MoFED) Ministry of Trade & Industry (MoTI), Ministry of Works, House & Infrastructure (MoWHI), Environmental Protection Agency (EPA), Ministry of Agriculture, Forestry & Food Security (MoAFFS), Ministry of Lands, Country Planning & Environment (MoLCPE), Ministry of Information & Communication, Ministry of Education, Science & Technology, Ministry of Foreign Affairs, International Cooperation, Non-Government Organisations, Ministry of Health and Sanitation (MoHS), Ministry of Water Resources (MoWR), Ministry of Social Welfare, Gender & Children Affairs (MoSWGCA) and Statistics Sierra Leone (SSL)
Sector	Energy

Table 45

No	5
Measure (title)	Tax incentives
Type of measure	Energy efficiency policy/tool, Financial and fiscal measures included fiscal incentives, tax exemptions, soft loans, subsidies, rebates, investment deduction schemes,
Priority (1 to 5, from <b>highest</b> to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015-2016
Description of the measure	Establish duty free tax exemption and other financial incentives
Target group	Investors, end users, public administration, planners, architects, installers, equipment manufacturers, retailers, energy suppliers
Implementing body/parties	Ministry of Energy (MoE), Ministry of Trade & Industry (MoTI) and Ministry of Finance and Economic Development (MoFED)
Sector	Finance

### 9.7 National public institution

Planned institutional measures to improve energy efficiency in Sierra Leone comprise the following:

**Table 46**

No	1
Measure (title)	Research and Development (R&D)
Type of measure	Capacity building, awareness raising/information
Priority (1 to 5, from highest to lowest)	1
Existing or planned	Planned
Time frame (start year – end year)	2015 – 2017
Description of the measure	<ul style="list-style-type: none"> <li>• Develop R &amp; D institutions for energy efficiency advancement;</li> <li>• Establish new energy efficiency programmes for future researchers.</li> </ul>
Target group	Investors, end users, public administration, planners, architects, installers, equipment manufacturers,
Implementing body/parties	Ministry of Energy (MoE), Ministry of Information & Communication, Ministry of Education, Science & Technology, Non-Government Organisations and the University of Sierra Leone (USL)
Sector	Tertiary institutions

## 10 LINK WITH REGIONAL INITIATIVES

The ECOWAS region has a series of on-going regional policies and initiatives in the field of energy efficiency:

- The ECOWAS Energy Efficiency Policy (EEEP);
- ECOWAS Energy Efficiency Programme (SEEA-WA);
- The West Africa Clean Cooking Alliance (WACCA);
- The ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN);
- The ECOWAS Solar Thermal Programme;
- Specific EE Initiatives:
  - Standards and labelling initiative;
  - Efficient lighting initiative;
  - Energy efficiency in buildings initiative;
  - High performance of distribution of electricity initiative;
  - Safe, sustainable and clean cooking initiative.

A summary of these regional initiatives can be found in Annex I of this plan.

Synergies between these programmes and the proposed measures in this plan will be explored and the country will actively participate in the regional initiatives.

## **11. PREPARATION OF THE NATIONAL ENERGY EFFICIENCY ACTION PLAN**

The Ministry of Energy, together with stakeholders (including MDAs, local, national and development partners), held several pre-meetings and participated at the inception meeting. An energy technical experts group, energy taskforce, MDAs, development partners, civil society, media, academics, chiefs, women groups, industries, the private sector, banking institutions, the Chamber of Commerce etc. participated, during the validation workshop, in the preparation of the National Energy Efficiency Action Plan.

Regional and local authorities were involved in the preparation of the plan through consultations, workshops, meetings and communicating to them by letters and telephones.

## **12. IMPLEMENTATION AND MONITORING OF THE IMPLEMENTATION OF THE NATIONAL EFFICIENCY ENERGY ACTION PLAN**

The Ministry of Energy's Directorate of Energy of the Republic of Sierra Leone is the national authority responsible for the follow-up of the National Energy Efficiency Action Plan. So far, no monitoring framework for energy efficiency measures has been developed. A monitoring system, including indicators for individual measures and instruments, will be developed after approval and validation of the action plan. Regional and/or local energy efficiency strategies, compliance mechanisms and responsible authorities at relevant levels will be discussed with regard to the implementation of the NEEAP.

## **ANNEX I – Definition of Terms Used in the NEEAP**

The terms described here have been organised alphabetically.

**Bagasse:** the fuel obtained from the fibre which remains after juice extraction in sugar processing

**Biomass:** biodegradable fraction of products, waste and residues from biological origin from agriculture (including vegetal and animal substances), forestry and related industries including fisheries and aquaculture, as well as the biodegradable fraction of industrial and municipal waste. The uses of biomass for energy are very diverse: from the traditional, low-efficiency burning of wood in open fires for cooking purposes to the more modern use of wood pellets for the production of power and heat, and the use of biodiesel and bioethanol as a substitute for oil-based products in transport.

**BRT:** Bus Rapid Transit Systems

**Building:** a roofed construction having walls, for which energy is used to condition the indoor climate; a building may refer to the building as a whole or parts thereof that have been designed or altered to be used separately; buildings' definition includes individual houses and multi-family houses, commercial buildings, public buildings.

**Building envelope:** it includes walls, roof, the bottom floor, windows, doors, all the elements that limits the inside and the outside of the building.

**CFL:** Compact Fluorescent Lamp

**Charcoal:** The solid residue from the carbonisation of wood or other vegetal matter through pyrolysis. The amount of biomass (usually fuelwood) necessary to yield a given quantity of charcoal depends mostly on three factors:

- parent wood density – the principal factor in determining the yield of charcoal from fuelwood is parent wood density, since the weight of charcoal can vary by a factor of 2 for equal volumes
- moisture content - moisture content of the wood also has an appreciable effect on yields - the drier the wood, the greater is the yield - ; and
- the means of charcoal production: charcoal is produced in earth-covered pits, in oil drums, in brick or steel kilns and in retorts. The less sophisticated means of production generally involve loss of powdered charcoal (fines), incomplete carbonization of the fuelwood and combustion of part of the charcoal product, resulting in lower yields.

**Traditional non-efficient charcoal production methods:** traditional charcoal production methods include open pits, oil drums and kilns with lower efficiencies. In the ECOWAS, charcoal is mainly produced by traditional methods in the informal sector (e.g. open pits and kilns) which are inefficient (60-80% of the energy in the wood is lost) and has impacts on the health and on the environment.

**Efficient charcoal production:** efficient charcoal is the terminology used on this template for the charcoal produced by modern methods that are more efficient than traditional ones. The modern methods use sealed containers and have higher efficiencies and thus higher yields. Within the EREP, under the targets for domestic cooking, a target for efficient charcoal production is set: 60%/100% of the charcoal production should be by improved carbonisation techniques (yield >25% in 2020 and 2030, respectively). In this template the MS is asked to set out its target and trajectory for efficient charcoal production. This is calculated by dividing the quantity of charcoal produced by improved carbonisation techniques with yield superior to 25% in tonnes by the total charcoal production in tonnes.

**Cogeneration (also known as combined heat and power)** is the simultaneous production of electricity and process heat from a single dynamic plant.

**CRSO:** Collection & Recycling Service Organisations

**Energy efficiency:** It means the ratio of output of performance, service, goods or energy, to input of energy

**Energy performance of a building:** the amount of energy actually consumed or estimated to meet the different needs associated with a standardised use of the building, which may include, inter alia, water heating, cooling, ventilation, use of daylight, shadowing systems and components, as well as electricity consumption for lighting and other uses as computer, domestic appliances, etc. This amount shall be reflected in one or more numeric indicators which have

been calculated, taking into account insulation, technical and installation characteristics, design and positioning in relation to climatic aspects, solar exposure and influence of neighbouring structures, own-energy generation and other factors, including indoor climate, that influence the energy demand;

Energy savings: means an amount of saved energy determined by measuring and/or estimating consumption before and after implementation of an energy efficiency improvement measure, whilst ensuring normalisation for external conditions that affect energy consumption

Energy efficiency: is a multidisciplinary concept which aims to increase energy savings from upstream to downstream in the energy chain. It is energy efficient to reduce energy consumption for the same type of product or service.

Energy service: It means the physical benefit, utility or good derived from a combination of energy with energy-efficient technology or with action, which may include the operations, maintenance and control necessary to deliver the service, which is delivered on the basis of a contract and in normal circumstances has proven to result in verifiable and measurable or estimable energy efficiency improvement or primary energy savings

EEEP: ECOWAS Energy Efficiency Policy

Energy Intensity: energy efficiency means the ratio of energy use to economic output of goods and services. Energy intensity is generally considered to be a good macro-economic indicator of energy efficiency. It can be calculated for an entire nation, or for specific economic sectors. The unit of energy intensity is an energy unit divided by a currency value, for instance:

toe/GDP at year 2005 USD at purchasing power parity.

EREP: ECOWAS Renewable Energy Policy

Primary energy intensity: is the ratio between the Total Primary Energy Supply (TPES) and the Gross Domestic Product (GDP) calculated for a calendar year. The gross inland consumption of energy is calculated as the sum of the gross inland consumption of the different sources of energy. To monitor trends, GDP is in constant prices to avoid the impact of inflation, base year 2005.

EnMS: Energy Management System

Energy saving performance contracts (ESPCs): An energy savings performance contract is an agreement between a building owner and an energy services company (ESCO) for the identification, evaluation, recommendation, design and construction of energy conservation measures, including a design-build contract, that guarantee energy savings or performance.

Energy Service Company (ESCO): The ESCO approach combines a financial service with technical services, thus simplifying energy savings for the user, by:

- choosing energy efficiency measures adapted to the user's needs;
- financing the purchase of necessary equipment;
- installing the equipment;
- in some cases, operating and maintaining the equipment;
- measuring the energy savings achieved, and billing the customer for a part of the savings.

Final Energy Consumption: is the total energy consumed by end users, such as households, industry and agriculture. It is the energy which reaches the final consumer's door and excludes that which is used by the energy sector itself. This includes electricity and fuels (such as oil, gas, coal, woodfuel etc.).

GDP: Gross Domestic Product. To monitor trends, GDP is in constant prices to avoid the impact of inflation, base year 2005.

Gigawatt-hour (GWh): 1,000,000,000 watt-hours.

Import and export: Import and export comprise quantities having crossed international boundaries.

Improved cookstoves (also called clean/efficient cookstoves): is a device that is designed to consume less fuel and save cooking time, convenient in cooking process and creates smokeless environment in the kitchen or reduction in the volume of smoke produced during cooking against the traditional stove; and thus addressing the health and environmental impacts associated with traditional cookstoves. Traditional cookstoves (open fires and rudimentary cookstoves using solid fuels like wood, coal, crop residues and animal dung) are inefficient, unhealthy, and unsafe, and inhaling the acrid smoke and fine particles they emit leads to severe health problems and death. Traditional cookstoves also place pressure on ecosystems and forests and contribute to climate change through emissions of greenhouse gases and black carbon. Within the EREP targets are set for improved cookstoves, as the pressure on the ECOWAS woodland will grow exponentially. Thus the policy includes the banning of inefficient stoves after 2020, enabling 100% of the population of the urban areas to use high efficient wood and charcoal stoves (with efficiencies higher than 35%) from 2020 onwards and 100% of the rural population to use high efficient charcoal stoves from the same date on. In this template the MS is asked to set a target for improved cookstoves measured in terms of the % of the population that uses efficient cookstoves. This is estimated by dividing the number of inhabitants that use improved cookstoves by the total number of inhabitants of the country.

Informal building: Traditional buildings or buildings built without legal authorisation;

Kilowatt (kW): 1,000watts

Kilowatt-hour (kWh): 1,000watt-hours.

ktoe: thousand tonnes of oil equivalent

LED: Light Emitting Diodes

LPG: Liquefied petroleum gas

Major renovation: Renovation affecting the walls, roof and the bottom floor(for example wall insulation), the system (for instance a change of the air conditioning system) but also the addition of a new room with a useful area of more than 12 m<sup>2</sup>.

Megawatt (MW): 1,000,000 watts

Megawatt-hour (MWh): 1,000,000 watt-hours

Modern fuel alternatives (for cooking): known as non-conventional or advanced fuels, these are any materials or substances that can be used as fuels for cooking, other than conventional solid fuels such as coal, fuelwood and charcoal. These alternatives cover Liquefied petroleum gas (LPG), biogas, ethanol, solar power (e.g. solar cookers) and kerosene. In this template improved cookstoves are not considered within the modern fuel alternatives, as they are object of a separate analysis in this template.

MS: (ECOWAS) Member States

Non-technical electrical losses: in electricity distribution consist of theft and non-payment for electricity (including unpaid bills, absence of billing, billing calculation errors and accounting mistakes). Non-Technical losses are caused by actions external to the physical power system.

Purchasing power parities (PPPs): are the rates of currency conversion that equalise the purchasing power of different currencies by eliminating the differences in price levels between countries

REDD+: Reducing Emissions from Deforestation and Forest Degradation (REDD) is an effort to create a financial value for the carbon stored in forests, offering incentives for developing countries to reduce emissions from forested lands and invest in low-carbon paths to sustainable development. "REDD+" goes beyond deforestation and forest degradation, and includes the role of conservation, sustainable management of forests and enhancement of forest carbon stocks.

Solar cookers: or solar oven is a device which uses the energy of direct sun rays (which is the heat from the sun) to heat, cook or pasteurize food or drink.

Solar thermal: use of solar thermal energy to produce heat, for instance for produce hot water, or to provide cooling services;

Technical losses in power system are caused by the physical properties of the components of the power system. The most obvious example is the power

dissipated in transmission lines and transformers due to internal electrical resistance. Technical losses can be divided into transmission losses, occurring in the high voltage part of electricity grids, and distribution losses, occurring between the last power sub-station and the user's meter.

toe: tonnes of oil equivalent

Total Primary Energy Supply (TPES) is made up of: Indigenous production + imports - exports - international marine bunkers - international aviation bunkers +/- stock changes.

UNEP-GEF en.lighten initiative: The United Nations Environment Programme (UNEP)-Global Environment Facility (GEF) en.lighten initiative was established in 2009 to accelerate a global market transformation to environmentally sustainable, energy efficient lighting technologies, as well as to develop strategies to phase-out inefficient incandescent lamps to reduce CO<sub>2</sub> emissions and the release of mercury from fossil fuel combustion. The en.lighten initiative serves as a platform to build synergies among international stakeholders; identify global best practices and share this knowledge and information; create policy and regulatory frameworks; address technical and quality issues; and encourage countries to develop National and/or Regional Efficient Lighting Strategies.

USD: US Dollars

Useful floor area: floor area of dwellings measured inside the outer walls, excluding cellars, non-habitable attics and, in multi-dwelling houses, common areas

VAC system: the equipment, distribution systems and terminals that provide, either collectively or individually the processes of ventilating or air conditioned to a building or a portion of a building

VAT: Value Added Tax

WACCA: West African Clean Cooking Alliance

Watt-hour (Wh): a measure of electric energy equal to the electrical power multiplied by the length of time (hours) the power is applied

## **ANNEX II - REGIONAL INITIATIVES AND ACTIONS IN ENERGY EFFICIENCY**

### **1. ECOWAS ENERGY EFFICIENCY PROGRAMME**

The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) initiated the ECOWAS energy efficiency programme by soliciting financial support from the European Union (EU). The EU sponsored programme is dubbed Supporting Energy Efficiency for Access in West Africa (SEEA-WA). The SEEA-WA project is contributing to access to energy services in West Africa, through a regional programme to improve energy efficiency. The project aims to overcome the technical, financial, legal, institutional, social, gender and capacity related barriers that hinder the implementation of cost effective energy efficiency (EE) measures and systems.

SEEA-WA focuses on the special interests and realities of poor women and men in urban and rural areas. Based within the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE), SEEA-WA seeks to combine improved energy efficiency with ongoing work on renewable energy sources, in order to broaden energy access.

#### **SEEA-WA OBJECTIVES**

The overall objective of SEEA-WA is to improve framework conditions for access to energy services, by supporting the creation of a regional programme on governance, related to energy efficiency and access.

The specific objective is to:

- Aid the Development of policies and regulatory frameworks necessary for the adoption of energy efficiency measures;
- Raise the awareness of policy makers, regarding the commercial actors in the key energy value chains.
- Build capacity at the regional and national level to facilitate implementation of the key energy efficient technologies.
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### **2. SEEA-WA DESCRIPTION**

#### **2.1 Framework conditions:**

SEEA-WA aims to support ECOWAS national authorities in creating a conducive regulatory and business environment to encourage women and men to adopt energy savings. Project team members will aid in choosing among the wide variety of possible policy tools (standards and labelling, regulations, educational tools, fiscal and tariff tools, special purpose EE financial tools, etc.) those that would be applicable and effective in the West African context.

#### **Raising Awareness:**

Many energy efficiency measures pay for themselves, through savings on energy bills. Capturing this potential for savings requires decisions by a myriad of individuals, organisations and businesses. The awareness raising aspect of SEEA-WA will reach out, on the one hand, to the commercial actors of the key energy value chains – the stove builders and charcoal producers, the electric appliance importers and sellers, the power utilities, the home builders – and on the other hand, to the women and men who use energy and make the decisions on purchasing (or producing themselves) the major energy using devices.

- SEEA-WA Project Technical Implementation Strategy: Work with competence Centres in West Africa to build capacity at the regional and national level in the implementation of the key energy efficient technologies.
- Encourage exchange of experience and the flow of information among energy practitioners in West Africa.
- Organise focused training on the areas designated by national authorities, bringing in high level regional and international expertise.

Regional action on energy efficiency will benefit both the minority in West Africa who currently have access to modern energy but are faced with high prices and unreliable services, as well as the majority, for whom gaining access to affordable modern energy depends on reducing costs so as to make access programmes economically viable.

## **2.2. Main Activities:**

- Energy Efficiency stock taking, diagnosis in ECOWAS countries.
- Regional level institutional capacity building, knowledge sharing.
- National level institutional capacity building, knowledge sharing, institutional change.
- Development of ECOWAS EE White Paper.
- Formulating gender-sensitive energy efficiency policies and programmes.

## **2.3. Content and visual identity:**

- Carry out national campaigns focused on key intermediaries.
- Carry out regional and national media campaign focused on general public.
- Regional and national capacity building on technical issues.
- Regional and national financial tools.

## **2.4. SEEA-WA Actions**

### **2.4.1. Actions at the National Level**

- Identification of a national Competence Centre for Energy Efficiency
- Stock taking of the current EE situation in the countries
- Supporting the identification and development of concrete EE actions
- Targeted Capacity Building

#### 2.4.2. Actions at the Regional Level

- Energy Efficiency White Paper
- Development of policy tools (e.g. labels and standards)
- Establishment of a network (Exchange of information, best practice and lessons learned)
- Regional trainings on specific issues

### 3. THE EE POLICY (EEEP) AND TARGETS

The ECOWAS Center for Renewable Energy and Energy Efficiency (ECREEE), under the SEEA-WA project elaborated the ECOWAS Energy Efficiency Policy and set regional targets for energy efficiency measures in ECOWAS Member States. This policy has been adopted by the Heads of Government and authority of the ECOWAS Member States.

The ECOWAS Energy Efficiency Policy seeks to contribute to creating a favourable environment for private investments in energy efficiency, and spurring industrial development and employment through reduction of energy bills. Energy efficiency is considered as an integral part of the modernisation and greening of West African economies. The policy aims to implement measures that free 2000 MW of power generation capacity and in the long term, more than double the annual improvement in energy efficiency, so as to attain levels comparable to those of world leaders. In effect, the amount of energy needed to produce a certain amount of goods and services would decrease by about 4% annually.

The specific targets of the regional energy efficiency policy are:

1. Phase out inefficient incandescent lamps by 2020;
2. Reduce average losses in electricity distribution from the current levels of 15 - 40% to the world standard levels of below 10%, by 2020;
3. Achieve universal access to safe, clean, affordable, efficient and sustainable cooking for the entire population of ECOWAS, by 2030;
4. Adopt region-wide standards and labels for major energy equipment by end of 2014;
5. Develop and adopt region-wide efficiency standards for buildings (e.g. building codes);
6. Create instruments for financing sustainable energy, including carbon finance, by the end of 2013, and in the longer term, establish a regional fund for the development and implementation of sustainable energy projects.

#### 3.1. The policy Answer

- Adoption of the White Paper on Access to Energy in 2006
- Creation of ECREEE in 2007: *ECOWAS Centre for Renewable Energy and Energy Efficiency*
- The SEEA-WA project - financed by the ACP-EU Energy Facility, UNDP, ADEME - supported the development of a regional Energy Efficiency Policy. Approved in 2012 by the region's Heads of State.

### **3.2. The Policy Targets**

A process that was initiated at the first meeting of the Regional Multisector Group (Bamako, May 2005) led to the adoption by ECOWAS-UJEMOA Heads of State (Niamey, January 2006) of a strategy for improved access to energy services: the "White Paper for a Regional Policy For Increasing Access to Energy Services For Populations in Rural and Peri-Urban Areas in Order to Achieve the Millennium Development Goals". The White Paper contains the following ambitious numerical targets for access to modern cooking fuel, to mechanical power for productive activities, and to electricity:

- 100% access to a modern cooking fuel;
- 60% access in rural areas to productive energy services in villages, in particular mechanical power to boost the productivity of economic activities;
- 66% access to an individual electricity supply;
- 60% of the rural population will live in localities with:
  - modernised basic social services - healthcare, drinking water, communications, lighting, etc;
  - access to lighting, audiovisual and telecommunications service, etc.;
  - The coverage of isolated populations with decentralised approaches.

### **4. THE ECOWAS PROGRAMME ON GENDER MAINSTREAMING IN ENERGY ACCESS (ECOW-GEN)**

In 2013, the ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) launched a flagship programme entitled ECOWAS Programme on Gender Mainstreaming in Energy Access (ECOW-GEN). The programme was established against the background that women's potential, in the ECOWAS region, as producers and suppliers of energy services is under-utilized and that empowering women to make significant contributions in the implementation of the adopted regional renewable energy and energy efficiency policies is necessary for the achievement of the Sustainable Energy for All (SE4ALL) goals in West Africa. Moreover, the programme is founded upon the principles of the ECOWAS Gender Policy which emphasizes the "need to develop policies and programmes to provide alternative energy sources which would contribute to women's health and also alleviate their time burden".

To stimulate the development of women-led business initiatives in the energy sector, ECREEE, through the support of the Spanish Agency for International Cooperation and Development (AECID), established the ECOWAS Women's Business Fund. ECREEE will work with Member States to identify and support, through the fund, innovative energy projects implemented by women groups and associations. In addition to this, ECREEE will assist Member States to establish similar funds in their respective

### **5. THE ECOWAS SOLAR THERMAL PROGRAM**

The overall goal of the Solar Thermal Program (SOLTRAIN) in West Africa is to contribute to the switch from a fossil fuel based energy supply to a sustainable energy supply system based on renewable energies in general but based on solar thermal in particular. The overall project will be coordinated by ECREEE and technically implemented by AEE INTEC in cooperation with 8 institutional project partners from 7 West African countries (Cape Verde, Nigeria, Burkina Faso, Ghana, Mali, Senegal, Niger and Sierra Leone).

The ECOWAS solar thermal capacity building and demonstration program therefore aims to remove existing awareness, political, technological, and capacity related barriers which restrict solar thermal energy deployment in ECOWAS countries. The program will also contribute to increase the grid stability and save national power reserves as solar thermal systems will significantly reduce the stress on electric grids due to the shift from electricity to solar energy. The program links precisely to the goals of the regional policies on Renewable energy and energy Efficiency adopted by the ECOWAS Authority of Heads of State and Government in 2013. The regional policies considered solar thermal as a least cost sustainable energy technology and set specific targets for its use to meet sanitary and industrial hot water needs in the region.

The goals of SOLtrain West Africa are:

- Capacity Building by theoretical and practical Train-the-trainer courses to selected universities and polytechnic schools in the area of solar water heating and solar thermal drying
- Identify, monitor, analyze and improve existing solar thermal systems together with the partner institutions (practical training).
- Technical support of local producers.
- Design and Install solar thermal systems on the partner institutions for teaching and demonstration purposes.
- The partner institutions will offer trainings to national companies, installers, producers and further training institutions within their countries.
- Installation of 200 Demonstration systems at social institutions as schools and hospitals engineered by the partner institutions and installed by national practitioners
- Trainings to administrative, political and financial stakeholders in each country
- Solar thermal testing facility in one of the countries

The program will run from 2015 until 2018 and will strengthen the capacity of national actors and of existing partner institutions dealing with solar thermal energy such as polytechnic schools and universities in all 15 ECOWAS Member States.

## **6. PROSPECTS FOR THE FUTURE**

To be able to achieve these policy targets, specific initiatives have been put in place in order to define the future prospects and the way forward for EE in the region. The step-by-step implementation of these initiatives is described below.

### **6.1. Specific EE initiatives**

The policy elaborates specific programmes that have been earmarked to achieve the ECOWAS EE. These programmes are classed into (6) priority initiatives namely:

- Standards and labeling
- Efficient Lighting,
- High performance of Distribution of Electricity,
- Energy Efficiency in Buildings,
- Safe, Sustainable and Clean Cooking,
- Financing Sustainable Energy.

## 7. STANDARDS AND LABELING

The main components of the ECOWAS energy efficiency Standards and Labeling initiative are as follows:

- Regional cooperation on the development and implementation of ECOWAS regional standards and labels for energy using equipment (lighting, refrigerators, air conditioners, motors, cooking etc.) and coordination with international standards development, for example with clean cookstoves;
- Regional cooperation on the development and implementation of legislative, regulatory and other energy efficiency policies and tools such as product efficiency rating systems, the definition of multiple tiers of product performance and standardized testing and certification of equipment to verify performance and accuracy of labelling;
- Awareness raising for national authorities, manufacturers and the general public
- Capacity building of main stakeholders and training and qualification of staff
- Development and implementation of financial instruments to support the implementation of ECOWAS standards and labels. This refers both to securing funding for development and implementation of the S&L initiative and to the introduction of financial incentives to promote the adoption of efficient energy using equipment by end-users.

### 7.1. Key Actions on standards and labeling at regional and national levels

The main activities to be conducted in the framework of the ECOWAS energy efficiency standards and labelling initiative are listed as preparatory phase, design and development phase and implementation phase. This document will detail the implementation phase actions to enhance development of the various National Energy Efficiency Action Plans.

**(\*\* See Sub-Annex 1a for standards and labeling implementation phase actions \*\*)**

## 8. EFFICIENT LIGHTING

To ensure effective and self-sustaining transition to efficient lighting in all ECOWAS countries, a cohesive set of national and regional actions regarding on-grid and off-grid lighting have been designed for implementation in these countries. These actions cover the four parts of the integrated policy approach:

- Minimum Energy Performance Standards (MEPS);
- Supporting Policies and Mechanisms (SPM);
- Monitoring, Verification and Enforcement (MVE); and
- Environmentally Sound Management (ESM).

The scope and depth of these actions will vary from country to country depending on whether the country has: i) many or intensive MEPS/SPM/MVE/ESM activities underway or planned; or ii) some MEPS/SPM/MVE/ESM activities underway or planned; or iii) no MEPS/SPM/MVE/ESM activities.

In order to meet the objectives of this Strategy, it is intended that energy efficiency interventions will be implemented through a phased approach. The timing of the three Phases is as follows:

- Phase 1: July 2014 to December 2015;
- Phase 2: January 2016 to December 2016;
- Phase 3: January 2017 to December 2020

The key activities under the four thematic areas of the Strategy are summarized as follows:

### 8.1 Minimum Energy Performance Standards – Key Activities

- Conduct national consultations with policy makers and other stakeholders on the Harmonised MEPS of on-grid and off-grid efficient lamps
- Pursue the process of the ECOWAS Standards Harmonisation Model (ECOSHAM) to adopt and publish ECOWAS Harmonised MEPS of on-grid and off-grid efficient lamps
- Adopt ECOWAS Harmonised MEPS of on-grid and off-grid efficient lamps (by each ECOWAS Member Country) and publish in national official journal.

Through stakeholder consultations, the Thematic Working Group on Minimum Energy Performance Standards developed Minimum Energy Performance Standards for Mains-Voltage General Lighting Service Lamps and Minimum Energy Performance Standard for Off-Grid Lighting Products. The key requirements under the Minimum Energy Performance Standards for Mains-Voltage General Lighting Service Lamps include:

Lamp Efficacy – lamps must have a minimal efficacy, measured in lumens per watt (lm/W) of the following:

Table 47

Rated Lamp Wattage LP (W)	Minimum Efficacy (lm/W)
LP < 5	40
5 ≤ LP < 9	45
9 ≤ LP < 15	50
15 ≤ LP < 25	55
LP ≥ 25	60

- Lamp Lifetime – lamps shall have a rated lamp lifetime of 6000 hours or more, as measured according to the appropriate IEC test standard.
- Power Fluctuation Tolerance – lamps shall be able to operate within a voltage range of 160-260V.
- Power Factor – lamps shall have a power factor that is no less than the values shown

Table 48

Rated Lamp Wattage	Minimum Power Factor
<25W	≥ 0,50
≥25W	≥ 0,90

- Light Quality – lamps shall achieve a colour rendering index (Ra) of 0.80 or higher.
- Lamp Mercury Content – lamps shall contain no more than 2.5 mg of mercury.

The key requirements under the Minimum Energy Performance Standard for Off-Grid Lighting Products include:

- **Lumen Maintenance** –the light output of the product shall be ≥ 85% of specified light output at 2,000 hours AND ≥ 95% of specified light output at 1,000 hours(depreciated at highest setting) (draft)
- **Durability and Quality** – the off-grid lighting product must comply with the following quality standards:
- **Charger** – any included AC-DC charger must carry approval from an accredited consumer electronics safety regulator.
- **Battery** – must be protected by an appropriate charge controller that prolongs battery life and protects the safety of the user. No battery may contain cadmium or mercury at levels greater than trace amounts.
- **Water Protection**
  - Portable Separate Systems: IP x1
  - Portable Integrated System: IP x3
  - Fixed (outdoors) Integrated System – permanent outdoor exposure: IP x3
  - All PV Modules - permanent outdoor exposure: IP x3 AND circuit protection
- **Brightness** – At least one lighting level, which defines the “specified light output” in subsequent testing, must meet one of the following criteria:
- Light Output must be greater than 25 lumens or greater than 50 lux over an area of 0.1 m2 under test conditions described in IEC TS 62257-9-5.

## 8.2 Supporting Policies and Measures – Key Activities

- Inform consumers, policy makers and other stakeholders of the advantages of efficient lighting products over the traditional lighting products – on radio, television, at public fora organized in various public places such as lorry stations, sponsored events at community centres, under the sponsorship of the traditional leaders (chiefs, elders and opinion leaders)
- Distribute free on-grid and off-grid efficient lighting products or at subsidised cost to carefully selected communities (with retrieval and destruction of replaced incandescent lamps)
- Implement of social housing projects fully equipped with efficient lighting
- Implement financing schemes to cover the upfront cost of efficient lighting products (e.g., on-bill financing)
- Implement harmonised mandatory labelling and certification for on-grid and off-grid efficient lamps in all ECOWAS countries

### **8.3. Monitoring, Verification and Enforcement – Key Activities**

- Establish National Registries for on-grid and off-grid lighting products
- Monitor efficient on-grid and off-grid lighting products at ports and markets of ECOWAS countries
- Establish a Regional Test Laboratory for on-grid and off-grid efficient lighting; ensure this laboratory has international accreditation
- Establish National Test Laboratories for on-grid and off-grid efficient lighting or strengthen selected existing national laboratories; ensure this laboratory has international accreditation
- Make importers, wholesalers and distributors of efficient lamps and their customers aware of penalties for non-compliance of standards and labelling requirements

### **8.4. Environmentally Sound Management – Key Activities**

- Create public awareness of the environmentally sound disposal of on-grid and off-grid efficient lamps and batteries
- Develop and adopt national regulation for environmentally sound disposal of spent on-grid and off-grid efficient lamps and batteries
- Develop and implement national collection systems established for spent on-grid and off-grid efficient lamps and batteries
- Develop and establish commercially viable recycling and disposal facility for spent on-grid and off-grid efficient lamps and batteries

## **9. ENERGY EFFICIENCY IN BUILDINGS**

The Energy Efficiency in buildings has a policy and regulation prepared on the ECOWAS Directive on Energy Efficiency in buildings and submitted at the ECOWAS Energy Ministers meeting for approval.

### **9.1. General Activities of national interest**

Other activities that could be incorporated into different national actions include:

- Identifying and analysing the real energy data consumption of buildings in ECOWAS countries in order to propose reference values on energy consumption, and also prepare regional standards and labelling for energy performance of buildings;
- Specifying the contents of existing building codes and legislations on energy efficiency in buildings in the 15 ECOWAS;
- Individual countries to revise or develop building codes and legislations on energy efficiency in buildings in order to transpose the regional directive into National building codes;
- Carrying out pilot projects of energy performance construction in countries (for example construction of bioclimatic schools showing experiences and local materials)

### **9.2. National training programmes on EE in Buildings**

- Train the trainer on thermal calculations tools and energy performance of buildings.
- Train the trainer for best building /construction practice and for energy audits in buildings

## **10. HIGH PERFORMANCE OF DISTRIBUTION OF ELECTRICITY**

Electricity distribution systems are by nature local. It is however worth noting that, in some countries, cross border distribution can be advantageous. This means that the solutions adopted must be implemented by a local distribution company with the aid and cooperation of national authorities and international partners. While the actions to be carried out are local, WAPP and ECREEE can provide regional support to facilitate national action. The "Alliance for High Performance Distribution of Electricity" which brings together the activities of ECREEE and WAPP aims to provide this support through the following actions:

- Facilitating sharing of experience and best practices among West African distribution companies.
- Carrying out regional capacity building programmes.
- Facilitating the sharing of human and technical resources among West African distribution companies.
- Creating a data base, through cooperation between WAPP and the ECREEE Energy Observatory, on the state of the electricity sector in the ECOWAS countries, including production, losses, tariffs, etc.
- Creating awareness among national political leaders on the issues, opportunities and obstacles to improving power distribution, through high level political events at the regional level.
- Creating a large West African market in high performance distribution equipment, so as to lower costs, through regional standards for equipment.
- Fostering regional production of high performance distribution equipment, to feed a regional market.
- Supporting the creation of a West African research network for power distribution, adapted to West African conditions.
- Facilitating financing of national upgrading programmes, through regional meetings with development and finance partners.

## **11. SAFE, SUSTAINABLE AND CLEAN COOKING**

### **11.1 Policy and regulatory framework**

The policy and regulatory framework on clean cooking calls for the development and adoption of national cooking policies, strategies and targets, including legal and regulatory mechanisms in line with the existing ECOWAS regional policies and the SE4ALL initiative. It aims to reach market transformation towards modern and alternative fuels and efficient devices to reduce health and environmental impacts of traditional fuel use on the people.

### **11.2 Regional initiatives to support national actions**

The regional initiatives target the development of a national action plans for clean, safe, efficient and affordable cooking energy solutions including an assessment of the current situation (framework conditions/barriers, cooking habits, market for clean cook stoves, producers etc.), as well as targets and strategies to reach these targets.

A national action plan could be developed around the following intervention logic:

- Enhancing demand
- Strengthening supply
- Fostering an enabling environment
- Support the promotion of market-based solutions (including the private sector, NGOs, community-based organisations and microfinance organizations) and the enhancement of market mechanisms.
- Support the build-up of participatory, integrated institutional approaches, where communities play a key role. Community-based strategies can be helpful along the whole value chain from community-managed forests through modern supply channels and more efficient end-user equipment

### **11.3. Possible measures to develop LPG programmes include, among others:**

- Modernizing regulatory frameworks
- Formally adopting of international quality and safety standards
- Improving roads and port infrastructure and reducing port congestion
- Communicating information widely to the public in nontechnical language, specifically, address perception of high risk of LPG use for cooking in households
- Facilitating operator training
- Monitoring to discourage commercial malpractice as well as raise public awareness
- Offer incentives to encourage private LPG retail/service companies to build up distribution network and retail outlets
- Developing financial schemes such that LPG marketers can offer micro-finance schemes, and can lower barriers to LPG selection by making it easier to finance cylinder deposit fees and stove purchases

The specific objectives of the safe and sustainable cooking initiatives include:

#### **a) Creating a self-sustaining entrepreneurial network of rural micro-enterprises for delivery of improved biomass fuels. Measures to achieve this objective could be, among others:**

- Conducting training courses for new entrepreneurs wherever required
- Conducting refresher courses for successful entrepreneurs

#### **b) Promotion and marketing activities, e.g. village level awareness camps and programmes organised to create marketing opportunities for the new enterprises**

- Ensuring quality of the products through continuous monitoring and evaluation
- Encouraging local banks and financing institutes to support the new businesses

#### **c) Establishing the use of improved biomass fuels as a common practice for rural households by:**

- Strengthening and expanding PSFM in production forest areas: support the development of strategic partnerships and collaborative arrangements with national institutions and Non-Profit Associations, regional and international agencies.
- Ensuring community engagement in PSFM and village livelihood development
- Pilot forest landscape management: develop methodologies and frameworks for forest landscape management
- Enabling a legal and regulatory environment (especially forest law) For example:
- Assessment of national REDD+ potential
- Development of a REDD+ Strategy, including assessments such as: forest conservation and use, agriculture, energy, livelihoods, rural economy, biodiversity & ecosystem services, development issues etc.
- Development of criteria & guidelines for the development of REDD+ pilot projects
- Undertake assessment of environmental and social issues and risks: identify major potential synergies or inconsistencies of country sector strategies in the forest, agriculture, transport, or other sectors with the envisioned REDD+ strategy

**d) Establish a monitoring system for the fuel wood value chain in order to prevent uncontrolled deforestation and guarantee sustainable forest management.**

Examples:

- Involve women in the conceptualization, development and implementation of energy policies, projects and programmes as much as possible
- Produce promotional messages to address the gender issue and attempt to form partnerships with women's groups (or NGOs in the area)
- Develop programmes to train young women to produce, operate and maintain equipment on their own
- Develop and implement gender-responsive national policies and programmes on clean and efficient cooking
- Economic empowerment of women through their increased involvement in the cooking energy value chains
- Capacity building of policy makers and practitioners to integrate gender in their cooking energy policies and programmes
- Integration of gender indicators in all baseline studies
- Conduct gender analysis of business models to evaluate economic implications for women in the value chain as well as social benefits and barriers for women related to different production modes
- Development of practical guidelines for mapping gender in the cooking energy value chains
- Gender integration in marketing and awareness raising messages at regional level to ensure that women and men are targeted and to ensure the content is gender sensitive

## **12. THE WEST AFRICAN CLEAN COOKING ALLIANCE-WACCA**

The ECOWAS Centre for Renewable Energy and Energy Efficiency (ECREEE) initiated a regional Cooking Energy initiative called West African Clean Cooking Alliance (WACCA). It was officially launched during the ECOWAS High Level Energy Meeting in Accra, Ghana, on 30 October 2012. The overall objective of the initiative is to provide access to clean, safe, efficient and affordable cooking energy in the entire ECOWAS region. The principal goal of the initiative is to improve living conditions (economic, social and health) of the population of ECOWAS countries through an increased access to cleaner and more efficient

cooking fuels and devices, sustainable biomass and modern fuels, while reducing local (deforestation) and global (greenhouse gases emissions) environmental impacts. The WACCA objectives are in line with the overall objective of ECREEE to promote energy access, renewable energy and energy efficiency within the ECOWAS region and thus by 2020, 60% of the population and by 2030, the entire ECOWAS population shall have access to clean, safe, efficient and affordable cooking energy.

At regional level, WACCA is set to build upon existing interventions on the various fuels and technologies, accumulate and share knowledge on the available existing technologies and technical approaches. WACCA will facilitate the adoption of standards for cooking technologies in accordance with international agreements as developed under the Global Alliance for Clean Cookstoves (GACC) and through that, enhance and complement activities implemented in the framework of the ECOWAS Regional Programme on Sustainable Energy for All (SE4ALL) through the use of Renewable Energy (promotion of alternatives of Fuelwood) and Energy Efficiency (ECOWAS Initiative on Standards and Labeling). The capacities for research and policy development on guidelines for the value chain of cooking fuels (wood, charcoal, LPG, bio-ethanol, etc.) will be strengthened and a consistent system for monitoring and evaluation in accordance with other monitoring and evaluation systems will be developed at regional level.

At national level, WACCA will assist in mapping the existing initiatives on fuel and cooking equipment and updating national strategies for cooking energy. Through the evaluation of solutions and bottlenecks, the initiative will enable the development of approaches for the local production of equipment and fuels and market development for technologies and fuels. Key elements of the initiative will be development of clean cooking strategies, capacity development, and implementation of awareness campaigns and establishment of financing mechanisms.

Agencies and organisations working together with ECREEE include:

- ETC-Energia,
- Global Alliance for Clean Cookstoves (GACC)
- Austrian Energy Agency (AEA)
- GERES,
- GIZ and
- ICEED

### Sub-Annex 1a: Standards and labeling Implementation phase actions

Table 46

Step	Description	Priority	Resource Needs
1	<b>Implementation of core activities</b>		
1.1	<p>Conduct training and informational workshops to educate and build capacity among stakeholders.</p> <p>For instance:</p> <ul style="list-style-type: none"> <li>- <i>Training workshops to build capacity on standards and labelling in the national standards bodies and energy authorities</i></li> <li>- <i>Training workshops in certification procedures, compliance monitoring, and enforcement programs.</i></li> <li>- <i>Training of importers, retailers and other relevant stakeholders such that they actively support the initiative.</i></li> </ul>	H	H

1.2	Initiate the Institutional Development Plan.	H	H
1.3	Initiate the Monitoring, Verification, and Enforcement Plan.	H	M
1.4	Initiate the Monitoring & Evaluation Plan	H	M
1.5	Initiate the Communications Plan and launch awareness campaigns	H	H
<b>2.0</b>	<b>Product Policy Implementation</b>		
2.1	Assess international product definitions, test protocols, rating schemes, performance level definitions, certification procedures, technical analyses, and data sources for use as a baseline in development of S&L policy for the selected product category	H	L
2.2	Collect additional market data and baseline usage and performance data for the selected product category, as necessary to inform a decision on efficiency performance levels, for instance through field surveys (e.g. end-use metering studies) and laboratory testing	H	H
2.3	Development of minimum energy performance standards (MEPS) for selected products on the basis of market analysis and international benchmarking	H	M
2.4	Organise a series of in-person stakeholder meetings for the selected product category to discuss proposed efficiency requirements, collect feedback, and encourage institutional buy-in.	H	L
2.5	Adopt or develop a test method for evaluating energy performance of the selected product. Take steps to harmonise with international test methods, to the extent that such standards are available, applicable for use in the region, and can help to expedite the policy development process	H	L
2.6	Finalize requirements for certification and regional recognition of qualified products	H	L
<b>3.0</b>	<b>Implementation of complementary activities</b>		
3.1	Development of supporting government activities to increase the effectiveness of energy efficiency standards and labels, such as government promotion of the programme, inclusion into government procurement policy and publication of lists of current models on the market	M	L
<b>4.0</b>	<b>Financing of implementation of the S&amp;L initiative</b>		
4.1	Explore options for technical assistance and develop proposals for potential donors in order to secure funding for implementation of the S&L	H	L

Notes: H=High, M=Medium, L=Low