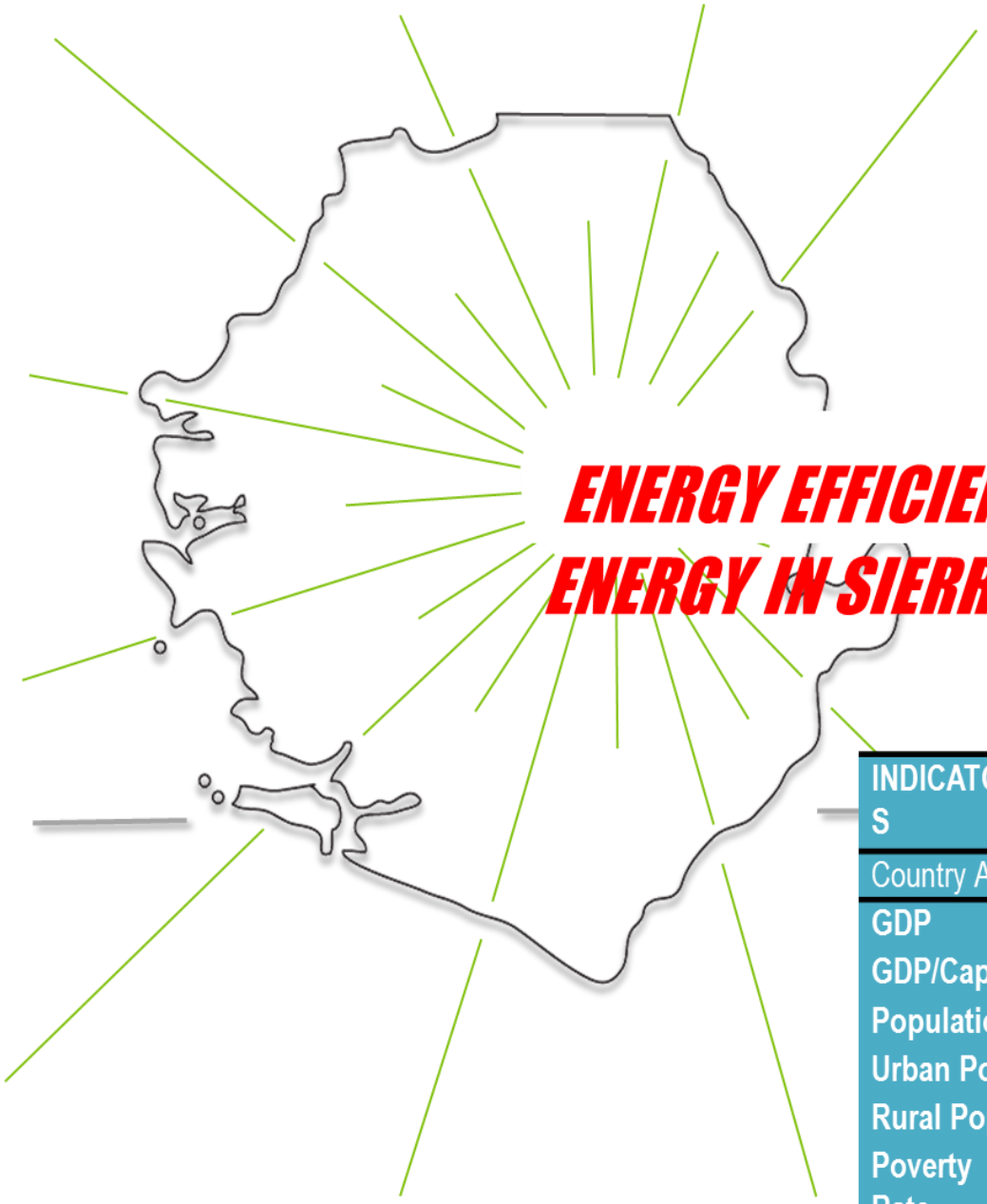


ENERGY EFFICIENCY AND SUSTAINABLE ENERGY IN SIERR LEONE

INDICATORS	Sierra Leone: Year 2013
Country Area	72,325 Sq. Km
GDP	3.13 billion USD
GDP/Capita	513 (constant 2005 USD)
Population	6190280 est.
Urban Pop.	2590952 est.
Rural Pop.	3599328 est.
Poverty Rate	70% est.

Introduction: Energy Sector in SIERRA LEONE

- Energy consumption in Sierra Leone is dominated by biomass, which accounts for over 83% of energy used. The largest source of biomass energy is wood fuel followed by charcoal. Imported Petroleum Products are the next largest source of power at approximately 15.8%. Grid-generated electricity accounts for the remainder of the power supplied to the country's citizens. Wood fuel is the traditional form of energy and is used almost exclusively by households for cooking and craft activities. Petroleum, on the other hand, is the most important source of energy for the modern productive Energy Sector (including transportation and private electricity generation)

Introduction: Energy Sector in SIERRA LEONE

1. Currently, the Electricity sub-sector in Sierra Leone faces challenges with less than 13% access. Efficiency and access are constrained by high technical losses on the T&D Network, which are further compounded by low voltage quality due to overburdening of infrastructure by illicit users. The stock of energy efficient appliances and equipment also remains low. Further, the development and use of Renewable Energy from Hydro, Solar, Biomass and other facilities has been a slow process.

Introduction: Energy Sector in SIERRA LEONE

- Nevertheless, Sierra Leone has great potential in energy resources and opportunities for the productive use of energy and development of energy facilities. Some of these opportunities include: the presence of strong political will, a stable political and security situation, a tropical climate conducive for solar, high levels of rainfall for hydro, the development of the West Africa Power Pool (WAPP), a large landscape of green vegetation for biomass, good working relationships between government and development partners and a good environment of doing business

Introduction: Energy Sector in SIERRA LEONE

- The level of energy consumption in the country has grown substantially between 2006 and 2013 from 1,349 ktoe to 3,926.8 ktoe respectively (MoE, MAFFS, PU, EUEI-PDF 2013, consultant survey, 2014). Nevertheless, there remains a huge gap of suppressed demand for energy especially in the electricity sub-sector

Introduction: Energy Sector in SIERRA LEONE

- The energy supply consists of electricity, petroleum products and renewable energy, including hydropower. In these sub-sectors, the focus is on increasing the supply of modern energy supplies for Sierra Leone. Table 1 shows the total primary energy supply and Table 3 represents the Energy supply in Sierra Leone.
- Table 2: Total primary energy supply
- YearTotal Primary Energy Supply (GWh) Total Primary Energy Supply (ktoe)
- 2013 47123 3926.8
- 2012 43718 3643
- 2011 17580 1464.9
- 2010 (base year) 17479 1456.5

ENERGY SUPPLY 2013-2013

Year	Total Primary Energy Supply (GWh)	Total Primary Energy Supply (ktoe)
2013	47123	3926.8
2012	43718	3643
2011	17580	1464.9
2010 (base year)	17479	1456.5

Year	Biomass Consumption (000 toe)	Petroleum Products Consumption (000 toe)	Electricity (Grid Connected) Consumption (000 toe)	Final Energy Consumption (000 toe)
2007	1,175	166.0	3.1	1,344.2
2008	1,197	192.4	12.8	1,402.2
2009	1,218	164.5	12.3	1,394.8
2010	1,241	199.3	16.2	1,456.5
2011	1,262	187.8	16.1	1,464.9
2012	3393.8	232.5	16.8	3643
2013	3622	289.9	14.9	3926.8

Type of power plant	Installed Capacity in MW	Number of Plants	State Owned, Private, Mixed	Grid Connected or Decentralized Plant
Thermal Oil Plant	37	7	State Owned	Grid Connected
Large Hydropower plants (>10MW)	50	2	State Owned	Grid Connected
Small Hydropower Plants (< 10MW)	6.75	4	State Owned	Grid Connected
Auto-Generators (135MW) plus two years import (39MW)	135+39 = 174	33,000	Private	Isolated
Mining Company Gen.	88.5	Unknown	Private	Isolated
Photovoltaic	2.025	Unknown	Mixed	Isolated
TOTAL MW	358.3			

SOURCE :MOE/EGTC/EDSA/SPU/ NRA (2014)

POPULATION	2006	2007	2008	2009	2010	2011	2012	2013
Freetown	38,362	47,281	53,126	64,306	67,422	73,551	86,200	93,755
BO-Kenema	8,762	9,078	9,455	10,180	11,302	12,593	17,553	24,331
Makeni	305	430	521	596	602	1,040	3, 490	9,104
Lungi	-	-	-	-	-	-	-	1,758
Kono	-	-	-	-	-	-	-	377
Total Customer	47,429	56,789	63,102	75,082	79,326	87,184	107,243	129,325
Population with Grid connection	284,574	340,734	378,612	450,492	475,956	523,104	643,458	775,950
Population without Grid connection	4,937,426	5,009,266	5,106,388	5,173,508	5,294,644	5,478,896	5,394,202	5,414,330
Urban	1,982,418	2,03041 6	2,079,941	2,131,013	2,183,784	2,238,230	2,294,311	2,414,209
Rural	3,234,472	3,31278 4	3,393,589	3,476,917	3,563,016	3,651,850	3,743,349	3,776,071
Access to Electricity %	5.5	6.4	7.4	8.7	8.2	8.7~9	10.7	12.5

Energy Efficiency

- The potential for energy efficiency improvements in Sierra Leone is great. Primary energy consumption per capita stands at 0.295 toe in 2013. There is considerable room for improvement in the various energy sub sectors. Energy constitutes a large proportion of the country's GDP costs, and a considerable percentage of household energy expenditure. Pursuing Energy Efficiency (EE) measures will contribute significantly to savings. Fuel substitution could also reduce the negative impact of the use of some fuels on the environment and reduce the cost of energy services.
- In the demand sub-sectors, the need for increasing access, promoting the use of more efficient and cleaner energy sources

ENERGY EFF

- and equipment, as well as of widely available renewable energy resources cannot be over-emphasized. For the household sector, Government has placed emphasis on the promotion of LPG as a cooking fuel as well as wider dissemination of fuel-saving stoves, and the adoption of renewable technologies. For agriculture and fisheries, the need for the provision of energy sources including renewable energy sources to stimulate mechanization should be addressed. In the commercial sub-sector, focus is on more efficient energy devices for communal cooking and heating and for lighting.

ENERGY EFF

- Low efficiencies mean unnecessary waste that cannot be afforded in a country in which energy supplies are well below the suppressed demand.
- The energy efficiency policy and action plan formulated in 2014 addresses the policy and implementing measures for efficient lighting, solar cookers, efficient buildings, energy labelling of products/buildings, transport and improved cookstoves.

Challenges to Energy EFF.

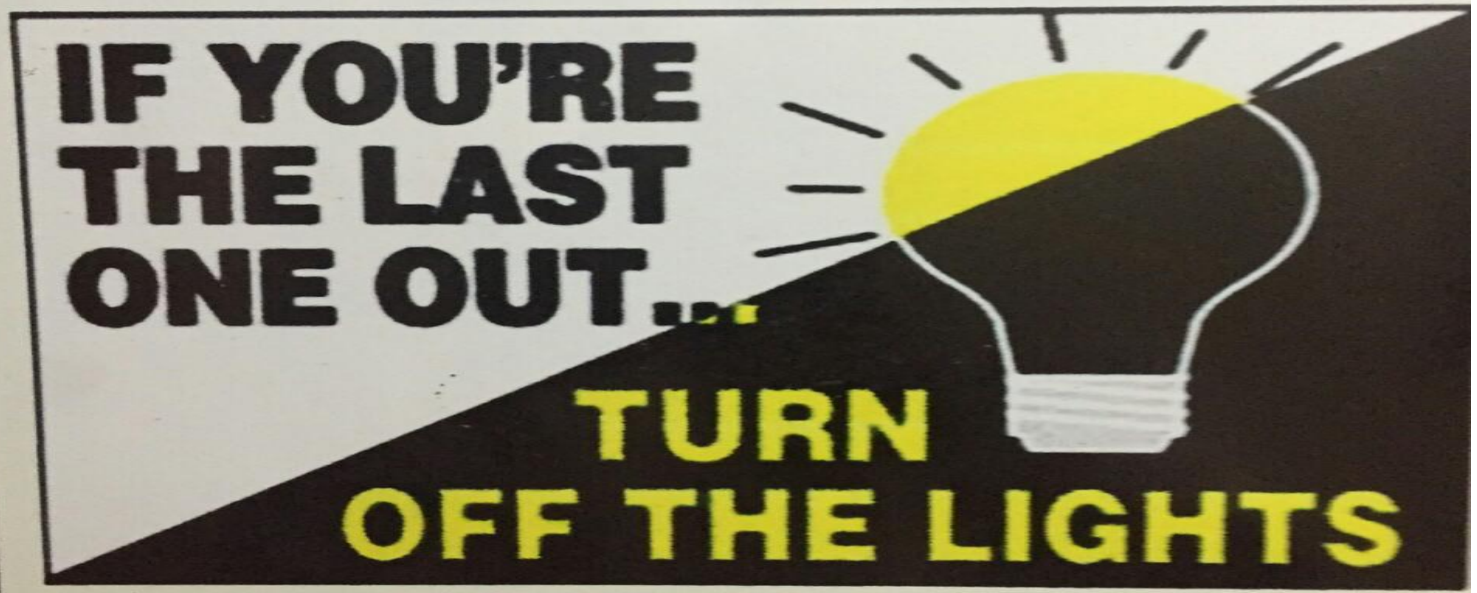
- OLD NETWORK
- SUBSTANDARD MATERIALS USED FOR ELECTRICAL CONNECTIONS
- OVER BURDEN TRANSFORMERS
- OLD ELECTRICAL EQUIPMENTS
- HIGH VOLTAGE RATING APPLIANCES
- ENERGY CONSEVATION HABITS NOT INCULCATED

ON GOING PROJECTS/INTERVENTIONS

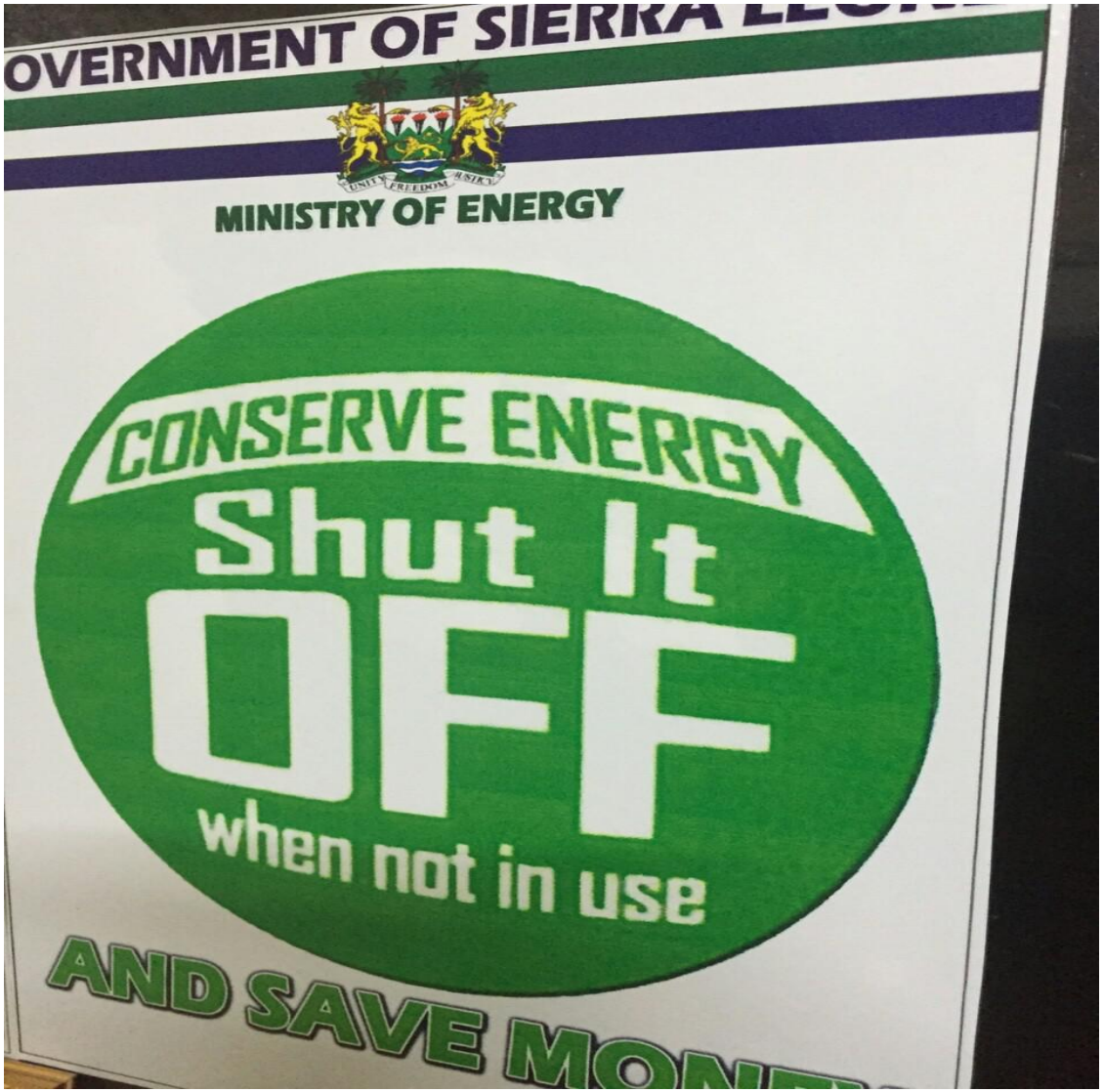
- DEVELOPMENT OF THE RENEWABLE ENERGY AND ENERGY EFFICIENCY, SE4A ACTION PLANS AND POLICIES
- Energy efficiency and energy conservation education drive
- ESTABLISHMENT AND MANAGEMENT OF THE Barefoot Women SOLAR COLLEGE (This college is solely managed and run by illiterate women being sponsored by the Govt. through the MoE : installed 7,000 solar home systems in rural communities).
- Installed 8,800 street lights installed in all the cities and provincial head quarter towns. The Ministry will hand these over to the cities and Local councils.
- Engaging other stake holders ie Trade and Finance on enforcing the policy issues that borders on standards, importation of energy efficient appliances.

GOVERNMENT OF SIERRA LEONE

MINISTRY OF ENERGY



CONSERVE ENERGY


OVERNMENT OF SIERRA
UNITY FREEDOM JUSTICE
MINISTRY OF ENERGY
CONSERVE ENERGY
Shut It
OFF
when not in use
AND SAVE

ON-GOING PROJECTS/ INTERVENTIONS

- DEVELOPMENT OF BUMBUNA 2 HYDRO =220MW
- SMALL HYDRO POWER INTERVENTIONS:
- CHARLOTTE POWER (2MW),
- BANKASOKA (2MW)
- MAKALIE(0.13MW) :4MW
- MOYAMBA HYDRO: 10MW
- PICO HYBRID OF 2MW OF ENERGY (SOLAR AND HYDRO) –RIVER NO.2
- INSTALLATION PRESSED PROJECT- SOLAR INTERVENTIONS FUNDED BY EU THROUGH WHH : ENERGY ACCESS TO BE FIVE GROWING TOWNS IN THE RURAL AREAS.
- Development of solar Energy interventions: 11 MW:
- INSTALLATION OF SOLAR STREET LIGHTS (8,800)
- 50,000 SOLAR STREETS LIGHT TO BE INSTALLED COUNTRY WIDE

ON-GOING PROJECTS/ INTERVENTIONS

- 50,000 solar streets light to be deployed in 149 chiefdom, country wide.
- Granting of duty waiver on Renewable Energy equipment and appliances by the government of Sierra Leone.
- Rehabilitation and Reinforcement of the T&D Net work of Freetown
- Upgrade of the Primary Network in the Eastern part of Freetown
- Protection of the Network Countrywide.

WHAT NEEDS TO BE DONE

- Energy Efficiency
- The following measures were outlined in the Government of Sierra Leone National Policy Document of 2009.
- • (a) Reduce energy losses through up-grading of power transmission and distribution systems
- • (b) Promote the use of energy efficient equipment and technologies;
- • (c) Encourage the use of equipment for power factor correction in industries and homes;
- • (d) Promote the development and introduction of improved fuel-saving kerosene, charcoal and wood stoves;
- • (e) ongoing awareness campaign to sensitize consumers of the importance of energy efficiency and its relationship to productive use and economy of scale of investment.
- • (f) Promote capacity building on energy auditing and efficiency analysis.
- • (g) Introduce an Energy Efficiency and Conservation Act that would spell out mandatory energy management practices, building codes, requirements on energy efficiency levels of energy consuming equipment, energy audit regimes for formal industries and commercial entities

SUSTAINABILITY

- SUSTAINABILITY: AVAILABILITY + AFFORDABILITY + RELIABILITY + PREDICTABILITY
- Sustaining the current Energy production means:
- Massive investment in the network and Generating Plants *AND ENERGY MIX*: there are a few interventions in this: JICA/WAPP/WB/AfDB/EU/ the Govt. of China etc

OVERVEIW OF SUSTAINABILITY ISSUES

- REDUCTION OF COMMERCIAL AND TECHNICAL LOSSES
- INCREASE ACCESS WITH QUALITY POWER SUPPLY
- ENERGY MIX TO REDUCE OVER REALIANCE ON HEAVY FUELS, REDUCE OVERHEADS IN GENERATION OF POWER = REDUCED TARIFF = INCREASES ACCESSIBILITY

WHAT ARE WE DOING???????

- INTERVENTIONS IN BOTH THE GENERATION AND T&D TO BRING THEM UP TO ACCEPTABLE OPERATING STANDARDS
- OVERHAULING OF THE UTILITY BY UNBUNDLING THE SECTOR INTO GENERATION AND T&D FOR EFFICIENCY (JAN. 2015)
- DEVELOP THE ENERGY STRAGEY 2018 WHERE BY WE WANT TO INCREASE POWER GENERATION TO 1000MW

WHAT ARE WE DOING????

- CURRENTLY WORKING ON THE CEC PROJECT 128MW; AWAITING PRG FROM WB
- THE WAPP LINE CLSG PROJECT 23MW
- THE RURAL ELECTRIFICATION PROJECT: 16MW
- DEVELOPMENT OF BUMBUNA 2 HYDRO =220MW
- CHARLOTTE (2MW),BANKASOKA (2MW) AND MAKALIE(0.13MW) :4MW/MOYAMBA HYDRO: 10MW
- Development of solar Energy interventions: 11 MW
- INSTALLATION OF SOLAR STREET LIGHTS (8,800)
- 50,000 SOLAR STREETS LIGHT TO BE INSTALLED COUNTRY WIDE

ENERGY AND THE CITIES

- We intend to devolve the Solar streets light project to the councils after installation.
- We have no institutional frame work with the cities on Energy related issues. We hope the organizers of this conference will help provide and finance the necessary platform hitherto, within the ambit of the legislation.

- ***WHAT ARE WE DOING?????***

FOR INCREASE IN ENERGY ACCESS, AND THE PROVISION OF SUSTAINABLE ENERGY TO ALL, WE NEED A HUGE FINANCIAL INTERVENTION:

- GOVT HAS :

1. PPP UNIT
2. ESTABLISHMENT OF THE ENERGY PLANNING UNIT
3. LEGAL AND INSTITUTIONAL FRAME WORK DEVELOPED
4. LIBERALISED THE POWER GENERATION SECTOR BY ENCOURAGING THE INTERVENTIONS OF IPPs

- THANK YOU:
- COMPLIED BY:
- REV. ING. PAUL CHARLES ***SAFFA*** WITH CONTRIBUTIONS FROM:
- MDM ZAINAB ***BUYA- KAMARA*** (PS, MOE)
- HIS WORSHIP ***THE MAYOR*** OF FREETOWN.
- EXTRACTS FROM THE ENERGY STRATEGY/ *BASE LINE REPORT*