Assessment of the National Energy Policy of Liberia, 2009

Initiative for Climate Action Transparency

Initiative for Climate Action Transparency – ICAT Assessment of the National Energy Policy of Liberia, 2009

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List of Acronyms and abbreviations

AfT	: Agenda for Transformation
AU	: African Union
BAU	: Business as Usual
EPA	: Environment Protection Agency
GHGs	: Greenhouse Gases
GoL	: Government of Liberia
HSDGs	: High Speed Diesel Generators
ICAT	: Initiative for Climate Action Transparency
INC	: Initial National Communications
IPCC	: Intergovernmental Panel on Climate Change
LEC	: Liberia Electricity Corporation
LERC	: Liberia Electricity Regulatory Commission
LPRA	: Liberia Petroleum Regulatory Authority
LPRC	: Liberia Petroleum Refining Company
MDGs	: Millennium Development Goals
MFDP	: Ministry of Finance and Development Planning
MME	: Ministry of Mines and Energy
NDCs	: Nationally Determined Contributions
NEPL	: National Energy Policy of Liberia
NESF	: National Energy Stakeholder Forum
NOCAL	: National Oil Company of Liberia
NREAPs	: National Renewable Energy Action Plans
PAPD	: Pro-Poor Agenda for Prosperity and Development
PRS	: Poverty Reduction Strategy
RESMP	: Rural Energy Strategy Master Plan
RREA	: Rural Renewable Energy Agency
SDGs	: Sustainable Development Goals
UNFCCC	: United Nations Framework Convention on Climate Change
WB	: World Bank

Terminologies

1.1. Greenhouse Gases (GHGs)

Greenhouse gasses are those gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of thermal infrared radiation emitted by the Earth's surface, the atmosphere itself, and by clouds (1).

1.2. Climate Change

In article 1 of the United Nations Framework Convention on Climate Change (UNFCCC), climate change refers to a change of climate that is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and that is in addition to natural climate variability observed over comparable time periods (2).

1.3. Sustainable Energy

Sustainable energy involves the provision and sustainable use of energy such that it meets the overall energy system needs of the present without compromising the ability of future generations to meet their needs (3).

1.4. Nationally determined contributions (NDCs)

Nationally determined contributions represent the commitments of each country to reduce greenhouse gas emissions and adapt to climate change (4).

1.5. ICAT assessment guides

ICAT assessment guides are a series of methodologies for assessing the GHG, sustainable development and transformational impacts of policies and actions in an integrated and comprehensive manner across all levels of governance (5).

1.6. Paris Agreement

Paris Agreement is a legally binding international treaty on climate change adopted by 196 Parties at COP 21 in Paris, on 12 December 2015 and entered into force on 4 November 2016. Its goal is to limit global warming to well below 2°C, preferably to 1.5°C, compared to pre-industrial levels (6).

1.7. Sustainable development goals (SDGs)

Sustainable development goals, also known as the Global Goals, were adopted by the United Nations on the 25th of September 2015 as a universal call to action to end poverty in all its forms and dimensions, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity. The 17 SDGs are integrated—they recognize that action in one area will affect outcomes in others, and that development must balance social, economic and environmental sustainability (UNDP, A/70/L.1 - Transforming our world: the 2030 Agenda for Sustainable Development) (7).

Abstract

Energy is key to the economic growth of any nation in the world. Liberia, like most Sub-Saharan African countries, is susceptible to poverty. At the same time, Liberia is exposed to the adverse effects of climate change, which also affects the development of the energy sector. Thus, the consideration of the Initiative for Climate Action Transparency (ICAT) through the Environment Protection Agency of Liberia (EPA) to support the assessment of the National Energy Policy of Liberia is welcome.

This enables the EPA to inform future energy policies, guide institutions and programs in their energy policy processes and provide policymakers with a better understanding of the requirements for successful policy development and implementation. The National Energy Policy of Liberia (NEPL) was adopted in 2009 at a time of economic revitalization and infrastructure rehabilitation, reconstruction and expansion to accelerate the objectives of universal access to clean, affordable, and reliable modern energy.

However, overall intermediate opportunity outcomes at the sector level remained characterized by insufficient transmission and distribution infrastructure, high tariffs, power theft and exceedingly high electricity technical loss rates in the power sector. Furthermore, the high cost of diesel fuel, including the adulterated and often improperly calibrated volumetric gauges at petrol stations, and inefficiency in rural areas restricted access to modern energy.

The NEPL acknowledged the imminent dangers of the fossil fuel-driven economy, its environmental concerns, and the expediency of adopting less carbon-intensive and environmentally friendly development pathways. It recommended urgent action to diversify the economy and create a sustainable energy supply mix. These were based upon the country's drive to meet its international commitments, the Millennium Development Goals (MDGs, now the Sustainable Development Goals/SDGs), SDG7, the Paris Agreement (2015) and Agenda 2030.

This assessment reviews the standpoint of key policy issues involving the accessibility, quality, cost, and institutional framework of Liberia's energy sector. It starts by detailing the key challenges of the energy sector both globally and locally. It reviews the energy targets (mitigation and adaptation) identified in Liberia's revised Nationally Determined Contributions (NDC), accepted by the UNFCCC in September 2021. It evaluates the corresponding policy propositions that aim to achieve those targets.

This study further establishes the linkages between the NEPL and other national, regional, and international plans. It then applies the ICAT methodology guide for assessing sustainable development impacts, which qualitatively assesses the specific impacts and goals of the NEPL. Finally, the assessment proposes possible policies to accelerate actions and enhance cross-sectoral coordination and monitoring, reporting, and verification (MRV) application that would lead Liberia's energy sector to carbon neutrality by 2050.

Keywords: Sustainable energy development, Climate Change and mitigation, National Energy Policy, Nationally Determined Contributions, Sustainable Development Goals, ICAT Methodology, Liberia

Introduction

Energy is an enabler for accelerating economic performance and national development of Liberia. It is also vital in achieving the country's Sustainable Development Goals [1] (8). The National Energy Policy of Liberia (NEPL) is the policy framework document adopted in 2009 by Liberia's national cabinet. It is a key component of the Government's developmental plans and efforts to support the "Poverty Reduction Strategy (PRS)" which built upon the "150-Day Plan" of January 2006 and the "Interim Poverty Reduction Strategy Process (IPRSP)" for the period July 2006 to June 2008". Its goals are revitalizing the economy and rehabilitating infrastructure to aid delivery of basic services in the country's energy sector. This plan follows the nation's worst developmental regression and provides the basis to set out rebuilding a nation devastated by 14 years of civil strife (9).

The NEPL is well-aligned with the then government's national developmental policies; PRS (Poverty Reduction Strategy, 2008), Agenda for Action and Economic and Social Development, and the Global Millennium Development Goals (MDGs). The principal objective of the NEPL is to foster Liberia's economic, political and social development based on universal access to affordable, sustainable, and environmentally friendly modern energy and energy services. The policy addressed four vital strategic issues implied in the principal policy objective: 1) Access with 2) Quality and 3) Reasonable Cost, with 4) Adequate Institutional Framework (10).

Since the formulation and adoption of the NEPL, moderate progress has been made in the energy sector's economic and sectorial reforms (11). The amendment of the 1973 Electricity Act that established the Liberia Electricity Corporation (LEC) in 2015 as the only national grid company has mandated the utility's legal and regulatory framework for the generation, transmission and distribution, and sale of electricity within the country. It also regulates the importation and export of electricity. The 2015 New Electricity Law authorized the establishment of a regulatory board known as the Liberia Electricity Regulatory Commission (LERC). This board is an independent regulatory authority to license and set cost-reflective tariffs. The NEPL also initiated the establishment of the Rural and Renewable Energy Agency (RREA) and the Rural Energy Fund (REF). It also suggested the need to develop the Rural Energy Master Plan to promote renewable energy technologies as a major tool and development program to achieve universal energy access in Liberia (12).

The adoption of the Paris Agreement, and the Sustainable Development Goals in 2015, brought an accelerated change in the developmental and transformational context of the energy sector. Liberia, like many other countries of the international community has adopted specific targets for the energy sector in its Nationally Determined Contribution. By 2030, the country commits to reducing greenhouse gas emissions in the energy sector (excluding the transport sector) by 40.6 % below business-as-usual (BAU) levels through several mitigation actions and measures (13). These include, inter alia, the installation of 100MW renewable energy plants and development of off-grid small hydropower plants.

After Liberia's successful NDC update in 2021, the country is currently moving from the target setting stage toward the critical process of implementing actions and measures outlined in the updated NDC. Therefore, the sectoral policy environment must support the realization of the NDC targets by providing

[1] Government anticipates a sustainable path towards creating a modern, efficient, diversified and environmentally sustainable energy sector which has the capacity to provide affordable and accessible energy supplies for all to sustain economic performance and national development. PRO-POOR AGENDA - The Executive Mansion. *https://www.emansion.gov.lr.* [Online] 2018. https://www.emansion.gov.lr/doc/Pro-Poor%20Agenda%20For%20Prosperity%20And%20Development%20book%20for%20Email%20sending%20(1).pdf%20-%20Compressed.pdf.

sufficient means for line ministries and agencies to implement these targets and measures. There are several policies related to energy in Liberia. However, the NEPL is the most relevant policy. It takes the focus of this assessment analysis to understand how well the policy can assist in implementing the NDC mitigation targets and actions within the energy sector.

This assessment seeks to uncover how the NDC targets and actions support sustainable development and how they can build on actions and measures the NEPL has already achieved. In the context of current and long-term national policies and plans, the call for sectoral coordination and implementation mechanisms of these strategic plans and actions are fundamental to the overall objective of the energy sector. This assessment analyses the main achievements of the current NEPL, including its performance against major sustainable development priorities. It further examines to what extent the implementation of actions and measures in the updated NDC would also bring additional SDG benefits above those already delivered by the NEPL in its present form.

Thus, the consideration for the present assessment review of the NEPL is to inform future energy policies, guide institutions and programs in their energy policy processes, and provide policymakers with a better understanding of the requirements for successful policy development and implementation.

Section 1. Methodological Approach

The study uses an exploratory ex-post policy assessment approach described in the ICAT Methodology Guide for assessing Sustainable Development Impacts. It employs a comprehensive list of impact categories. This methodology is part of a series developed by the Initiative for Climate Action Transparency (ICAT) to help countries assess the impacts of policies and actions.

It is intended to be used in combination with other ICAT assessment guides and can be used in conjunction with other guidance (5). As part of the assessment, we identified a targeted group of stakeholders and policy makers from four-line ministries and agencies (MME, MFDP, LEC, EPA) related to the development and implementation of the NEPL to provide a comprehensive and robust range of information and insights (Annex 1).

This information (input and feedback) was collected using a structured semi-open questionnaire and an all-inclusive stakeholder interview engagement approach (Annex 2 and 3). Stakeholder consultations were then concluded with the completion of a follow-up questionnaire (Annex 4). The challenges of the energy sector and analyses of key systemic sustainable development goals (SDGs) are based on extensive literature reviews. The first section of the study describes the applied methodology 1.

The second section discussed the state of Play of Liberia's NDC targets in the context of national development strategies, and how the NDC can accelerate energy decarbonization and promote low carbon economy to achieve sustainable development. The study recaps the energy targets presented in Liberia's revised NDC and the corresponding policies that aim to fulfil them. It qualitatively assesses the main objectives of the National Energy Policy of Liberia and their alignment to local, regional and international development goals and targets 2.

The third section assesses the NEPL using a holistic stakeholder consultation approach and a review of relevant literature. The fourth section provides the key challenges of the NEPL and other related policies. It proposes possible mitigation policies to accelerate actions and enhance cross-sectoral coordination and monitoring, reporting and verification application that would lead Liberia's energy sector to carbon neutrality by 2050 3, 4. The findings from the assessment were established based on information gathered from in-depth review of relevant literatures and interviews with key stakeholders and policy makers (technicians, focal points, experts, and high-level officials) involved with the development and implementation of the policy (Figure 1).

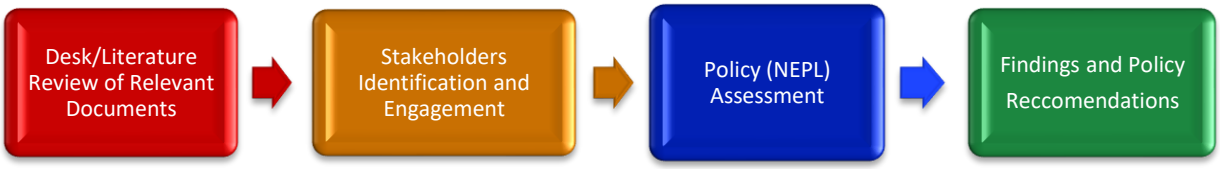

Figure 1: Assessment Methodology

Section 2: Description of the NDC targets, measures and actions in the energy sector

1. Nationally Determined Contributions (NDC) and how they can be used to accelerate decarbonization of the energy sector

Nationally determined contributions (NDCs) are at the heart of the Paris Agreement and the achievement of these long-term goals. NDCs embody efforts by each country to reduce national emissions and adapt to the impacts of climate change. The Paris Agreement (Article 4, paragraph 2) requires each party to prepare, communicate and maintain successive nationally determined contributions (NDCs) that it intends to achieve. Parties shall pursue domestic mitigation measures, with the aim of achieving the objectives of their contributions[2] (6). These climate actions will determine whether the world achieves the long-term goals of the Paris Agreement and reaches global peaking of greenhouse gas (GHG) emissions as soon as possible. Consequently, undertaking rapid reductions in accordance with best available science, is necessary to achieve a balance between anthropogenic emissions by sources and removals by sinks of GHGs in the second half of this century. "It is understood that the peaking of emissions will take longer for developing country Parties, and that emission reductions are undertaken on the basis of equity, and in the context of sustainable development and efforts to eradicate poverty, which are critical development priorities for many developing countries" (4).

The changes implied by energy sector decarbonization affect several industrial sectors and residential activities directly (e.g., automotive industries, electric batteries, biofuels production, mobility, electricity production) and all other sectors indirectly, notably via the change in the costs of energy services.

Therefore, "*nationally determined contributions (NDCs) and long-term emission reduction strategies have a key role to play in shaping the transformation of the energy sector, especially in developing countries, where emissions are projected to grow the most*" (14). Transformative change in the energy sector undertaken in support of climate objectives should, at the same time, enable prosperity and economic growth in countries in support of the Sustainable Development Goals (SDGs).

2. Review of the energy target identified in Liberia's revised NDC and corresponding policies that aim to fulfil them

Liberia's revised NDC was completed and submitted to the UNFCCC in August 2021 with the purpose of guiding actions and policymaking for the country to reduce its GHG emissions and adapt to climate change. It presents a platform to integrate Liberia's Low Carbon Development Strategy into the country's medium-term development agenda (PAPD) as well as its long-term sustainable development vision by 2030 (Liberia's Rising Vision 2030) (13). Within the document, Liberia commits to reducing its economy-wide greenhouse gas emissions by 64% below the projected business-as-usual level by 2030,

[2] [UNFCCC Definition of NDC]: UNFCCC COP 21, 'Paris Agreement', December 2015. https://unfccc.int/process-and-meetings/the-paris-agreement/nationally-determined-contributions-ndcs/nationally-determined-contributions-ndcs (6)

through a combination of the following:

- Unconditional GHG reductions of 10% below BAU, resulting in an absolute emissions level of 11,187Gg CO_2e in 2030;
- With an additional 54% reduction conditional upon international support, which would result in an absolute emissions level of 4,536.64 Gg CO_2e in 2030.

To achieve this target, the country has included additional sectors to those previously included in the 2015 NDC. The Energy sector, which is responsible for the highest percentage (49%) of the country's GHG emissions level, commits to reduce its GHG share by 40.6% below BAU levels by 2030 as indicated below in Table 1, (15) (13).

Table 1: Energy mitigation and adaptation targets, actions and policy measures presented in Liberia's revised NDC

Mitigation targets

• Reduce GHG emissions from energy sector (excluding transport sector) by 40.6% below BAU levels by 2030;
  ◦ Create a private investment enabling environment focusing on Power Purchase Agreements (PPAs) for renewable energy (RE).
  ◦ Reduce emissions by 79.8 Gg CO2e per year by the installation of 100 MW RE plants producing 300GWh per year with load factor of 40% by 2030.
  ◦ Reconnection of Monrovia clients to the grid. Reduce emissions by 124.15 Gg CO2e per year by supporting the process by which 100% of the owners of individual generators will switch to the distribution network, by 2030
  ◦ Development of off-grid small hydropower plants (HPP) and on-grid ones via PPAs.
  ◦ Reduce emissions by 15.4 Gg CO2e per year by installing a batch of several sites with 20 MW capacity; medium HPP with an output of 40 GWh/year and with 50% base load minimum for rural electrification and connected to the grid, by 2030.
  ◦ Develop large solar photovoltaic (PV) plants with (Independent Power Producers (IPPs) and PPAs. Reduce emissions by 0.52 Gg CO2e per year supporting the installation of in total 10 MW Capacity PV Plants with an output of 2 GWh/year by 2025.
• Produce and distribute energy saving cook stoves to reduce the use of fuel wood and charcoal (Link to Forest sector).
• Reduce emissions by 588 Gg CO2e per year by making sure 60% of households using fuel wood or charcoal are supplied with energy efficient cook stoves by 2030.

Mitigation Actions and Policy measures

• Improve the policymaking capacity with better cross sectoral coordination and implementation with focus on low GHG enabling investments.
• Capacity Building in NDC: Emission Reduction policies and implementation.
  ◦ Technical Assistance to improve the applicability of the institutional and legal framework, focusing on Power Purchase Agreements, regulatory framework, and unbundling the energy sector. This is downstream to the policy making process and in synergy with it.
• Support the implementation of a full regulation of the electricity sector with accurate costs, and tariffs.
• Liaise with WAPP to create a strategy to obtain cleaner electricity in the dry season, avoiding in this way the uses of fossil fuel for electricity generation in that season.
  ◦ Actual costs and tariffs calculated in the 3 segments to be unbundled: generation, transmission and distribution by 2023
  ◦ Social subsidies to support social tariffs implemented by 2024
  ◦ Reduce total electricity loss to 10% by 2025 through the improvement of the distribution network (technical losses) and the implementation of a social tariff (non-technical losses)
• Use the new private investment enabling environment to write a roadmap to achieve a renewable energy generation to at least 30% after 2030.
• Develop a strategy for reduction of fuel consumption in the energy industries sector.
  ◦ To support the distribution of energy saving cookstoves, implement a campaign to increase awareness to promote the use of energy efficient cook stoves and regulate its use.

Adaptation targets

In the Energy sector, Liberia commits to the following adaptation targets:

- Create private investment enabling environment focusing on Power Purchase Agreement (PPA) in renewables
  - Diversify the energy matrix to provide a more resilient system under climate variability
- Reconnection of Monrovia clients to the grid, supporting the process by which the owners of individual generators will switch to the distribution network
  - Risk mapping of climate stress vulnerability of energy infrastructure – future investment should be guided by such risk mapping.
  - Updating design and construction standards and materials to ensure that future energy infrastructure is more resilient to anticipated climate and extreme weather events
- Development off-grid small Hydro Power Plants and on grid ones via PPAs
  - Maximize the opportunities that energy access offers in improving livelihoods and diversifying income sources.
  - Promote productive uses of energy through skills trainings, access to finance and business development.
- Develop large photovoltaic (PV) Plants with Independent Power Producers (IPPs) by signing PPAs
  - Diversify the energy matrix to provide a more resilient system under climate variability.

Adaptation Actions and Policy Measures

- Improve the policy making capacity with better cross sector coordination and implementation with focus low carbon enabling investments
  - Include mainstreaming activities to improve the energy sector strategies and policies at the national level with climate adaptation strategies and policies.
- Support the implementation of a full de-regulation of the electricity sector (into independent transmission, distribution, and generator subsectors) with accurate costs, and tariffs.
- Improve the adaptation capacity of the most vulnerable since access to reliable and affordable electricity provides social and economic development.

***Source*: Liberia's Revised NDC, 2021**

The extent of implementation and achievement of these targets as proposed in the updated NDC are conditioned upon the provision of adequate means of implementation (financial resources, capacity building and technology transfer, etc.) by the international community. A condition that does not constitute an international obligation to Liberia. The government is also committed to unconditionally support the implementation and achievement of the overall targets through other financial mechanisms including the traditional budgetary allocation to the environment sector (13).

3. Current policy environment for the energy sector

3.1. Liberia's National Development Strategies and linkages to Regional and Global Development Initiatives

Like for all sectors, the development pathway of the energy sector is guided by the country's development strategy. After decades of economic regression and the fourteen years of civil war, the Government of Liberia has made significant strides in rebuilding the country and expanding the economy through the introduction of a broad set of policies and strategies aiming to foster peace, accelerate reconstruction and development, and building strong systems of governance.

The NDC implementation takes place in the context of Liberia's overall development strategies. Liberia's current development plan is the Pro-Poor Agenda for Prosperity and Development (PAPD), which guides the country's development pathway for the period 2018-2023. It follows the Agenda for Transformation (AfT) 2012/2017, and the Poverty Reduction Strategy of Liberia (PRS) 2008/2011. The PAPD is informed by regional and global initiatives such as the Agenda 2063, the Kyoto protocol, the Paris Agreement and the 2030 Sustainable Development Goals, Annex 5.

For the energy sector, the PAPD reaffirms the Government of Liberia (GoL) anticipation for creating a

sustainable path towards a modern, efficient, diversified and environmentally sustainable energy sector which has the capacity to provide affordable and accessible energy supplies for all to sustain economic performance and national development. The GoL intends to enhance economic productivity, by:

a. Revising the NEPL;
b. Establishing an energy sector working group;
c. Investing more in generation, transmission, and distribution with emphasis on private sector distribution network; and
d. Accelerating the implementation of the Rural and Renewable Energy Agency strategic master plan (8).

The PAPD further contains specific quantified targets for the energy sector. These targets are anticipated to be achieved by 2023 and they include the following:

- Increase universal electricity access by 30%;
- Increase electricity generation from 134 to 270 megawatts and
- Increase transmission and distribution from 511km to 2279km

Between 2009 and 2016, the GoL developed several policies and plans that were cardinal in the development and implementation mechanisms of strategic plans and actions in the energy sector. The overarching objective of these policies was to achieve rapid, inclusive, and sustainable development objectives. Amongst these, several policies and strategic plans directly and indirectly target the reduction of GHG emissions. An overview of the most relevant policies, projects and plans for the sector is presented in Table 2. The **NEPL** governs the energy sector related policies and actions with the objective of universal access to clean and affordable energy and energy services for all Liberians. The goals set out by the NEPL aim to connect 70% of Monrovia's Population and 35% of the nation as a whole by 2030 (16). **Liberia's Investment Plan for Renewable Energy (IPRE)**, complementing the Least Cost Power Development Plan, focuses on off-grid areas where extending the main grid will not be cost-effective in the near future. It provides a road map for scaling up renewable energy interventions to increase access, reduce overreliance on imported fossil fuels and strike a balance between rural and urban areas in electricity provision (17).

The **2015 Electricity Law** establishes the legal and regulatory framework for the generation, transmission, distribution and sale of electricity within the territory of the Republic of Liberia, and the import and export of the same. This law aims to facilitate the implementation of the NEPL (12). The **Rural Energy Strategy and Master Plan (RESMP)** envisages the *Least Cost Long term vision*. The starting point for the RESMP was the development of a long-term vision for the universal electrification of all Liberians - most likely only achievable on the 2050 horizon. The priority for rural energy is to start building the least cost long term vision based on Medium Voltage investments, Decentralized Grids and Renewable Energies that can maximize the number of connections in an equitable way across the country until 2030 – from Monrovia to cities and towns, from cities and towns to more rural areas (10).

Among the policies governing the energy sector, the NEPL is the most comprehensive policy because, it covers all of the sub-sectors of energy (electricity, petroleum and renewable energy). It further provides the legal and institutional arrangements to accelerate the sector's growth to meet the SDGs. Since the NEPL is the most relevant policy and serves as the central policy document governing the energy sector, Liberia's achievement of its Vision 2030 through a low-carbon, climate-resilient development pathway dwells primarily on the implementation and periodic updating of the NEPL, and other key national and climate change policies and action plans such as the **NEEAP**, **NREAPs**, **NPRSCC** and **NAP**.

Table 2: Current Policies/Projects/Plans in Energy Sector of Liberia

Policies/Plans	Year
National Energy Policy	2009
ECOWAS Renewable Energy Policy	2013
National Liberia Power Sector Capacity Building and Energy Master Planning	August 2013
Scaling-up Renewable Energy program (SREP)	2013
Liberia's Investment Plan for Renewable Energy (IPRE)	2013
Least Cost Power Development Plan (LCPDP)	August 2014
New Energy Act also called Electricity Law	2015
National Energy Efficiency Action Plan (NEEAP)	2015
National Renewable Energy Action Plans (NREAPs)	2015
SE4ALL Action Agenda	2015
Rural Energy Strategy and Master Plan (RESMP)	2016
Transmission and Distribution Pipeline Projects	2016
National Policy and Response Strategy on Climate Change (NPRSCC)	2018
Barrier Analysis and Enabling Framework for Climate Change Mitigation Technologies in the Energy Sector Report II	2020
National Adaptation Plan (NAP)	2020

Section 3. Policy impact assessment and analysis

1. Assessment of the Liberia National Energy Policy "NEPL" (2009 – 2017)

1.1. Synopsis of the Policy

The NEPL was formulated to transform the Government's vision for development into reality with tangible impacts from the energy sector to improve the lives of Liberia's citizens. This Policy grew from the National Energy Stakeholder Forum (NESF) held in 2006 to evaluate the local realities and experiences of the sector. The results of the NESF were then compiled into a National Energy Sector White Paper (NESWP) published by the Ministry of Lands, Mines and Energy in February 2007.

Using the White Paper, and taking account of regional and international best practices, a draft policy document was then developed, validated and then adopted in 2009 by cabinet. The NESWP examined strategies to harness Liberia's tremendous renewable resources to extend modern energy services to the nation's rural population.

The NEPL is a framework geared towards the vision and realization of the GoL's social and economic development strategies elaborated mainly in three of the four Pillars of the GoL's Poverty Reduction Strategy, namely, revitalizing the economy, strengthening governance and the rule of law and rehabilitating Infrastructure and delivering basic services. Four of the most important themes centered on: "rehabilitation of the energy (electricity) sector, least-cost production of energy", "acceleration of public and private partnership" and "regulation and enforcement of the policy". The primary objective of the NEPL is to ensure universal and sustainable access to affordable and reliable modern energy supply to foster the economic, political, and social development of Liberia. The policy access goals were projected to climax in 2015. Table 3 below summarizes the Poverty Reduction Strategy pillars II, III, and IV energy sector deliverables (2009-2017) as specified in the NEPL.

Table 3: PRS-II, III, and IV energy sector deliverables: 2009 – 2017

Energy Sector	OUTPUTS (2009 – 2017)
Rehabilitation of LEC and Rural Hydro Power Plant	88MW Mt. Coffee Hydro Plant, 38 MW Thermal Power Plant, 5 MW Light Fuel and 16200m^3 storage and transport facilities and the Yandohun 60kw micro-hydro system
Connectivity (Transmission and Distribution)	Two percent nationwide, 0.35 per kw, 66kv substations, 1,249 km TRANSCO CLSG (225kv)
Management	Manitoba Hydro International
Policy and Regulatory Institutions	Options For Development of Liberia's Energy Sector (2011), Technical Assistance for optimizing Mt. Coffee and Hydro Production (2012), Liberia Power Sector Capacity Building and Energy Master Planning (August 2013), Scaling-up Renewable Energy program (2013), Liberia's Investment Plan for Renewable Energy (IPRE) (2013), Least Cost Power Development Plan (LCPDP) (August 2014), New Energy Act 2015 also called 2015 Electricity Law, Liberia Electricity Regulatory Commission (LERC) (2015), National Energy Efficiency Action Plan (NEEAP) (2015), National Renewable

	Energy Action Plans (NREAPs) (2015), SE4ALL Action Agenda (2015), Rural and Renewable Energy Agency (RREA) (2015), Rural Energy Strategy and Master Plan (RESMP) in 2016, The Transmission and Distribution Pipeline Projects (2016)

***Sources*: World Bank; USAID, 2020**

The NEPL contains provisions for improving energy access, quality, costs and institutional frameworks for the implementation of the policy. The policy mandates the reformation of the energy sector based on transparency, private sector assurance, and the creation of the requisite institutional and independent regulatory body to promote economic efficiency. Realizing that the impact of policies does not occur automatically, and the repeated nature of political changes, it was proposed that the NEPL be periodically revised and updated every 5 years. However, since it's adoption in 2009, the NEPL hasn't been updated. However, it is in a process of been upgraded to the National Energy Master Plan of Liberia. The NEPL's provisions were important in informing other planning initiatives–particularly those now focusing on meeting the short and medium term needs of Liberia with support garnered from development partners to meet international best practice. This would subsequently lead to long term development of the energy sector.

The rehabilitation of Mount Coffee Plant by donors such as Norway, Germany and the European Investment Bank (EIB) as well as the joining of the Millennium Challenge Corporation partners and the GoL in 2015, the completion of three heavy fuel oil (HFO) thermal plants (38MW) (which are cheaper alternatives to High Speed Diesel Generators (HSDG)), and 16200m^3 storage and transport facilities have increased the total installed generation capacity in the country from the 22 MW HSDG (now partly decommissioned) to 126 MW in the wet season (11) (16).

2. Assessment results of the NEPL from stakeholder consultations

Following several engagements with several relevant stakeholders including technicians, experts, specialists and other high-ranking officials from four (4) line ministries and agencies (MME, MFDP, LEC, EPA) involved with the development and implementation of the National Energy Policy, the following responses were properly collected, analyzed and evaluated to ensure correspondence and consistency with the policy documents.

- The NEPL is a strategic policy which falls in the categories of setting standards and implementing rehabilitation and regulation programmes. It details the reformation of electricity, petroleum, rural and renewable energy sectors framework. Key stakeholder groups affected by the policy are: Residential households, private institutions, urban and rural communities, business people, etc. The key objectives of the policy mentioned by stakeholders were: "reconstruction, rehabilitation and the maintenance of the national grid and hydro power plants"; "to improve the energy sector through effective systems and infrastructure for quality service delivery" and "to build human resource capacity". The Policy has been valid for a period of thirteen (13 years). It contains a provision that mandates it to be revised every five years as development progresses. However, since its inception, no revision has taken place.
- There are many measures and interventions the policy sought to achieve. These proposed interventions, measures and activities are yet to be accomplished. However, few were accomplished and are in effect, Table 4.

Table 4: Status of specific interventions targeted by the NEPL

Intervention	Objective	Status
The development of an energy master plan	• To have an orderly and more effective national energy development program consistent with the principles and goals outlined in the NEPL; • To develop both grid and off-grid energy master plans, focused on both supply-side and demand-side options.	No energy master plan has been developed so far, but other following sub-sector plans have been developed: Rural Energy Strategy and Master Plan (RESMP) 2016; the National Energy Efficiency Action Plan (NEEAP) (2015); and the National Renewable Energy Action Plans (NREAPs) (2015).
Provision of least-cost production of energy	• To address the limited access to energy services base on a targeted subsidized basis to those who can only afford to pay a portion of the cost; • To ensure a balance between the interests of investors, consumers, and the general public.	The development of the least-cost energy plan for Liberia as a whole, predicting both the geospatial extent and lifetime costs of Liberia's grid and off-grid power systems in both urban and rural areas for the next 30 years. However, there has been some progress made in the energy sector. Electricity cost declined from $0.50/kwh in 2009 to $0.39/kwh in 2017, with a prospect of a further decrease to $0.24/kwh in 2022.
The adoption of international best practices	• To guide and separate the roles of policy making, monitoring, and operation in the energy sector; • To provide effective collection and analysis of GHG emissions data.	Intervention is currently in effect. For example, the intervention of the Capacity Building Initiative for Transparency (CBIT) at various line ministries and agencies which are involved in the process to secure transparency of mitigation of GHG emissions.
The acceleration of public-private-partnerships	• To address the limited funding resources for energy infrastructure or development projects of the sector; • To encourage the private sector's participation, reduce government's expenditure and to improve the generation, distribution and transmission of energy productions and services.	Public-private partnerships operations are in effect, but with limited-service provision. The country has benefited from the Manitoba Hydro International Management service contract, for the rehabilitation of the Mount coffee Hydro-Power Plant. The rehabilitation cost, around $230 million. It was financed by the Liberian government, the Norwegian government, the European Investment Bank and Kreditanstalt für Wiederaufbau (KfW). The Yandohun micro-hydro, implemented by RREA and financed by the World Bank, involved the rehabilitation of 60 kW to serve 240 households and was commissioned in May 2013 (17).
The creation of an Energy Regulatory Board (ERB)	• To monitor, interpret and enforce policies, rules, and plans. A process analogous to the functions of a judge in a court of law; • To minimize and eliminate loss, theft, and corruption and to promote international best practices in wholesale and retail energy transactions and in the granting of licenses and concessions; and • To ensure a balance between stakeholder interests by monitoring the implementation of policies, plans, quality standards, and	Currently functioning to a limited extent because it focuses on electricity. The sector reform enactment in 2015, entitled 2015 New Electricity law has mandated the establishment of a regulatory board known as the Liberia Electricity Regulatory Commission. This was proposed in the NEPL. Moreover, in response to the rising incidence of power theft, the Government amended the penal law in 2019 to make power theft a

	license provisions while reporting directly to the office of the president and the appropriate committee of the Legislature.	felony with strict penalties proportionate to the seriousness of the offense.
The reorganization of the Ministry of Lands, Mines and Energy (MLME)	• To lessen the clustered responsibilities of the Deputy Minister for Operations; • To improve efficiency and to adequately discharge its oversight role over all the different energy sub-sectors as well as to direct and supervise, through policy making and planning, the efficient development of the energy sector as a whole; and • To expand its capacity in and focus on energy.	Partially established and currently in effect. This has yielded some progress since the separation and autonomy of lands from mines and energy in 2011 (18).
The creation of a Saint Paul River authority or other river authority	• To provide oversight authority, excluding licensing, for all development activities affecting both upstream and downstream portions of the Saint Paul and other river basins, including the revitalization of the Mount Coffee hydropower plant in a manner consistent with optimal development of Liberia's water and hydroelectric resources.	Authority is yet to be established. However, the rehabilitation of Mount Coffee was a success. This is a project that laid the foundation for the large hydropower developments along the Saint Paul River and the other major rivers, which are needed to provide more affordable power for the country.
Changes to the legislation establishing the National Oil Company of Liberia (NOCAL) and the Liberia Petroleum Refining Corporation (LPRC)	• To separate policy making from operational functions; • To achieve international best practice in terms of transparency and good governance.	NOCAL and the LPRC Acts/Laws were amended in 2019 by executive order, termed as the Petroleum Act of 2019 after legislative consultation; to update it to conform to the current reality of the sector in alignment with the Global Grid System as mandated by ECOWAS for member States.
The establishment of the Rural and Renewable Energy Agency	• To plan, finance and implement projects for the delivery of modern energy services for rural development; • To manage the Rural Energy Fund for coordination and sustainable management of financing of projects and programs.	The agency was established by law, in 2010; and enacted in 2015 to support all economically viable, socially acceptable, and environmentally friendly rural energy projects and programs regardless of financial viability.

- The NEPL implementation strategy is generally well-aligned with overarching national energy policy objectives to which it makes explicit reference. It follows the MDGs and the PRS. The pursuit for economic, social and environmental benefits in the energy sector is at the forefront of these policies. The implementation strategy of the Policy necessitated funds and technical expertise, leadership and effective coordination. The organizational and operational framework for implementation centers on a "Steering Committee", chaired by the Minister of Mines and Energy and composed of Government Ministers and other important stakeholders; and an "Implementation Coordination Committee" chaired by a LEC coordinator and composed of technical personnel from important line ministries and the agencies they control.
- The relevant line ministries and agencies responsible for the implementation of the policy include:
    a. Ministry of Mines and Energy–Policy development and Enforcement
    b. Liberia Electricity Corporation–Infrastructure development and Public Service delivery
    c. Bureau of Standards–Regulations on the energy sector
    d. Liberia Electricity Regulatory Commission–Regulates revenues and tariffs collected in relation to electricity
    e. Environment Protection Agency–Environmental Cost and benefits
    f. Ministry of Finance and Development Planning–Alignment of Investment Plans to SDGs
- The NEPL implementation is concentrated at the national, subnational, and city levels, with its operations being affected within the political jurisdiction and geographical limits of Liberia. There has been enforcement or compliance mechanisms or procedures accompanying the implementation of the Policy.
- Concerning monitoring, reporting and verification procedures associated with implementing the Policy, some measures (LERC) were carried out but, not wholistically at sector level. Since the inception of the NEPL in 2009, the major gaps identified as principal impediments to the successful delivery of strategic anticipated outcomes include: "the challenge of inadequate sectoral coordination", "lack of progress-tracking system" and "limited and inconsistent financial support" (19) (20).

The alignment of the NEPL with national, regional and global objectives can be captured in specific goals and targets. The "Poverty Reduction Strategy" was expounded on four pillars, three of which included revitalizing the economy, strengthening governance and the rule of law and Rehabilitating Infrastructure and Delivering Basic Services with more emphasis being placed on rehabilitation of energy infrastructure such as (LEC, Hydro and Thermal Power Plants, Installation of Transmission and Distribution lines and the reconstruction and rehabilitation of storage facilities for Heavy Fuel Oils). Pillar four (rehabilitating infrastructure and delivering basic services), incorporated several components with one of the most important focusing on Energy. The priority of the Government in the first 3-years of the PRS period was the Rehabilitation, Revitalization and Maintenance of the electricity and petroleum sectors in Liberia. Afterwards, the improvement of other infrastructure has been highly

prioritized in the development agendas of the government. In the Agenda for Transformation (Aft), power and energy are described as optimal options to drive economic transformation of Liberia; increase access to renewable energy services and affordable power for community and economic transformation.

In the context of the Pro-poor Agenda for Prosperity and Development, accelerating energy access to all parts of the country with emphasis on private sector distribution network for increase productivity is recognized. The PAPD also acknowledges the need to accelerate the implementation of the Rural and Renewable Energy Agency strategic plan. The alignment of the NEPL with national, regional and global objectives can be captured in specific goals and targets. These targets and interventions are established around specific pillars crafted by national government. Annex 6 shows the pillars, goals and targets through which the objectives of the NEPL captured national, regional and global initiatives.

2.1. Coverage performance of the NEPL in the context of achieving NDC measures

The assessment further evaluates the NDC Measures and degree of coverage by the NEPL in Table 4. Energy drives economic growth, reduces poverty, accelerate social progress and improve the overall quality of life (21). The NEPL has made some progress creating a supporting environment that is conducive for the achievement of energy specific adaptation and mitigations actions and measures that are proposed in the revised NDC. They include the rehabilitation of the 88MW Mount Coffee and Yandohun micro-hydro power plants and the Lighting Lives in Liberia (LLL) solar initiative, a donor funded project geared towards the achievements of renewable energy (RE) access of 40% load by 2030.

Prospects of private investment enabling environment focusing on Power Purchase Agreements (PPAs) for renewable energy seems feasible because of the recent **Executive order No. 107** issued by the President of the Republic of Liberia. This proclamation by law, provides incentives by encouraging private sector investment in the procurement of essential off-grid solar lighting appliances, equipment and system components directly related to renewable energy development with the view, inter alia, to increase access to clean, affordable and quality energy services. Thus, the prospects for large solar photovoltaic (PV) plants with (Independent Power Producers (IPPs) and PPAs is a win-win for the country's commitment to the transition to RE as stated in its recently revised NDC.

However, the NEPL creates a policy environment that facilitates the achievement of the NDC targets to a limited extent. The petroleum sector of Liberia is marked by mostly imported fossil fuel. Gasoline, diesel and kerosene are used as self-generating energy sources for most residential, hotels, hospitals, schools and industrial activities located in urban and rural Liberia as an alternative to the national grid connections. The current NEPL recognizes the limited technological and financial resources, a growing population, and escalating energy demand and consumption as major constraints in Liberia's reduction of GHG emissions to meet its energy adaptation and mitigation targets. In addition to limited enforcement and compliance mechanism, it is worth noting that the policy didn't achieve its proposed sector's emission reduction target of 10% by 2015 from the baseline year (2009) of the policy (9) (22). The policy itself currently cannot meet the NDC's ambitiously set measure of 40.6% towards 2030, because the provision has not been enshrined in the policy. In its present form the NEPL therefore does not support emission reduction that commensurate with the sector's long-term SDGs as well as the sector's long-term goal of carbon neutrality by 2050. The successful achievement of these would require the enforcement of established entities (the Bureau of Standards; LERC; and the Liberia Petroleum Regulatory Authority (LPRA) and updating the NEPL to achieve the recent NDC targets of the energy sector.

Table 5: NDC Measures and degree of coverage by the NEPL

NDC Measure	Degree of coverage by Energy Policy Fully/Partially/Not Covered	Assessment
Reduce GHG emissions from energy sector (excluding transport sector) by 40.6% below BAU levels by 2030;	Partially covered	Starting from the adoption of the Policy in 2009, the NEPL had a set target to reduce greenhouse gas emissions by 10% by 2015. It was discovered that the policy didn't achieve this emission reduction target, instead we observed an increase in emission of 10% that year, which led to a 20% emission of GHG in 2015. This failure renders the policy short of meeting the newly revised NDC's ambitiously set measure of 40.6% towards 2030. This is cause by the use of fossil fuels as a major source of energy for socio-economic activities as well as the limited access to clean and efficient energy services and mitigation technology. Hence, the need for increased sectoral coordination; capacity building; the enforcement of regulating and implementing entities of the sector and the updating of the NEPL to attain the NDC mitigation targets and measures.
Create a private investment enabling environment focusing on Power Purchase Agreements (PPAs) for renewable energy (RE).	Partially covered	The policy environment within the energy subsectors (electricity and petroleum) didn't attract private investments during the adoption of the NEPL. This was due to the LEC not satisfactorily meeting the requirements of a bankable power purchase agreement to cater to the urban areas before reaching rural settlements. To attend to this deficiency, the recent **Executive order No. 107** issued by the President of the Republic of Liberia, provides incentives (import tariffs) by encouraging private sector investment in the procurement of essential off-grid solar lighting appliances, equipment and system components directly related to renewable energy development with the view, inter alia, to increase access to clean, affordable and quality energy services (23).
Reduce emissions by 79.8 Gg CO2e per year by the installation of 100 MW RE plants producing 300GWh per year with load factor of 40% by 2030.	Partially Covered	The NEPL recognizes the vast RE resources (hydro, solar and possible wind potential) of the country and called for the rehabilitation of the 88MW Mount Coffee Plant. This helped the GoL to secure support by donors such as Norway, Germany and the European Investment Bank as well as the Millennium Challenge Corporation partners in 2015. There are many donor-funded projects geared directly and indirectly towards the achievements of RE access of 40% load by 2030. For example, the Lighting Lives in Liberia (LLL), 2012-2017, supported the development of a commercial market for Lighting Global certified solar products and sought to distribute 100,000 units of solar technology. However, 26,412 products were sold and 1,154 were donated in off-grid areas. It was financed by the World Bank, Global Environment Facility (GEF)Trust Fund Grant and implemented by the RREA (24) (16).
Reconnection of Monrovia clients to the grid. Reduce emissions by 124.15 Gg CO2e per year by supporting the	Partially covered	The goals set out by the NEPL aim to connect 70% of Monrovia's population and 35% of the nation as a whole to the grid by 2030. Urbanized Monrovia experienced

process by which 100% of the owners of individual generators will switch to the distribution network, by 2030.		an increase of 0.58% of population access in 2011, compared to 0% access nationwide in 2009. An increase of 6% in Monrovia and 1 % Rural by 2019, compared to 0% access nationwide in 2009. Additionally, with the near decommissioning of the 1,249 km TRANSCO CLSG (225kv) of the West Africa Power Pool interconnections of Liberia, Guinea, Sierra Leone and Ivory Coast, Liberia can attain her objectives of accessibility, availability, affordability and sustainability in the energy sector. This will improve accessibility or improve it to 100 % as a result of increased availability in electricity leading to absolute affordability.
Development of off-grid small hydropower plants (HPP) and on-grid ones via PPAs.	Partially covered	To facilitate the orderly development of the power system by the public, private sector, and local communities, the NEPL calls for the rehabilitation of the Yandohun micro-hydro power plant. The process was implemented by RREA and financed by the World Bank, and involved the rehabilitation of 60 kW to serve 240 households and was commissioned in May 2013 and it is currently operational. The Liberia Renewable Energy Access Project (LIRENAP) was implemented by RREA and financed by World Bank and the Strategic Climactic Fund from 2016-2021 (17) (16).
Reduce emissions by 15.4 Gg CO2e per year by installing a batch of several sites with 20 MW capacity; medium HPP with an output of 40 GWh/year and with 50% base load minimum for rural electrification and connected to the grid, by 2030.	Partially covered	The NEPL didn't cover the installation of a batch of several sites with 20MW capacity; the LEC had 9.6 MW diesel generation, with 80km of transmission and distribution network in 2009. However, it hinted at the prospects for the application of solar technologies such as photovoltaic and solar thermal systems. Moreover, the RESMP, 2016 placed the rural electrification rate at 30% in 2030 with a prospect of more than 20MW until 2020 and 50MW until 2030 outside of the national grid.
Develop large solar photovoltaic (PV) plants with (Independent Power Producers (IPPs) and PPAs. Reduce emissions by 0.52 Gg CO2e per year supporting the installation of in total 10 MW Capacity PV Plants with an output of 2 GWh/year by 2025.	Partially covered	The prospects of large solar photovoltaic (PV) plants with IPPs and PPAs were not a major deficiency, because annual solar insolation shows good prospects for the application of solar technologies such as photovoltaic and solar thermal systems. Hence the call for a simplified licensing and monitoring procedures for small installations (less than 500 kW or some threshold determined from operational experience), in the NEPL. The RESMP includes a provision on solar energy that- "At least 20 MW on the National Grid by 2020 and 60 MW by 2030".
Produce and distribute energy saving cook stoves to reduce the use of fuel wood and charcoal (Link to Forest sector).	Partially covered	The NEPL recognizes the limited technological and financial resources, a growing population, and escalating energy demand and consumption. It recommends improved energy efficiency through increased share of RE.

Reduce emissions by 588 Gg CO2e per year by making sure 60% of households using fuel wood or charcoal are supplied with energy efficient cook stoves by 2030.	Covered	The NEPL calls for more than 60% of Liberians having access to energy efficient cookstoves to avoid indoor air pollution from emissions, particulates, and wastes associated with conventional energy sources by 2015. Accordingly, the assessment discovered that the access goal of efficient cookstove of the NEPL meets the ambitious target of the NDC proposed 60% utilization of energy cookstoves. Liberia must integrate and enforce renewable energy technologies and services into the overall national energy supply mix.

***Sources*: NEPL, 2009; RESMP, 2016; USAID Power Africa, 2020; Liberia's Revised NDC, 2021; Executive order No. 107 of Liberia, 2022**

3. Analysis of the NEPL's performance against the SDGs

This section evaluates the performance of the NEPL against the impact dimensions of the SDGs. The analysis drawn from the information presented in Figure 2 confirms that the NEPL performs to a moderate extent in achieving some socio-economic targets including improved access to clean, reliable and affordable energy; improved quality of life, health care and well-being; increased accessibility and quality of education; the creation of new business opportunities in the sector; increased job creation in the energy sector as well as increased economic activity and productivity amongst others.

On the other hand, the analysis reveals that the NEPL performs poorly in achieving any target relating to environmental sustainability and the promotion of decent health. In fact, the analysis points out that the implementation of the NEPL contributes to increased GHG emissions from increased imported fossil fuel consumption, increased air pollution, increased noise level from generators, destruction of ecosystems, reduction in soil quality and the prevalence of respiratory diseases and other health hazards from energy emissions.

The assessment and analyses were done using through observed professional responses gathered from technicians, specialists and officials at various line ministries and agencies that were involved with the formulation, implementation, and regulation of the NEPL (Annex 2) (19). Due to the scarcity of real time quantitative data, we employed the ICAT methodology of impact assessment coupled with literature reviews from previous policy documents concerning the energy situation of the country. These were used to evaluate the impact dimensions of the SDGs against the policy. The major impacts of the NEPL identified at various degrees are illustrated in Figure 2. More information on the policy's impact dimensions per degree are provided in aforementioned Figure; while the nature of these impacts is indicated in Table 6. The assessment further identified the predominant SDGs captured by the NEPL in Table 7.

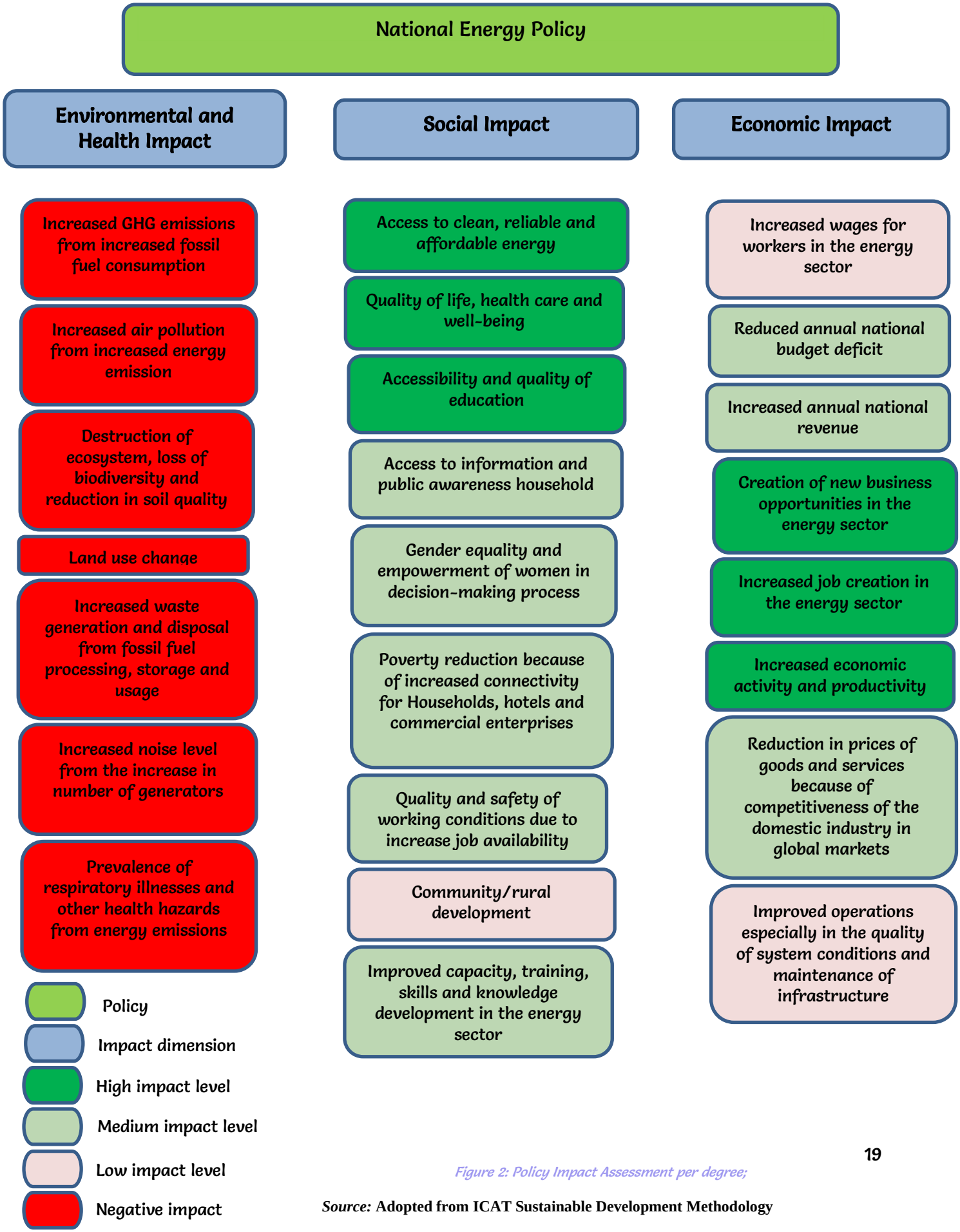

Figure 2: Policy Impact Assessment per degree;

Source: **Adopted from ICAT Sustainable Development Methodology**

The assessment of the nature of specific impacts, the impact dimension and category were completed based on stakeholder consultation and the review of relevant literature, Table 6.

Table 6: Nature of Impact Assessment of the National Energy Policy of Liberia

Dimension	Impact category (Targeted SDGs)	Specific impacts identified	Nature of impact Positive Moderate Negative	Methods/ sources used
Environmental and Health	Climate change mitigation	Increased GHG emissions from increased vehicles fossil fuel consumption	Negative	Stakeholder consultation
	Air quality, noise and health impacts of air pollution	Increased Air and noise pollutions from increased energy emissions	Negative	Literature review
	Biodiversity and ecosystems protection; Soil quality	Destruction of ecosystem, loss of biodiversity and reduction in soil quality	Negative	Literature review
	Land use change	Change in land use (energy mix)	Negative	Literature Review
	Waste generation	Increased waste generation and disposal from fossil fuel processing, storage and usage	Negative	Stakeholder consultation
	Alternative fuel consumption	Increased consumption of fossil fuel due to lack of effective policy enforcement mechanism to promote the use of clean, alternative fuel	Negative	Stakeholder consultation
	Respiratory illness and death (SDG 3)	Prevalence of respiratory illnesses and other health hazards from energy emissions	Negative	Literature review
Social	Capacity, skills and knowledge development	Improved capacity, training, skills and knowledge development in the energy sector	Positive	Stakeholder consultation
	Quality and safety of working conditions	Improved quality and safety of working conditions due to more jobs in the energy sector	Positive	Stakeholder consultation
	Poverty	Poverty reduction because of increased connectivity for Households, hotels and commercial enterprises	Positive	Stakeholder consultation
	Gender equality	Promotion of gender equity and Participation of women in decision-making process in the energy sector	Positive	Stakeholder consultation
Economic	Functionality and efficiency	Increased system functionality and efficiency leading to reduction in blackouts and power theft, and the sale of adulterated petroleum products, etc.	Moderate	Stakeholder consultation
	Operation	Improved operations especially in the quality of system conditions and maintenance of infrastructure	Moderate	Stakeholder consultation
	Jobs	Increased job creation in the energy sector	Positive	Stakeholder consultation
	Revenue	Reduced annual national budget deficit;	Positive	Stakeholder consultation

		Increased annual national revenue	Positive	Stakeholder consultation
	Income	Increased household disposable income due to reduced tariffs and prices of goods and services	Positive	Stakeholder consultation
	Wages	Increased wages for workers in the energy sector	Moderate	Stakeholder consultation
	New business opportunities	Creation of new business opportunities in the energy sector	Positive	Stakeholder consultation
	Economic activity and productivity	Increased economic activity and productivity	Positive	Stakeholder consultation
	Prices of goods and services	Reduction in prices of goods and services because of energy connectivity and productivity	Positive	Stakeholder consultation

***Source*: Adapted from WRI (2014) presented in ICAT Sustainable Development Methodology**

Energy drives economic growth, reduces poverty, accelerate social progress and improve the overall quality of life (21). It contributes directly or indirectly to the achievement of almost all other SDGs by facilitating and enabling relevant social-economic development processes in Annexes 6 and 7 (23). The increase of energy services in Liberia has to some extent contributed positively to the sustainable development goals of the country. It has provided increased access to electricity, job opportunities and, improved health facilities and ensured inclusiveness and social equality (21). The improvement in reconstruction, rehabilitation and management of LEC; Hydro, Thermal power Plants and the installation of transmission and distribution lines across the country are key influences on pre-and post-disaster management, yet it has contributed to climate change. Table 7 below presents the predominant SDGs and targets captured by the NEPL.

Table 7: Predominant SDGs and Targets captured by the NEPL

Goal	Target	Specific element captured
Goal 1: End poverty in all its forms everywhere (Poverty reduction)	**Target 1.5b:** Create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions	• Reduced poverty through economic efficiency - by lowering costs, and enhancing opportunities; • Contributed immensely to achieving sustainable economic growth, improving access to efficient services and RE markets, and enhancing social well-being of communities, building productive capacity, as well as promoting trade and regional and global integration; • Improved energy access which has generated employment and created opportunities and long-term benefits for low-income earners and communities.
SDG 7: Ensure access to affordable, reliable, sustainable and modern energy for all (energy sustainability)	**Target 7.1:** By 2030, ensure universal access to affordable, reliable and modern energy services	• Encouragement of the production and commercialization of efficient stoves as well as the rise of the renewable energy sector (e.g., sale, installation and services of solar panels, Pico PV lamps etc.); • Created jobs and small businesses, leading to income generation for both women and men; • Furthermore, families saved money and time due to reduced fuel demand for cooking and lighting.
SDG 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	**Target 9.1:** Develop quality, reliable, sustainable and resilient infrastructure, including regional and trans-border infrastructure, to support economic development and human well-being, with a focus on affordable and equitable access for all **Target 9.4:** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries acting in accordance with their respective capabilities	• The resilient and improved energy infrastructure have somewhat enhanced social and economic resilience as well as meeting security and health needs (modern and efficient energy technologies emit less or no CO_2 at all); • Improved access to information and communication technologies, including Internet and mobile phones.
SDG 16: Promotion of peaceful and inclusive society for sustainable development, and building effective and accountable institutions at all levels	**Target 16.B**: Promote and enforce nondiscriminatory laws and policies for sustainable development	• Ensured respect for the rule of law and improved diversity; • Encouraged private sector investments in an enabling environment.

	Target 16.5: Substantially reduce corruption and bribery in all their forms	
SDG 17: Strengthen the means of implementation and revitalize the Global Partnership for Sustainable Development	**Target 7.1:** Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection **Target 17.8:** Fully operationalize the technology bank and science, technology and innovation capacity building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology	• Garnered huge support from the international community in the global fight against climate change. • Effectuated domestic agendas that are in line with the SDGs.

The deliverables of the NEPL have also contributed negatively to Liberia's sustainable development goals and targets. The reconstruction and rehabilitation of energy facilities have major implications for fossil fuel consumption, and pollution. These upgrades will have serious impact on public health and climate change contributing to increased global warming, which Liberia is exceptionally vulnerable to.

4. Analysis of how the potential co-benefits of NDC and SDGs implementation could improve Liberia's Energy Sector

The Energy Sector of Liberia is pivotal in supporting the achievement of the climate change mitigation targets and Sustainable Development Goals (SDGs) of the country. Accessibility, availability and affordability to energy services are major pre-requisites for economic development and make entrepreneurial activities beyond daylight hours possible. These however, contribute to the global climate crisis.

Moreover, beyond the direct mitigation benefits of climate action (i.e. the reduction of GHG emissions), the implementation of energy NDC's actions and measures, will correspondingly have by far mostly positive impacts and generate additional sustainable development benefits (i.e. socioeconomic and environment benefits) such as increased energy security, reduced air pollutions/better air quality, and increased public health outcomes amongst others- all of which boosts prosperity and wellbeing.

Table 8 below reveals additional SDG benefits, besides GHG emission reduction, that the country stands to accrue from the implementation of the energy mitigation and adaptation actions and measures presented in the revised NDC. The implementation of any of the mitigation measures will most likely have positive impacts on SDG 7 about energy efficiency; SDG 9 about infrastructure; SDG 12 about fuel subsidies and SDG 13 about climate action (Table 8). See Annexes 7 and 8 for details on specific targets.

Table 8: Additional SDG impacts/benefits to be achieved from implementing energy NDC actions and measures.

Reduce GHG emissions from energy sector (excluding transport sector) by 40.6% below BAU levels by 2030;	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 12:** Ensure sustainable consumption and production patterns (Fuel subsidies) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 7.1** **Target 12.a** **Target 13.2.1** **Target 13.2.2**
Create a private investment enabling environment focusing on Power Purchase Agreements (PPAs) for renewable energy (RE).	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency)	**Target 3.9** **Target 8.5** **Target 7.1**
Reduce emissions by 79.8 Gg CO2e per year by the installation of 100 MW RE plants producing 300GWh per year with load factor of 40% by 2030.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 12:** Ensure sustainable consumption and production patterns (Fuel subsidies) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 7.1** **Target 8.5** **Target 12.a** **Target 13.2.1** **Target 13.2.2**
Reconnection of Monrovia clients to the grid. Reduce emissions by 124.15 Gg CO2e per year by supporting the process by which 100% of the owners of individual generators will switch to the distribution network, by 2030.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 11:** Make cities and human settlements inclusive, safe, resilient and sustainable (Sustainable cities and communities)	**Target 3.9** **Target 7.1** **Target 9.4** **Target 11.1**

Development of off-grid small hydropower plants (HPP) and on-grid ones via PPAs.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 12:** Ensure sustainable consumption and production patterns (Fuel subsidies) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 7.1** **Target 8.5** **Target 9.4** **Target 12.a** **Target 13.2.1** **Target 13.2.2**
Reduce emissions by 15.4 Gg CO2e per year by installing a batch of several sites with 20 MW capacity; medium HPP with an output of 40 GWh/year and with 50% base load minimum for rural electrification and connected to the grid, by 2030.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 5:** Achieve gender equality and empower all women and girls **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 12:** Ensure sustainable consumption and production patterns (Fuel subsidies) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 5.4** **Target 5.b** **Target 7.1** **Target 8.5** **Target 9.4** **Target 12.a** **Target 13.2.1** **Target 13.2.2**
Develop large solar photovoltaic (PV) plants with (Independent Power Producers (IPPs) and PPAs. Reduce emissions by 0.52 Gg CO2e per year supporting the installation of in total 10 MW Capacity PV Plants with an output of 2 GWh/year by 2025.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	**Target 3.9** **Target 7.1** **Target 8.5**

	Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 9.4** **Target 13.2.1** **Target 13.2.2**
Produce and distribute energy saving cook stoves to reduce the use of fuel wood and charcoal (Link to Forest sector).	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 7.1** **Target 8.5** **Target 9.4** **Target 13.2.1** **Target 13.2.2**
Reduce emissions by 588 Gg CO2e per year by making sure 60% of households using fuel wood or charcoal are supplied with energy efficient cook stoves by 2030.	**Goal 3:** Ensure healthy lives and promote well-being for all at all ages (clean energy) **Goal 7:** Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency) **Goal 8:** Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all **Goal 9:** Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure) **Goal 13:** Take urgent action to combat climate change and its impacts (Climate action)	**Target 3.9** **Target 7.1** **Target 8.5** **Target 9.4** **Target 13.2.1** **Target 13.2.2**

Conclusion, Outlook and Recommendation

The NEPL serves as the vessel of change in the energy sector of Liberia, and it is the country's central energy policy. The NEPL came during the time of economic revitalization and infrastructure rehabilitation, reconstruction, and expansion. To bridge the gap between the realities on the ground at the time and the government vision expressed in the then PRS, the NEPL acknowledged the imminent dangers of the fossil fuel-driven economy, its environmental concerns, and the expediency in adopting a less carbon-intensive and environmentally friendly development pathway. It recommended urgent action to diversify the economy and create a sustainable energy supply mix. These were concerns addressed in its main policy issues involving the accessibility, quality, cost, and institutional framework of the energy sector. Hence, the principal objective is to ensure universal access to modern energy services in an affordable, sustainable and environmentally-friendly manner to foster economic, political, and social development in Liberia. This objective is vital for achieving the 2030 Agenda for Sustainable Development and the Paris Climate Change Agreement.

The assessment found that the NEPL was ahead of its time in policy planning to meet other medium to long-term national objectives. Some of the objectives targeted by the NEPL are the Social and Economic Development Agenda for Transformation (2012-2017), Pro-poor Agenda for Prosperity and Development (PAPD, 2018), and regional and international sustainability objectives. However, the NEPL has made moderate progress in the energy sector's economic and sectorial reforms. The policy recommendations of sectoral reformation with requisite institutional setups and legal frameworks are yet to be fully implemented. The overall intermediate opportunity outcomes at the sector level remain characterized by insufficient transmission and distribution of infrastructural networks, high tariffs, power theft, and exceedingly high technical loss rates. Other deficiencies include: high cost of diesel fuel, adulterated and often improperly calibrated volumetric gauges at petrol stations, and inefficiency at the rural level. While we recognize the limited capacity of the sector, the issue of transparency and accountability is also paramount at both rural and urban levels.

Moreover, the energy sector of Liberia, like most sub-Saharan countries, displays progressive urbanization, accelerating population rates, and climate change. Rising income levels have escalated the demand, supply, and consumption of energy products and services. These have led to subsequently increased contribution of the country's greenhouse gas (GHG) emissions into the atmosphere. These outcomes reflect the inadequacy of appropriate regulatory policy and a limited capacity to manage the environmental, social, and economic costs engendered by increased fossil fuel consumption. The sector is the largest emitter of GHG in Liberia and the world. Therefore, the energy sector is also the sector with the highest potential for the application of technologies for mitigation against climate change. (15).

The NEPL provides several socio-economic benefits. The rehabilitation of energy infrastructure and delivery of basic goods and services are evident. The current policy environment of Liberia's energy sector facilitates the achievement of the NDC targets and actions to a limited extent. The NEPL had an unachieved GHG emission reduction target due to limited financial and technological resources and insufficient enforcement and compliance mechanisms. Such achievements and limitations are worth noting because it signifies the need for more implementation of policy recommendations to meet energy related NDC targets of the government of Liberia.

To enhance the effectiveness of policy implementation based on social-economic impacts assessment and climate data. We recommend that:

- The accessibility, availability, affordability and sustainability of the energy sector will have to receive increased support by the Government of Liberia with support from private sector investors through line Ministries and Agencies:" The Ministry of Mines and Energy, Environmental Protection Agency, Ministry of Transport (Liberia Meteorological Service), National Oil Company of Liberia, Liberia Petroleum Refining Corporation, Liberia Electricity Regulatory Commission, Liberia Petroleum Regulatory Authority, and all partners and stakeholders in the energy sector, through financial, technical, and regulatory mediums.

- The GoL, through the MME and collaborating partners, should regularly update key energy policies, including the NEPL and RESMP, to create the right enabling environment for NDC and SDG implementations. Therefore, this report recommends that the GoL embrace policies to ensure that the utilization of biomass and other renewable resources (efficient cookstoves, hydro and solar) for energy do not contribute to deforestation or food insecurity. It should adopt appropriate environmental and agricultural support strategies such as tree replanting programs and limiting biofuel production to non-edible plants or food crops that are surplus to requirements. The GoL should also harmonize the policy to meet specific targets of policies that were updated in the sector. Thus, the need to mainstream the reduction of the NDC in the NEPL is primal.

- The NEPL, even when updated, may not be sufficient to fully achieve the NDC targets, actions, and measures in the long run. This deficiency may also pose difficulties in achieving specific SDG targets. Therefore, current policies and strategies geared toward the needs of people who do not have access to modern energy carriers are required. Making energy supplies more reliable and encouraging the more efficient use of energy, introducing externality taxes and incentives (such as carbon taxes and early retirement incentives for older, less efficient, more polluting energy-using devices) are recommended. Accelerating the development and wider deployment of new renewable technologies and/or clean and safe advanced fossil fuel technologies, such as: carbon capture and storage and managing methane emission are required to complement the NEPL in mitigating carbon emissions in the energy sector, thereby improving the sector's performance against SDG targets.

- Increased sensitization and information campaigns of public and private individuals and institutions by the MME concerning the benefits of renewable energy and the costs for energy products and services be a continuous process. Additionally, the Government's current and future measures to reduce these costs to the consumer be a constant process.

- To encourage private sector participation in the energy sector and to improve the development of renewable energy beyond their internal energy needs, the Government of Liberia will have to use policy schemes such as feed-in-tariffs or feed-in-premiums, auctions, or tenders, and tax incentives. Feed-in Tariffs (FiTs) provide incentives for small domestic and business renewables. The incentives are given depending on the technology, size of the installation, kWh generated, and quality of resources (25). The FiTs will improve the present state of RE in the country. FiTs can create a potential source of income for the poor rural dwellers and the low-income earners in the urban areas. Homeowners, industries, and various communities will be encouraged to generate and sell electricity from the RE source to the national grid (26).

However, its successful implementation depends on the support of the government, civil society, and private investors. Thus, more effort needs to be put in place to ensure that FiTs become a reality like in other African countries that are presently using the scheme (27).

- Seeking additional financial aid in the fight against emissions for the country must be a priority. Such a recommendation can be realized through the mobilizing of domestic public and private sources to access international support through bilateral and multilateral sources such as the Green Climate Fund, Scaling-Up Renewable Energy Programs, Sustainable Energy for All, USAID Power Africa Initiatives, Capacity Building Initiative for Transparency, International Finance Corporation and other private sectors.

- The causal link between the energy sector and high-level national outcomes must be well-established, and efforts to track performance against such objectives should not further strain the already capacity-constrained monitoring, reporting and verification processes.

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Annexes

Annex 1: List of Interviewees

Name	Job title	Subject expounded on	Interview date
Prince C. Wilson	Assistant Director of Energy/ Capacity-building Initiative for Transparency, African Energy Commission and Nationally Determined Contribution Focal Point, Ministry of Mines and Energy	Description of specific interventions, implementation strategy, responsible entities, gaps identified and alignment of the intend of the NEP with targets (mitigation and adaptation) proposed in Liberia's Revised NDC.	March 3, 2022
Christopher B. Kabah	Manager of the Department of Planning and Policy/ Energy Sector and Nationally Determined Contribution Lead, Environment Protection Agency	Identification of policy gaps and categorizing the environmental impacts and, monitoring, reporting, and verification procedures associated with the NEP	April 25, 2022
Sam S. Sumo	Senior Financial Reporting Analyst, Liberia Electricity Corporation	Economic viability of the electricity sector for socio-economic growth and development of the country.	April 21, 2022
Henry B. Carter, Sr.	Senior Manager/ Human Resources, Liberia Electricity Corporation.	Socio-economic impacts and benefits of the NEP in the empowerment of human resources in driving SDGs.	April 21, 2022
Mr. Mulbah Sayka and Mr. Oliver Arkoi	Analysts, Ministry of Finance and Development Planning	SDGs and targets the policy sought to achieve, alignment of the NEP with other national, regional, and international development plans and strategies	March 28, 2022

Annex 2: Initiative for Climate Action Transparency (ICAT) Liberia Project NDC Tracking and Policy Impact Assessment (National Energy Policy of Liberia) Questionnaire

Information	Description	Response
Title of policy	Policy name	
Type of policy	Select the type of policy, such as those presented below or categories of policies that may be more relevant to the policy being assessed. Example: • Regulations and standards • Taxes and charges • Subsidies and incentives • Voluntary agreements or actions • Information instruments • Emissions trading programmes • Research, development and deployment policies • Public procurement policies • Infrastructure programmes • Implementation of technologies, processes or practices • Financing and investment	
Description of specific interventions the policy seeks to achieve	The specific intervention(s) carried out as part of the policy, such as the technologies, processes or practices implemented to achieve the policy: Example: •**Financial incentives**: The policy provides a financial subsidy of up to 30% of project/benchmark cost for rooftop solar projects. It also provides concessional loans to solar rooftop project developers. • **Eligible technology**: Grid-connected rooftop and small solar power plants with installed capacity of 1–500 kW • **Eligible sectors**: Residential (all types of residential buildings), institutional (schools, health institutions), social sectors (community centers, welfare homes, old age homes, orphanages, common service centers), commercial and industrial facilities • **Contract and payment duration:** Up to 30% of the eligible financial assistance and services charges at the time the proposal is sanctioned; the remaining 70% after successful commissioning of projects after sample verification on submission of requisite claims.	

	• **National budget allocated to the policy:** Approximately $750 million • **Other enabling actions under the policy:** » Training and capacity-building of stakeholders involved in the programme, such as government staff, utilities, regulatory commissions, banks and workers » Development of online portal for rooftop solar systems development programme, and registration of partners, approvals and project monitoring.	
Status of the policy	Whether the policy is planned, adopted or implemented: • Ex-ante (forward-looking/to be implemented) • Ex-post (backward-looking / adopted, currently in effect or has been implemented)	
Date of implementation	The date the policy comes into effect (not the date that any supporting legislation is enacted)	
Date of completion (if relevant)	If relevant, the date the policy ceases, such as the date a tax is no longer levied or the end date of an incentive scheme with a limited duration (not the date that the policy no longer has an impact)	
Implementing entity or entities	The entity or entities that implement(s) the policy, including the role of various local, subnational, national, international or any other entities	
Objectives and intended impacts or benefits of the policy	The intended impact(s) or benefit(s) of the policy Example: (The purpose stated in the legislation or regulation)	
Level of the policy	The level of implementation, such as national level, subnational level, city level, sector level or project level	
Geographic coverage	The jurisdiction or geographic area where the policy is implemented or enforced, which may be more limited than all the jurisdictions where the policy has an impact	
Sectors targeted	The sectors or subsectors that are targeted Example: (Energy supply (grid-connected solar PV))	
Other related policies	Other policies that may interact with the policy being assessed	
Relevant SDGs the policy target.	SDGs the policy focuses on or contributes to. Example: The policy is focused primarily on SDG 3 (Good health and wellbeing), SDG 7 (Affordable and clean energy), SDG 8 (Decent work and economic growth), SDG 9 (Industry, innovation and infrastructure), SDG 11 (Sustainable cities and communities), SDG 12 (Responsible consumption and production) and SDG 13 (Climate action), while also contributing to other SDGs	

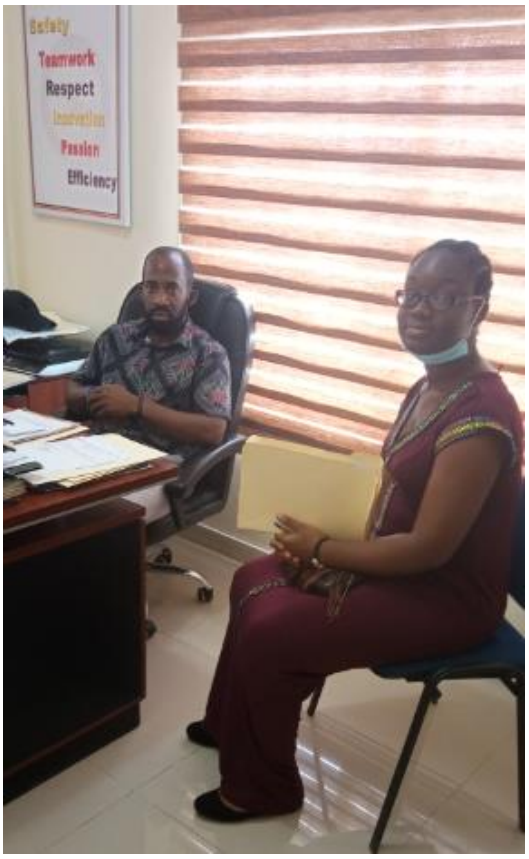
Is the policy in line with relevant targets proposed in the NDC? Yes No **(If yes, list specific targets)**	NDC target in the energy sector: **Reduce GHG emission from the energy sector (excluding the transport sector) by 40.6% below BAU levels by 2030** (Mitigation/Adaptation targets) • Create a private investment focusing on the power purchasing agreements for renewable energy • Reconnection of Monrovia city client to the grid; • Development of off-grid small hydropower plants and on-grid ones via the PPAs; • Develop large photovoltaic plants with Independent Power Producers and PPAs; • Produce and distribute energy cook stove to reduce the use of fuel wood and charcoal (link to the forest sector)	
Specific intended targets, such as intended level of indicators	Target level of key indicators, if applicable. Example: (The policy aims to install 40,000 MW of rooftop solar PV by 2022. The policy will lead to increased solar power generation in the country, contributing to greater energy independence, and increased jobs in the solar PV installation and maintenance sectors. Solar energy will also provide quick alternative power during any severe climate changes)	
What are the gaps identified since the date of implementation of the policy?	Example: Financial constraint, Sectorial coordination, favorable environment for investment etc.	
Title of establishing legislation, regulations or other founding documents	The name(s) of legislation or regulations authorizing or establishing the policy (or other founding documents, if there is no legislative basis). Example: (National renewable energy law)	
Monitoring, reporting and verification procedures	References to any monitoring, reporting and verification procedures associated with implementing the policy. Example: (Monitoring and evaluation studies of the policy will be carried out during the implementation period, as follows: • At the primary level of monitoring, channel partners are responsible for monitoring parameters such as end-use verification and compliance. They are also responsible for compiling statistical information, such as number of companies involved in the installation. • National monitors would be involved, for data on number of companies and employees active within the sector. • National monitors, consultants, institutions, civil society groups, corporations with relevant experience, and other government organizations would be involved, for ground verification/ performance evaluation on a random sample basis. • Electricity generation data should be available at the beneficiary level.	

	However, for projects above 5 kW, the system providers would also make generation data available to the government at specified intervals. • For projects 50 kWp and above, 100% field inspection is required.)	
Enforcement mechanisms	Any enforcement or compliance procedures, such as penalties for non-compliance. Example: (If evidence is presented that the applicant's information is incorrect, distributed funds will be paid back)	
Reference to relevant documents	Information to allow practitioners and other interested parties to access any guidance documents related to the policy (e.g., through websites) Example: For more information, see: http://mnre.gov.in/solar/schemes/	
Broader context or significance of the policy	Broader context for understanding the policy. Example: The current energy mix mainly consists of imported fossil fuels. Coal remains a dominant source of power generation in India. BMI Research forecasted in 2017 that coal will contribute 66% to India's power generation mix in 2025, and electricity generation from coal will increase by 5.8% between 2016 and 2025. In 2000, 67% of emissions in India were from energy generation and use. India plans a rapid increase in the renewable energy share in the national electricity generation mix, including plans to install 175 GW of renewable generation capacity by 2022. Solar is projected to contribute 100 GW of installed capacity by 2022, from the current 4 GW. Recent auctions have resulted in record low tariffs of Rs 3 (US$ 0.0446) per kWh. Rooftop solar has significant potential to contribute to national energy supply. Rooftop solar installed capacity reached 525 MW in 2015. This accounts for less than 10% of the installed utility scale solar capacity and a very small portion of the total power consumption in the country. The government's target of 40 GW of solar rooftop capacity by 2022 has injected increased ambition into the sector.	
Key stakeholders	Key stakeholder groups affected by the policy. Example: (Households, institutions (schools, health institutions), businesses, project developers, workers, utilities, banks, energy access programmes, women's organizations and cooperatives, microcredit institutions, and others)	
Other relevant information	Any other relevant information. Example: (Various implementation models are possible under the policy: • solar installations owned and operated by consumers • solar rooftop facility owned by consumers but operated and maintained by a third party • solar installations owned, operated and maintained by a third party • solar lease model, with sale of electricity to the grid • Solar installations owned by the utility or distribution company).	

Source: **Adapted from WRI (2014); Liberia Revised NDC 2021. Examples adapted from India's Ministry of New and Renewable Energy.**

Annex 3: Pictorials from stakeholder engagements

A). Engagement with Mr. Wilson, Ass. Director of Energy and CBIT, AFREC and NDC Focal Point at the Ministry of Mines and Energy in Monrovia on April 1, 2022.



B). Engagement with Mr. Carter, Senior Manager of Human Resources at the Liberia Electricity Corporation on Friday April 21, 2022.

C). Engagement with Mr. Kabah, Manager for the Department of Planning and Policy/ Energy Sector and NDC lead at the Environment Protection Agency of Liberia on April 25, 2022.

Picture Courtesies: **Princess Mary Tarpeh/ICAT/EPA @ 2022**

Annex 4: Initiative for Climate Action Transparency (ICAT) Liberia Project Policy Impact Assessment (National Energy Policy of Liberia, 2009) Follow-up Questionnaire (Face-to-face)

Dimension	Impact category	Brief description of specific impacts	Relevant Yes/No	Significant Yes/No
Environmental and Health	GHG: Climate change mitigation	The policy reduces GHG emissions by replacing fossil fuel energy with solar energy		
	Air quality, noise and other health impacts of air pollution	Reduces air and noise pollutions		
	Biodiversity and ecosystems protection; Soil quality	The policy protects ecosystem, biodiversity and increased soil quality		
	Land use change	The policy positively affects land use change		
	Waste generation	Reduced waste generation and disposal from fossil fuel processing, storage and usage		
	Alternative fuel consumption	Reduces the consumption of fossil fuel due to effective policy enforcement mechanism to promote the use of clean, alternative fuel and subsequent renewable energy		
	Respiratory illness and death	Reduces the prevalence of respiratory illnesses and other health hazards from energy emissions		
Social	Access to clean, affordable and reliable energy	The policy is expected to increase access to energy and significantly improve access to clean, affordable and reliable energy.		
	Capacity, skills and knowledge development	Improves capacity, training, skills and knowledge development in the energy sector		
	Quality and safety of working conditions	Improves quality and safety of working conditions due to more jobs in the energy sector		
	Poverty	Reduces poverty because of increase, accessible, reliable and environmentally friendly energy sources which would		

		create more employments		
	Gender equality	Promotion of gender equity and Participation of women in decision-making process in the energy sector		
Economic	Functionality and efficiency	Increases system functionality and efficiency leading to reduction in prices of energy products and services		
	Operation	Improves operations especially in the quality of system conditions and maintenance of infrastructure		
	Jobs	The policy is expected to create a significant number of new jobs in the solar manufacturing, installation and maintenance sectors		
	Revenue	Reduces annual national budget deficit as well as Increases annual national revenue		
	Income	The policy is expected to lead to significant financial savings for households, institutions and other organizations through reduced energy costs		
	Wages	The policy is expected to increase wages for workers in the solar sector, but assessing wages is not relevant to the objectives and was not expressed as a priority of stakeholders		
	New business opportunities	Creation of several new business opportunities		
	Economic activity and productivity	Increases economic activity and productivity		
	Prices of goods and services	Reduction in prices of goods and services because of increased availability and accessibility to energy services.		

Source: **Adapted from ICAT Guide for Assessing Sustainable Development Impacts**

Annex 5: Alignment of Liberia National Development Plans with Regional and Global Development Agendas

Poverty Reduction Strategy 1990 – 2015	Agenda for Transformation 2012 - 2017	Pro-poor Agenda for Prosperity and development 2018-2023	Sustainable Development Goals for 2030	Agenda 2063 Aspirations
Vision and principle: Moving toward rapid, inclusive and sustainable growth and development.	**Vision and principle**: A united people and a progressive nation meeting core expectation of stability, equity, and democracy.	**Vision and principle**: A united people and a progressive nation meeting core expectation of stability, equity, and democracy.	**Vision and principle**: "…resolved to free humans from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world onto a sustainable and resilient path. As we embark on this collective journey, we pledge that no one will be left behind."	**Vision and principle**: Building an integrated, prosperous and peaceful Africa, driven by its own citizens representing a dynamic force in the international arena.
Pillar I: Security **Goal**: To create a secure and peaceful environment, both domestically and in the sub-region, which is conducive to sustainable, inclusive, and equitable growth and development	**Pillar I**: Peace, Security and Rule of Law **Goal**: Create an atmosphere of peaceful co-existence based on reconciliation and conflict resolution and providing security, access to justice, and rule of law to all	**Pillar I**: Power to the People. **Goal**: To empower Liberians with the tools to gain control of their lives; reaching the furthest first and leaving no one behind	**Goal 1**: No poverty **Goal 2**: Zero hunger **Goal 3**: Good health and well-being **Goal 4**: Quality education **Goal 5**: Gender equality **Goal 8**: Decent work and economic growth **Goal 10**: Reduced inequalities	**Aspiration 1**: A prosperous Africa based on inclusive growth and sustainable development **Aspiration 6**: An Africa whose development is people-driven, relying on the potential offered by African People, especially its women and youth and caring for children

Pillar II: Economic revitalization **Goal**: To firmly establish a stable and secure environment and to be on an irreversible path toward rapid, inclusive and sustainable growth and development.	**Pillar II**: Economic Transformation **Goal**: To transform the economy so that it meets the demands of Liberians through development of the domestic private sector-using resources leveraged from FDI in mining and plantations; providing employment for a youthful population; investing in infrastructure for economic growth; addressing fiscal and monetary issues for macroeconomic stability; and improving agriculture and forestry to expand the economy for rural participation and food security.	**Pillar II**: The Economy and Jobs. **Goal**: A stable macroeconomic environment enabling private sector-led economic growth, greater competitiveness, and diversification of the economy	**Goal 2**: Zero hunger **Goal 5**: Gender equality **Goal 6**: Clean water and sanitation **Goal 7**: Affordable and clean energy **Goal 8**: Decent work and economic growth **Goal 9**: Industry, innovation and infrastructure **Goal 10**: Reduced inequalities **Goal 11**: Sustainable cities and communities **Goal 12**: Responsible consumption and production **Goal 13**: Climate action **Goal 15**: Life on land **Goal 17**: Partnerships for the Goals	**Aspiration 1**: A prosperous Africa based on inclusive growth and sustainable development **Aspiration 2**: An integrated continent, politically united, based on ideals of Pan-Africanism and the Vision of Africa's Renaissance **Aspiration 6**: An Africa whose development is people-driven, relying on the potential offered by African People, especially its women, youth, and children **Aspiration 7**: As a strong, united and influential global player and partner **Corresponding new deal peace building and state building goals (PSG):** **PSG 4**: Economic Foundation **PSG 5**: Revenue and Services
Pillar III: Governance and rule of Law **Goal**: To build and operate efficient and effective institutions and systems, in partnership with the citizens, that will promote and uphold democratic governance, accountability, justice for all, and that will strengthen peace.	**Pillar III**: Human Development **Goal**: To improve quality of life by investing in more accessible and higher quality education; affordable and accessible quality healthcare; social protection for vulnerable citizens; and expanded access to healthy and environmentally friendly water and sanitation services.	**Pillar III**: Sustaining the Peace. **Goal**: A more peaceful and unified society that enables economic transformation and sustainable development	**Goal 5**: Achieve Gender equality and empower all women and girls **Goal 16**: Promote peaceful and inclusive society for sustainable development, provide access to justice for all and build accountable and inclusive institutions at all levels	**Aspiration 3**: An Africa of good governance, democracy, respect for human rights, justice and rule of law **Aspiration 4**: A peaceful and secure Africa **Aspiration 5**: An Africa with a shared cultural identity, common heritage, values and ethics **Aspiration 6**: An Africa whose development is people driven, relying on the potential offered by people, especially its women and youth and caring for children
Pillar IV: Infrastructure and basic services **Goal**: To quickly embark upon the rehabilitation of infrastructure and the rebuilding of systems to deliver basic services to	**Pillar IV**: Governance and Public Institutions **Goal**: In partnership with citizens, create transparent, accountable and responsive public institutions that	**Pillar IV**: Governance and Transparency. **Goal**: An inclusive and accountable public sector for shared prosperity and sustainable development	**Goal 1**: No poverty; **Goal 5**: Gender Equality; **Goal 9**: Build resilient infrastructure, promote sustainable	**Aspiration 2**: An integrated continent politically united and based on the ideals of Pan Africanism and the vision of African renaissance

create the conditions and linkages needed to achieve broad-based growth and poverty reduction.	contribute to economic and social development as well as inclusive and participatory governance systems.		industrialization and foster innovation; **Goal 11**: Make cities inclusive, safe, resilient and sustainable; **Goal 15**: Sustainably manage forests, combat desertification, halt and reverse land degradation, halt biodiversity loss; **Goal 16**: Promotion of peaceful and inclusive society for sustainable development, and building effective and accountable institutions at all levels; **Goal 17**: A successful sustainable development agenda requires partnerships between governments, the private sector and civil society.	**Aspiration 3**: An Africa of good governance, democracy, respect for human rights, justice and the rule of law **Aspiration 6**: An Africa whose development is people-driven, relying on the potential offered by African People especially its women, and youth and caring for children **Aspiration 7**: Africa as a strong, united, resilient, and influential global partner and player
	Pillar V: Cross-cutting issues **Goal**: Mainstreaming Cross Cutting Issues across all sectors for society's overall productivity and well-being, with particular emphasis on the vulnerable segment of the country's population (Women, Children, People with Disabilities and Youth)			

Source: **PAPD, 2018**

Annex 6: Goals of the National Energy Policy of Liberia and linkages to national, regional and global development objectives and targets

"*The National Energy Policy of Liberia"* (NEPL) focuses on several strategic issues that are implied in the principal policy objective: access, quality, cost and the requisite institutional framework to move Liberia's economy and social sectors forward based on universal access to affordable, sustainable, and environmentally friendly modern energy services. The NEP falls in the category of infrastructure rehabilitation, economy revitalization and strengthening governance and the rule of law in urban and rural energy service delivery; and build human resource capacity. The National Energy Policy noted that to accomplish these objectives, Liberia needed:

1. **A "*National Energy Master Plan (NEMP)",***
2. An Energy Regulatory Board and
3. A "Reform of the Ministry of Lands, Mines and Energy and other government parastatals"

- The NEPL placed particular emphasis on reconstruction and rehabilitation of energy infrastructure across the country.
- The development and implementation of a modern "Rural and Renewable Energy Agency" and "Rural Energy Fund" were recommendations made - with focus on the Ministry of Lands, Mines and Energy (MLME) and Liberia Electricity Corporation.

Poverty Reduction Strategy 1990 – 2015	**Agenda for Transformation 2012 – 2017**	**Pro-poor Agenda for Prosperity and Development 2018-2023**	**Corresponding SDGs and Target for 2030**	**Corresponding Agenda 2063 Aspirations**
Pillar II: Economic Revitalization **Sector**: Private sector investment **Goal:** To create and restore a strong enabling environment for private sector investment and local distribution and regional exports in power sector. **Target**: To reduce or eliminate cumbersome business procedures and high administrative and regulatory cost for more international private and domestic investors to operate effectively and efficiently	**Pillar II**: Economic Transformation **Sector**: Private sector development **Goal:** Promote and sustain private sector development through enhanced economic competitiveness and diversification, increased value addition and an improved administrative and policy environment **Target:** To ensure rapid growth of international private and local investors that will lead to increased employment and wealth creation and reduced Poverty **Target:** Reduce impediments to expansion of employment and assure worker safety and environmental protection in industries.	**Pillar I**: Power to the People **Sector**: Private sector development **Goal:** To empower Liberians with the tools to gain control of their lives; reaching the furthest first and leaving no one behind **Target:** Increase access to social safety nets through social assistance, scaled-up cash transfer, and inclusion through work opportunities to reduce vulnerability and extreme poverty among disadvantaged groups and regions	**Goal 1:** End poverty in all its forms everywhere (Poverty reduction) **Target** 1.**5b**: create sound policy frameworks at the national, regional and international levels, based on pro-poor and gender-sensitive development strategies, to support accelerated investment in poverty eradication actions	**Aspiration 1:** A prosperous Africa based on inclusive growth and sustainable development **Aspiration 2:** An integrated continent politically united and based on the ideals of Pan Africanism and the vision of African renaissance

Pillar III: Infrastructure and basic services **Sector**: Energy **Goal:** To ensure that all power plants, substation transmission lines, petrol storage tanks and depots are rehabilitated and reconstructed and to build the capacity for a sustainable management of the sector. **Target**: Complete and publish the national energy policy and master plan. **Target**: Ensure the expansion of the Monrovia grid and begin to expand the grid to other cities. **Target**: Ensure the development of new hydropower generation capacity and assess other energy sources **Target**: Development of the upstream and downstream petroleum sectors and ensure that environmental impact studies are conducted and that sound environmental practices are followed.	**Pillar II**: Economic Transformation **Sector**: Power and Energy **Goal:** Increase access to renewable energy services and affordable power for community and economic transformation **Target:** To supply affordable power from the grid to MSMEs, industries and households in urban areas, while supporting alternative modes of generation that can extend electricity to off-grid areas using small-scale thermal-, solar- and hydro-technologies. **Target:** Promote a sustainable, transparent, and well-managed exploitation of Liberia's mineral resources and an equitable distribution of the benefits among citizens	**Pillar II**: Economy and jobs **Sector**: Infrastructure transformation (energy) **Goal:** A stable macroeconomic environment enabling private sector-led economic growth, greater competitiveness, and diversification of the economy **Target:** Increased economic activity and connectivity through critical energy infrastructure improvements (Reduce cost and increase generation, transmission and distribution networks and increase universal electricity access. **Target:** Increase universal electricity access, 30%; generation from 134 mw to 270 mw; reduce cost from 0.36 to 0.25 kwh; increase transmission and distribution from 511 km to 2279 km.	**Goal 7**: Affordable and clean energy **Target 7.1:** By 2030, ensure universal access to affordable, reliable and modern energy services	**Aspiration 1**: A prosperous Africa based on inclusive growth and sustainable development **Target 1.4.3.6**: At least 1% of GDP is allocated to science, technology and innovation research and STI driven entrepreneurship development. **Target 1.1.4.10:** At least 70% of the population indicate an increase in access to quality basic services (water, sanitation, electricity, transportation, internet connectivity)

Pillar III: Governance and rule of Law **Sector**: Public and Private Institutions **Goal:** To build effective and efficient institutions. **Target**: To review and revise government policies, laws and the Constitution to establish rational frameworks for better governance to strengthen and enhance the effectiveness and efficiency of public institutions and functionaries	**Pillar I**: Peace, Justice and Rule of Law **Sector**: Public and Private Institutions **Goal:** Create an atmosphere of peaceful co-existence based on reconciliation and conflict resolution and providing security, access to justice, and rule of law to all. **Target**: Maintain a secure and safe environment to enable sustainable socio-economic growth and development. **Target**: Ensure long term peace and stability through managing tensions in society to reduce the risk of future conflict, increasing social cohesion and ensuring that the principles of human rights are upheld. **Target:** Improve the negotiation, management and monitoring of concessions to ensure they contribute effectively to broad based economic and social development. **Target**: Protect the rights and dignity of all through a strengthened, credible and independent Judiciary delivering transparent justice. **Pillar IV**: Governance and Public Institutions **Sector**: Public and Private Institutions **Goal:** In partnership with citizens,	**Pillar IV**: Governance and Transparency **Sector**: Public and Private Sectors **Goal**: A more capable state with an inclusive and accountable public sector fostering shared prosperity and sustainable development **Target**: A reformed public sector exhibiting improved fiscal discipline and service delivery, and a rebalance in the concentration of economic and political activities away from Monrovia. **Target**: More robust structures in place to reduce waste and other systemic losses in the operations of Ministries, Agencies, and Commissions. **Target**: Improve tax administration for revenue-generation increases of at least 10% per annum **Target**: A complete integration and interfacing of key PFM databases – PM modules, Budget management, CSDRM, e-procurement system, CBL and TAS	**Goal 16**: Promotion of peaceful and inclusive society for sustainable development and building effective and accountable institutions at all levels. **Sector**: Public and private Sectors **Target 16.B**: Promote and enforce nondiscriminatory laws and policies for sustainable development. **Target 16.5**: Substantially reduce corruption and bribery in all their forms **Goal 17**: Partnerships for the Goals **Target 7.1**: Strengthen domestic resource mobilization, including through international support to developing countries, to improve domestic capacity for tax and other revenue collection **Target 17.8**: Fully operationalize the technology bank and science, technology and innovation capacity building mechanism for least developed countries by 2017 and enhance the use of enabling technology, in particular information and communications technology	**Aspiration 3:** An Africa of good governance, democracy, respect for human rights, justice and rule of law **Target 3.12.1.1**: At least 70% of the public acknowledge the public service to be professional, efficient, responsive, accountable, impartial and corruption free **Aspiration 5:** An Africa with a shared cultural identity, common heritage, values and ethics **Target 1.4.3.6**: At least 1% of GDP is allocated to science, technology and innovation research and STI driven entrepreneurship development **Target 1.4.3.6**: At least 1% of GDP is allocated to science, technology and innovation research and STI driven entrepreneurship development

	create transparent, accountable and responsive public institutions that contribute to economic and social development as well as inclusive and participatory governance systems. **Target**: Strengthen public institutions to ensure revenues and government assets are well managed, free from corruption and monitored and increase transparency and accountability of public and private institutions. **Target**: Improve the negotiation, management and monitoring of concessions to ensure they contribute effectively to broad based economic and social development			

Sources: **PRS, 2008; NEPL, 2009; Aft, 2012; PAPD, 2018**

Annex 7: Direct Energy targets of the global Sustainable Development Goals

Goal	Target
Goal 3: Ensure healthy lives and promote well-being for all at all ages (clean energy)	**Target 3.9:** By 2030, reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination
Goal 7: Ensure access to affordable, reliable, sustainable and modern energy for all (Energy efficiency)	**Target 7.1:** By 2030, ensure universal access to affordable, reliable and modern energy services
Goal 8: Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	**Target 8.5:** By 2030, achieve full and productive employment and decent work for all women and men, including for young people and persons with disabilities, and equal pay for work of equal value
Goal 9: Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation (Sustainable infrastructure)	**Target 9.4:** By 2030, upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes, with all countries taking action in accordance with their respective capabilities
Goal 11: Make cities and human settlements inclusive, safe, resilient and sustainable (Sustainable cities and communities)	**Target 11.1:** By 2030, ensure access for all to adequate, safe and affordable housing and basic services and upgrade slums
Goal 12: Ensure sustainable consumption and production patterns (Fuel subsidies)	**Target 12.a:** Support developing countries to strengthen their scientific and technological capacity to move towards more sustainable patterns of consumption and production **Target 12.c:** Rationalize inefficient fossil-fuel subsidies that encourage wasteful consumption by removing market distortions, in accordance with national circumstances, including by restructuring taxation and phasing out those harmful subsidies, where they exist, to reflect their environmental impacts, taking fully into account the specific needs and conditions of developing countries and minimizing the possible adverse impacts on their development in a manner that protects the poor and the affected communities
Goal 13: Take urgent action to combat climate change and its impacts (Climate action)	**Target 13.2.1:** Number of countries with nationally determined contributions, long-term strategies, national adaptation plans, strategies as reported in adaptation communications and national communications **Target 13.2.2:** Total greenhouse gas emissions per year

Source: **Energypedia.info**

Annex 8: Indirect Energy Targets of the Global Sustainable Development Goals

Goal	Target
Goal 1: End poverty in all its forms everywhere (No hunger)	**Target 1.2:** By 2030, reduce at least by half the proportion of men, women and children of all ages living in poverty in all its dimensions according to national definitions
Goal 4: Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	**Target 4.4:** By 2030, substantially increase the number of youth and adults who have relevant skills, including technical and vocational skills, for employment, decent jobs and entrepreneurship **Target 4.a:** Build and upgrade education facilities that are child, disability and gender sensitive and provide safe, non-violent, inclusive and effective learning environments for all
Goal 5: Achieve gender equality and empower all women and girls	**Target 5.4:** Recognize and value unpaid care and domestic work through the provision of public services, infrastructure and social protection policies and the promotion of shared responsibility within the household and the family as nationally appropriate **Target 5.b:** Enhance the use of enabling technology, in particular information and communications technology, to promote the empowerment of women
Goal 6: Ensure availability and sustainable management of water and sanitation for all	**Target 6.1:** By 2030, achieve universal and equitable access to safe and affordable drinking water for all

Source: **Energypedia.info**