

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: <http://unfccc.int/ttclear/support/national-designated-entity.html>
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned .PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Liberia
Request title:	The combination of Solar power and Mini Hydro to meet rural energy needs; a means of reducing carbon emissions in Liberia.
NDE	Dr. Ophelia Inez Weeks President of University of Liberia
Request Applicant:	Hon. Nathaniel T. Blama Sr. Executive Director/CEO (ENVIRONMENTAL PROTECTION AGENCY) NATIONAL DESIGNATED AUTHORITY (NDA) Contact: +231886518635 +231777518635

Climate objective:

- ☐ Adaptation to climate change
☒ Mitigation of climate change
☐ Combination of adaptation and mitigation of climate change

Geographical scope:

- ☐ Community level
☐ Sub-national
☒ National

☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Liberia has an overall lack of energy access which presents a major challenge to the country's development agenda. At approximately 12%, Liberia has one of the lowest electricity access rates in the world. In the capital city of Monrovia, less than 20% of the population has access to electricity. In most rural areas of Liberia, less than 5% of the population has access to electricity unlike those in some part of the South-eastern counties like Maryland, Grand Gedeh and the Northern part of Nimba that import power from neighbouring countries under the West African Power Pool Project (WAPP). The current energy situation in Liberia is dominated by traditional biomass consumption for cooking, heating and lighting. Less than 2% of rural population have access to the relatively poor quality and expensive modern energy services. It is estimated that over 95% of the country's energy needs are met by firewood, charcoal, and palm oil (EPA, 2008). As a result, there is an urgent need for reliable and affordable improved electricity services to support Liberia's economic transformation and improved human development post-conflict. Moreover, the country is susceptible to the adverse effects of climate change due to increased vulnerability and exposure. Shifting cultivation in the agriculture sector, unsustainable logging practices, unregulated coastal mining, high level of biomass consumption in the form of charcoal and fire wood for local energy use, and decreasing river flow due to high level of evaporation are factors contributing to climate change in Liberia. Current climate change vulnerability in Liberia include increase in extreme events (e.g., exacerbated floods, extreme drought), sea level rise, flooding and coastal erosion currently being experienced on an annual basis in coastal cities such as Monrovia, Buchanan and Greenville (EPA, 2019). Climate change impacts experienced by the country are manifested as high nocturnal temperatures, raising sea levels and changes in rainfall intensity and patterns.

Modern energy services based on electricity and petroleum products are mainly used for economic production and transportation. The use of modern energy services in the household sector consists primarily of kerosene, electricity diesel fuel generators, and to a lesser extent liquefied petroleum gas. Carbon dioxide (CO₂) is responsible for 50-60 per cent of the local GHG emissions in the country according to the 2004 National Biodiversity Strategy and Action Plan of Liberia. Most of the CO₂ emissions emanate from the use of petroleum products, while the remaining come from traditional farming practices where woody biomass is burned during cultivation (EPA, 2004). Baseline estimates of electricity demand range from 11 to 25 MW, rising at an average of 10.3% annually by 2010 and then decreasing slightly to a 3.4% growth annually until 2020. Demand in the residential, commercial, and institutional subsectors will be within the range of 10-12% by 2025. For the industrial subsector, a growth rate of 5% is applied for a business-as-usual (BAU) scenario between 2008 and 2015 but will be followed by a more rapid growth rate of about 12% as the country attempts to restore the full industrial capacity that existed before the war. By 2030, the Government of Liberia aims to meet an anticipated peak demand of 300 MW and serve 1 million customers, connecting 70% of the population in Monrovia and providing access to 35% of the rest of Liberia.

Currently Liberia is making some great efforts towards mitigating climate change. The country under its Technology Needs Assessment (TNA) process has identified three sectors that include agriculture, energy and the coastal erosion sectors. Earlier the government of Liberia conducted a series of national-level analysis of the technologies and practices that can either reduce the sources of GHG emissions or enhance their sinks and at the same time support sustainable development.

In the energy sector, the country targets included reduction of GHG emissions by 10%, improvement in energy efficiency by 20%, raising the share of renewable energy to 30% of electricity production and 10% of overall energy consumption, and increasing the share of biofuels in the transport sector to 5%. The trajectory of emissions was expected to be 647 Gg in 2015, increasing to 3,435 Gg in 2038 for the residential, commercial, and institutional (RCI) subsectors and to about 32,000 Gg by 2038 for the transport subsector. The emission of CO₂ from the industrial sector is expected to grow from 229 Gg CO₂ in 2015 to 404 Gg in 2020, 711 Gg in 2025 and 1,253 Gg CO₂ in 2038. However, targets that were set for 2015 were disrupted due to the 2014 Ebola outbreak which saw the country declined economically.

Liberia has six major rivers. They are Mano River, St. Paul River, St. John River, Cavalla River, Lofa River, and Cestos River. The Liberian rivers are rain-fed and empty into the Atlantic Ocean. The country has two major seasons; the dry and the rainy seasons. The seasons are divided into equal parts which makes it feasible to implement both the solar and mini hydro project to reduce the use of biomass for energy. Liberia records an annual rainfall of 5 meter per year which is an enormous hydroelectric potential. Mini hydroelectric systems can provide clean electricity to communities with very little environmental impact and greenhouse gas emissions.

Since the rivers of Liberia are rain-fed, there is a tendency that the amount of water in the rivers especially during the dry season will reduce thereby leading to the reduction in the amount of electric power supply for household. The country also has enormous potential for grid tied solar system because Liberia is located within the equatorial belt (which lies between latitudes 15 °S and 15 °N) and receives the second highest solar radiation on earth. Therefore, this project sees low or lack of income to purchase electricity as a barrier to the production and distribution of energy to rural communities.

Sectors:

Please indicate the main sectors related to the request:

- | | | | |
|--|--|--|---|
| <input type="checkbox"/> Coastal zones | <input checked="" type="checkbox"/> Early Warning and Environmental Assessment | <input checked="" type="checkbox"/> Human Health | <input checked="" type="checkbox"/> Infrastructure and Urban planning |
| <input checked="" type="checkbox"/> Marine and Fisheries | <input checked="" type="checkbox"/> Water | <input checked="" type="checkbox"/> Agriculture | <input checked="" type="checkbox"/> Carbon fixation |
| <input checked="" type="checkbox"/> Energy Efficiency | <input type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Industry | <input checked="" type="checkbox"/> Renewable energy |
| <input checked="" type="checkbox"/> Transport | <input type="checkbox"/> Waste management | | |

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

- | | | | |
|---|---|--|---|
| <input checked="" type="checkbox"/> Communication and awareness | <input checked="" type="checkbox"/> Economics and financial decision-making | <input type="checkbox"/> Governance and planning | <input checked="" type="checkbox"/> Community based |
| <input type="checkbox"/> Disaster risk reduction | <input checked="" type="checkbox"/> Ecosystems and biodiversity | <input checked="" type="checkbox"/> Gender | |

The project intends to develop, construct and operate three (3) scattered stand-alone mini hydro plants, distribution network and technical assistance for the period of 1 year. The 3 mini-grids will see over 100,000 people with electricity. This project will set up solar power plants in 3 communities to provide electricity for three major schools which will enhance education. For each of the sites, the project provides for the construction of the dam, power plant, the connecting line, distribution systems and home connections, necessary training for carrying out maintenance on the installations.

The Project aims to accelerate the uptake of mini hydroelectric and grid-tied solar PV technologies so as to reduce national dependency on imported fossil fuels and support Liberia on its path towards more decentralized, inclusive and resilient development. Moreover, this project intends to reduce the use of biomass and contribute to the overall objectives of national government to meet its target of reducing carbon emissions by 10% in 2030.

The technical assistance requested will go towards achieving the following objectives and targets:

- The project overall objective to increase rural communities access to electricity thereby reducing carbon emissions significantly.
- The project targets developing, constructing, and operating 3 mini-hydro plants and the installations of solar power in 3 rural community schools which will improve over 100,000 people lives in three counties.
- 3 mini dams, power plants, lines, training of 50 people for maintenance services, and 60 solar panels.
- It is expected that a component of the project will pursue the design of innovative business and financing models for mini hydroelectric and grid-tied solar PV technologies in Liberia, as well as strengthening of technical capacities and project development skills among public and private stakeholders.
- It is also expected that the project will provide technical assistance for the design and optimization of the isolated grid systems in the country.
- Further, an expected output of the project will be the development of methodologies for evaluation and technical optimization of mini hydroelectric and grid-tied solar PV systems with a view on technically sustainable, low-emission and least-cost electricity supply.

Expected timeframe:

This project will be implemented in one year in the 3 counties across Liberia.

Anticipated gender and other co-benefits from the technical assistance:

Gender equality as indicated amongst sustainable development goals has a vital importance in relation to mitigation and adaptation to climate change. The effective mainstreaming of gender requires planning and resources in order to manifest it into action. Climate Change mostly affects women in situation of poverty as they tend to rely more on nature resources. As climate change is causing changes in global temperatures, weather patterns and ecological systems in Liberia and the world at large, so is the women are challenged by social and economic difficulties. The anticipated technical assistance will provide local health facilities electricity to function effectively. Thereby provide medical support to cater to women and children. The provision of electricity and storage for agricultural produces will also reduce food shortage and assists local women to a greater planning over harvest, transportation, flexibility and greater control over where and what time to deliver their produce. In Liberia, women are of vital importance to the national economy. They are responsible for some 60% to 80% of food production. In many of the farming communities in Liberia, women are the main custodians of knowledge on crop varieties and they are the most vulnerable group to sicknesses.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity	Dr. Ophelia Inez Weeks President of University of Liberia
Request Applicant	Hon. Nathaniel T. Blama Sr. Executive Director/CEO (ENVIRONMENTAL PROTECTION AGENCY) NATIONAL DESIGNATED AUTHORITY (NDA) Contact: +231886518635 +231777518635 nblama@epa.gov.lr
Please add as many stakeholders and lines as required.	

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments, Low Emission Development Strategies, Nationally Appropriate Mitigation Actions, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.

Reference document (please include date of document)	Extract (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	REPUBLIC OF LIBERIA INTENDED NATIONALLY DETERMINED CONTRIBUTIONS (INDC) Reference (Page 4-15)
Technology Needs Assessment	Mitigation and Adaptation
National Adaptation Plans	Agriculture and Coastal Erosion
Nationally Appropriate Mitigation Actions	Energy
Add others here as relevant	

Development of the request (up to 2000 characters including spaces):

A team comprising of NDE, the TNA National Coordinator, Ministry of Land Mines and Energy and relevant Consultants was formed by the NDA to work on the proposal. The Mitigation arm of the EPA as well as the mitigation consultant of the ongoing TNA process worked closely with the TNA Coordinator to develop the proposal before submission to the Team for comments. Rounds of recommendations were considered from all involved ministries and Agencies before the final submission for the NDE's signature.

Background documents and other information relevant for the request:

- INDC
- TNA (Ongoing)

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms¹.

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

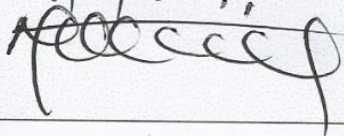
Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☒ **Initial engagement:** The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

☒ **Advanced engagement (preferred):** The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name: Hon. Nathaniel T. Blama Sr.

Date: 4/9/19

Signature: 

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.

I understand that, after the completion of the requested assistance, I shall support CTCN efforts to

¹ Please see:

https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:

NDE name: **Dr. Ophelia Inez Weeks**

Date: *Sept 16, 2019*

Signature:

[Handwritten Signature]

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.