

EXECUTIVE SUMMARY

E.1 INTRODUCTION

Planet One Energy Limited intends to develop four (4) different PV solar power projects with a combined design capacity of 50MW, located in four different locations in Sierra Leone: Port Loko in Port Loko District, Makoth in Bombali District, Kono in Kono District and Bo/Bandajuma in Kono District. Planet Solar Energy is seeking finance for the construction and operation of the Project from Frontier Energy, to be one of the investors in the project.

E1.1 Project Location

The proposed Port Loko Solar PV Power Plant will be located in a greenfield site approx. 2.7km north east of Port Loko Town along the Port Loko-Kambia Road. The site covers an area of 21.9 acres The land lies at an altitude of approx. 59m above sea level.

Site Boundary Coordinates

Id	Name	Description	Lat	Long	Northings	Eastings
1	SLS120/21 BP1	BP1	8.777077	-12.7659	970938	745770
2	SLS120/21 BP2	BP2	8.776879	-12.7645	970917	745921
3	SLS120/21 BP3	BP3	8.776295	-12.7636	970853	746026
4	SLS120/21 BP4	BP4	8.775032	-12.764	970713	745979
5	SLS120/21 BP5	BP5	8.772903	-12.7647	970477	745898
6	SLS120/21 BP6	BP6	8.773714	-12.7659	970566	745774
7	SLS120/21 BP7	BP7	8.774442	-12.7667	970646	745681
8	SLS120/21 BP8	BP8	8.77576	-12.7663	970792	745726
9	Port Loko	Project Site	8.775427	-12.7651	970756	745858.5

E1.2 ESHIA Study Addendum Objectives

In order to comply with Sierra Leones Environmental Protection Agency (EPA) requirements, Planet Solar Energy commissioned a consultant to carry out Environmental, Social and Health Impact Assessment (ESHIA) of the 4 sites and obtained the statutory EPA Licence in 2019. An Environmental and Social Due Diligence (ESDD) was further carried out in September 2021 which established some gaps in the report and recommended an ESHIA Study Addendum. The ESDD also recommended that the ESHIA Addenda Reports for the 4 sites be standalone.

This ESHIA Study Addendum is for the development of a 3MW Solar PV Power Plant at Port Loko in Port Loko District, Sierra Leone.

E1.3 ESHIA Study Addendum Methodology

The ESHIA Study Addendum methodology followed a systematic process that predicted and evaluated the impacts the project could have on the physical, biological, social/ socio-economic and cultural environment, and identified measures that the Project will take to avoid, reduce, mitigate, offset or compensate for adverse impacts; and to enhance positive impacts where practicable.

The study methodology comprised of the following activities:

- Preliminary meetings and document review;
- Environmental Baseline Data collection;
- Site inspection and discussions with site personnel;
- Air and Noise baseline monitoring;
- Ecological Assessment;
- Baseline Socio-Economic Studies;

- Community Resources Mapping;
- Meetings and engagement with stakeholders;
- Public Consultation on project impacts;
- Data analysis and assessment of impacts;
- Development of various management interventions to mitigate impacts;
- Public Disclosure Meeting;
- Reporting.

E2 PROJECT DESCRIPTION

The proposed Port Loko Solar PV Power Plant will be located in a greenfield site approx. 2.7km north east of Port Loko Town along the Port Loko-Kambia Road. The power generated will be evacuated through a new 2.7km long 11kV transmission line to be developed as part of the project. This will be connected to the local distribution grid via an existing government substation (which has capacity to receive the generated power on plug and play basis).

E3 LEGAL FRAMEWORK

The applicable frameworks that have been used in this study are:

a) National Guideline

- The EPAA 2008 is the cardinal legislation on environmental protection for the government of Sierra Leone.

The proposed Solar Plant project is listed in First Schedule of the Act. In compliance with this Act, an ESIA Study was carried out and an EIA License issued in 2019. The implementation of the project will need to comply with requirements of this Act during construction, operation and decommissioning.

b) International Standards that include:

- Under the IFC Performance Standards (2012), the proposed project has minimal environmental and social impacts that will arise during construction and operation phases therefore falls under Category B of IFC PS1.

The IFC PS on Environmental and Social Sustainability

PS	Performance Standard	Remarks
PS1	Assessment and Management of Environmental and Social Risks and Impacts.	<i>Applicable</i> <i>There are Environmental and Social risks that will arise during construction</i>
PS 2	Labour and Working Conditions	<i>Applicable</i> <i>The project is going to employ skilled and unskilled workers to offer services in the project and their welfare will need to be taken care of.</i>
PS 3	Resource Efficiency and Pollution Prevention	<i>Applicable</i> <i>There are project activities like maintenance of vehicles and machines, fugitive dust and exhaust emissions that have the potential to cause pollution.</i>
PS 4	Community Health, Safety, and Security	<i>Applicable</i> <i>Community members will be employed in the project. Project vehicles will also be transporting materials and waste outside the site exposing community members to safety risks</i>
PS 5	Land Acquisition and Involuntary Resettlement	<i>Applicable</i> <i>Although the proposed land for the Port Loko Solar PV Power Plant had been amicably acquired by Planet Solar Energy and a long-term lease for 25 years obtained, the transmission line will run along an existing road corridor that is crowded, narrow and in some cases developed to the edge of the road.</i> <i>The transmission line corridor will require a RAP to be prepared</i>

PS	Performance Standard	Remarks
PS 6	Biodiversity Conservation and Sustainable Management of Living Natural Resources	Applicable The project site is neither a protected area nor a key biodiversity area. The site is highly disturbed through frequent fires, charcoal burning and fuel wood cutting rendering the area a modified habit. No part of the project area can be considered critical habitat since there are no trigger species.
PS 7	Indigenous Peoples	Not Applicable There are no indigenous peoples in the project area.
PS 8	Cultural Heritage	Not Applicable The site was previously an agricultural land and the community members confirmed absence of any known physical cultural resources. However, given the earthworks involved, a chance find procedure has been incorporated as presented in Appendix 5 .

- According to EIB Environmental and Social Standards, the project is listed under Annex II - Industry Energy that requires screening and development of necessary mitigation measures and therefore falls under Category B.

The applicable EIB Environmental and Social Standards used in the study

Standards	Standard	Remarks
1	Environmental and Social Impacts and Risks	Applicable ESHIA Study Addendum is being carried out to identify potential impacts for mitigation
2	Stakeholder Engagement	Applicable There are stakeholders that need to be meaningfully consulted and engaged
3	Resource Efficiency and Pollution Prevention	Applicable Project will use machines and vehicles that can impact soil and other resources
4	Biodiversity and Ecosystems	Applicable. The project site is neither a protected area nor a key biodiversity area. The site is highly disturbed through frequent fires, charcoal burning and fuel wood cutting rendering the area a modified habit. No part of the project area can be considered critical habitat since there are no trigger species.
5	Climate Change	Not Applicable The Solar PV Power Plant project is addressing climate change by endeavouring to reduce GHG
6	Involuntary Resettlement	Applicable Although the proposed land for the Port Loko Solar PV Power Plant had been amicably acquired by Planet Solar Energy and a long-term lease for 25 years obtained, the transmission line will run along an existing road corridor that is crowded, narrow and in some cases developed to the edge of the road. The transmission line corridor will require a RAP to be prepared
7	Vulnerable Groups, Indigenous Peoples and Gender	Partially Applicable The project area has gender issues
8	Labour Rights	Applicable The project will employ people and there is potential for labour influx. Worker's rights issues will arise
9	Health, Safety and Security	Applicable There construction activities that will pose safety risks hence require assessment
10	Cultural Heritage	Not Applicable The site was previously an agricultural land and the community members confirmed absence of any known physical cultural resources. However, given the earthworks involved, a chance find procedure has been incorporated as presented in Appendix 5 .

- The World Bank (WB) Group's Environmental, Health and Safety (EHS) Guidelines were also applied.

E.4 BASELINE ENVIRONMENTAL AND SOCIAL CONDITIONS

E4.1 The Physical Environment

The vegetation at the site is typically a wooded grassland with scattered and disturbed secondary forest trees and farm bush. There are no wetlands within the site but the area is surrounded by disturbed secondary forest. The site slopes southwards a stream (approx.300m away) that drains into Bankasoka River (800m away). The site covers an area of 21.9 acres at an altitude of approx. 59m metres above sea level. The paved Port Loko-Kambia Road that passes along the northern boundary of the site will be the main access road to the site.

E4.2 Climate

The average annual rainfall is about 3010mm. Most rainfall occurs in August with a monthly average rainfall of 760mm. The lowest rainfall occurs in the month of January (3mm). The months when Port Loko receives plenty of rainfall are July and August while the months when least rainfall occurs are January and February. The average annual temperature is 30°C in Port Loko. The warmest month of the year is January, with an average temperature: 31.4°C. Usually, August is the coldest month in Port Loko, with average temperature 28.1°C. The difference between the hottest month: January and the coldest month: August is: 3.3°C.

E4.3 Topography

Port Loko Town and its environs are characterized by heights between 3m and 65m above sea level. The topography of the area is undulating with most areas being at fairly high elevation while the Banakasoka River basin being as low as 3m above sea level. The site is located at an elevation of 59m above sea level.

E4.4 Geology and Soil

The Port Loko Site is located in the Kasila Group. The Kasila Group is distinctive group of mafic gneisses and granulites that lies along the south-western part of the West African craton of Sierra Leone and passes south-eastward into Liberia. They consist of gabbros, amphibolites, hornblende schists, garnet-mica schists, and charnockitic and anorthositic granulites with a predominantly north-west to southeastern strike and showing some signs of isoclinal folding and intensive shearing. The lithology of the Kasila Group is dominated by fine- to medium-grained basic granulites with minor horizons of quartz magnetite, quartz diopside, and sillimanitic rocks. The granulites are intruded by deformed gabbros, anorthosites, and ultramafics in which relict igneous textures have survived the PanAfrican reworking in zones where shearing was less intense (Morel, 1979).

Soils in Port Loko site are found in dissected low plateaux of low to moderate relief on a Precambrian granulite and local mylonite. These Soils are moderately shallow, reddish loam to clay loam with high gravel content. During the dry season, these soils can easily be blown by the wind or raised when a vehicle passes through to generate fugitive dust.

E4.5 Hydrology and Hydrogeology

Hydrology

The Port Loko site drains in the Rokel River Basin. The Rokel basin is covering an area of approximately 10,600 km². The Site is saddled between Bankasoka and Kamaranka River Catchment. The two rivers flow south westwards towards Port Loko where they join and continue as one river to the Atlantic Ocean. The site gently slopes southwards towards a stream (300m downstream) and feeds into Bankasoka River (800m). No surface water passes through the site.

Hydrogeology

The Basement Complex, Leonean and Liberian Granites – Kasila Group composed of gneisses and granulites. There is typically a layer of highly weathered rock –the regolith. This is generally up to 20 m thick, although up to 37 m thick has been seen.

At the base of the weathered zone, the underlying crystalline bedrock of the Archean Gneisses is often extensively fractured and not clay rich, and can store and transmit groundwater through fractures. The average thickness of the fractured aquifer zone is 35 m, but it can be as thick as 60m. Borehole yields in this formation are typically between 0.3 and 1.5 l/s. This deeper, fractured aquifer zone is typically a more sustainable groundwater source than the upper weathered zone. It also has more potential for the natural attenuation of contaminants, because of the overlying clay zone and the longer pathways. In 2017, HydroNova (USA) conducted an extensive survey on all existing hydrogeological data in Sierra Leone and estimated the average yield of the aquifers in Koidu Area at 2l/s which translates to 7.2m³/hour.

E4.6 Baseline Data Collection and Analysis

In order to have baseline data for future monitoring purposes, on site measurements were carried out and the results are provided below.

a) Ambient Air Quality

The project site is located in the outskirts of Port Loko Town CBD approx. 2.7km east along the paved Port Loko-Kambia Road. During the dry season, other unsealed roads, slash and burn agriculture practices, windblown dust from exposed areas of land, and smoke from domestic wood fires contribute negatively to the air quality. However, the ambient air quality is expected to be good, with levels of pollutants very likely to be below detection limits all due to the rural nature of the proposed project area.

Air samples were measured for Particulate Matter (PM₁₀ and PM_{2.5}), Sulphur Dioxide (SO₂), Nitrogen Dioxide (NO₂). All the parameters measured were found to be within the limits contained in the Sierra Leone Standard Bureau (SLSB) and World Health Organisation (WHO) guidelines.

b) Ambient Noise Levels

The noise baseline measurements were carried in the same location as the Air Quality Measurements. There are no major sources of noise pollution apart from the vehicles passing along the Port Loko-Kambia Road. The main existing noise sources in the area mostly emanates from motor cycle and vehicles passing through the area. The results from the noise level assessments have registered values that comply with the Sierra Leone Standards Bureau (SLSB) and World Health Organisation (WHO) guidelines.

c) Physical Cultural Resources

The proposed Port Loko Solar Power Plant site was farming land used for growing trees especially oil palm trees before it was acquired by Planet Solar Energy (SL) Ltd. Consultations with the local community and leaders have confirmed there are no physical cultural resources at the proposed site. It has been a farmland for the period the landowners have owned it.

d) Ecological Resources

The site is characterized by wooded grassland with scattered and disturbed secondary forest trees and farm bush. Common tree species include *Bombax ceiba*, *Elaeis guineensis* among others. There is no wetland habitat within the site but there are substantial areas of disturbed secondary forest in the neighbourhood. Fauna species recorded at the site include, five (5) mammals, forty-two (42) birds and thirteen (13) reptiles. Other species include butterflies, dragonflies, beetles, spiders, grasshoppers etc.

e) Socio-economic Environment

The proposed Port Loko Solar PV Power Plant will be located in a greenfield site approx. 2.7km north east of Port Loko Town along the Port Loko-Kambia Road.

A total of 20 socio-economic questionnaires were administered to the project area community. Contrary to the general assumption that agriculture remains the backbone of the economy in Sierra Leone, 70% of the respondents from the household survey in Port Loko stated to be engaged in commercial enterprise to maintain their respective family. This was followed by employment in the formal sector (teaching, banking, law, medical etc.), accounting for 35%; with farming scoring only 25%. The trend depicts that Port Loko Town is an urban setting, with most people engaging in entrepreneurship or small businesses.

E5 ANALYSIS OF PROJECT ALTERNATIVES

An analysis of “With” and “Without” Project scenario revealed that the positive impacts outnumbered the adverse impacts due to the proposed development. The adverse impacts are envisaged only during the construction phase which will be temporary in nature and of a short duration. Appropriate mitigation measures will be adopted to limit these adverse impacts during the construction phase.

The current electricity production in the country cannot meet the demand. Majority of the users who are not connected to the national grid use thermal generators which are polluting the environment and increasing GHG. The proposed project will alleviate shortage of electricity supply in the Country and at the same time reduce dependence on fossil fuel for production of power resulting into considerable reduction in greenhouse gas emissions.

E6 PUBLIC AND STAKEHOLDER CONSULTATIONS AND DISCLOSURE

Public consultations were carried out as an integral part of the social and environmental assessment process of the project with an objective to inform and educate stakeholders about the proposed actions and to receive and record public perceptions about the project. It assisted in identification of the likely issues and problems associated with the project as well as the needs and concerns of the population likely to be impacted. This participatory process helped in reducing the public concerns and enabling participation of the local people in this development process.

E6.1 Key Informants Interviews

Initial engagement with Key Stakeholders was done in January 2022. Further consultations were carried out in February 2022. Each Key Stakeholder was visited, provided with a brief on the proposed project before their views were sought through an interactive interview session. Refer **Appendix 2** of this report.

E6.2 Public Consultation Meeting

The Public consultation meeting was held on 5th February at Town Barry Hall, Port Loko Town, Sierra Leone. The local community and relevant stakeholders including government representatives participated in this meeting.

The meeting was attended by a total of 121 participants (95 male and 26 female). The agenda, minutes of the meeting, list of participants and attendance sheets are provided as **Appendix 3**.

E6.3 Public Disclosure Meeting

Project impacts disclosure meeting was carried out on Wednesday 4, May 2022 at Town Barry Hall, Port Loko Town, Sierra Leone. The meeting was convened to disclose the findings of the study and the project mitigation measures that will be carried out to reduce/eliminate the identified impacts. It also discussed the next steps in the project process. The meeting was attended by a total of 76 participants.

The key outcomes of the meeting were:

- The identified impacts can be managed through the mitigations provided in the ESMP;
- The community and the other stakeholders supported the implementation of the project;
- Community committee was formed with the following representation:
 - ✓ Town chief
 - ✓ Member of Parliament
 - ✓ Councillor
 - ✓ Religious reps x 2
 - ✓ Mammy Queen (women)
 - ✓ Youth
 - ✓ Physically Challenged

The minutes of the meeting are provided in **Appendix 4**.

E7 PROJECT IMPACTS AND MITIGATION MEASURES

The project has both positive and potential negative impacts. Detailed evaluation of the impacts and mitigation measures are provided in Chapter 7 of this Report. A summary of these impacts including enhancement measures for the positive impacts and mitigation measures for the negative impact are provided below.

E7.1 Positive Impacts

- a) ***Climate Change Mitigation and Adaptation*** – The Solar PV Power Plant will generate 3MW of clean energy that shall be evacuated to the local grid. The proposed enhancement measure is to have the youth taking interest in enhancing their knowledge in the green energy sector. The project can impart skills and knowledge of the solar power technology to the youth through hands on engagement and training.
- b) ***Employment opportunities for Youth and Community*** - The project will provide job opportunities for the youth and members of the community. The proposed enhancement measures include preparing and implementing a gender plan to promote equity in job issuance and offer training opportunities and apprenticeships to males and females in the project area in order to enhance their skills.
- c) ***Opportunities to Offer Services*** - The workers at the solar plant will require various goods and services to be provided by the community members. Proposed enhancement measures include giving priority to Port Loko project area community members to provide goods and services. Such services should be on an arranged programme making the community members offering such services maximize benefits from their services.
- d) ***Provision of Market for Local Materials*** - During construction, materials that will be used at the solar plant that are available locally will be sourced locally for the development of the facility. Proposed enhancement measure includes offering opportunity to supply building materials such as cement, sand and other small accessories and tools to project area community members as first priority.
- e) ***Generation of Electricity to the National Grid*** - By generating 3MW of electricity from solar power and connecting it to the Grid, this will contribute to lowering the need to use energy generated from sources that are releasing GHG. Since there is a huge power deficit in the country, the Government should encourage for more investments in solar power by IPPs and more training programmes for the youth on solar energy.

E7.2 Negative Impacts and Mitigation Measures

a) Land Use change

Impacts - The land use is changing from agricultural use to a commercial land for production of solar power.

Mitigation - The impacts on land use change will be confined to the project footprint and the remaining area of the site will be used to enhance the ecology of the site area.

b) Soil Erosion and Contamination

Impacts – During site preparation, soil will be excavated and made loose. This will result in soil erosion and siltation of downstream surface water sources i.e. the swamp and the streams passing through the site. Oils, fuels and chemicals used at the site may spill on to the soil and cause contamination.

Mitigations – Put in place soil control measures including compacting excavated soil, sprinkling of water and ensuring speedy removal of excavated soil for appropriate reuse or disposal. Machines and vehicles to be well maintained to avoid oil leaks to the ground. Oils, fuels and hydraulic fluids are to be stored on paved areas with containment.

c) Air Quality

Impacts - Fugitive dust and exhaust emissions will arise during construction activities at the site and vehicle movements inside the site and outside.

Mitigations – Removal of vegetation from the project footprint areas only. Control of vehicle speeds and sprinkling water to suppress dust. Vehicles should be well maintained and unnecessary raving of engines and idling should be minimized to reduce exhausted emissions. Workers to be provided with nose masks to protect them from inhalation of fugitive dust and exhaust emissions.

d) Noise Emissions

Impacts – Machinery and vehicles being used during construction will generate noise.

Mitigations – Ensuring vehicles and machines are well maintained. Minimizing vehicle movements and instructing drivers to minimize raving of vehicles and other machinery. Workers to be provided with ear muffs to protect them from excess noise.

e) Biodiversity

Impacts – Removal of vegetation from the project site may result in loss of habitat for small mammals, and some reptiles. There is high potential for invasive species to invade cleared areas.

Mitigations – Only clear vegetation from the project footprint areas. Carry out clearing of vegetation systematically and with caution to allow for fauna to migrate to neighbouring areas. Uproot any invasive species that emerge in a timely manner. Ensure workers do not kill any fauna encountered at the site. Promote the planting of trees in areas not directly affected and nurture them to grow.

f) Occupational Health and Safety

Impacts – Injuries or accidents may occur during construction arising from using machines and tools. Those working at heights may be exposed to falls.

Mitigations – Contractor to prepare and implement an Occupational Safety and Health Management Plan (OSHMP) and provide workers with appropriate PPE to protect them from injuries. Those working at heights shall be provided with harnesses. Contractor to ensure PPEs are well used by workers.

g) Physical Cultural Resources

The site was previously an agricultural land and the community members confirmed absence of any known physical cultural resources. However, given the earthworks involved, a chance find procedure has been incorporated as presented in **Appendix 5**.

h) Solid and Liquid Waste

Impacts – During construction, the domestic waste from the contractor’s camp and construction waste from construction activities will be generated. There will also be sanitary waste generated at the site.

Mitigations – Contractor shall provide appropriate waste bins within the site and encourage waste segregation. An approved firm shall be engaged to collect waste for appropriate disposal.

Hazardous waste like used oil and hydraulic fluid is generated, the Contractor shall manage the handling of such waste through the use of a Chain of Custody Form for accountability. Approved hazardous waste handling firm shall be engaged to dispose of such waste.

i) HIV and Communicable Diseases STIs

Impacts – The project area is susceptible to the spread of HIV/AIDS and other communicable diseases

Mitigations – Contractor to provide HIV/STIs Management Plan. And sensitize workers and the community on prevention mechanisms. Provision of protection items like condoms to be availed to workers.

j) Community Health and Safety

Impacts -The presence of machinery and vehicles moving in and out of the project site may pose safety risks to community members or those using the access road to the site.

Mitigation – Evaluation of risks associated with vehicle and machine movements to be done and measures put in place including identification of appropriate routes and instruction of drivers to control speeds.

k) Impact of Increased Traffic

Impacts – The Contractors vehicles will increase this traffic. The turnoff to the site from the major will heighten the risk of accident.

Mitigations – The Contractor shall prepare a traffic management plan and post traffic marshals at the identified potential accident spots.

l) Water Resources

Impacts – Construction activities will have modest demand for water. It is estimated that during operation that each event of cleaning of the 7,560 modules will be 15,120 litres of water assuming each module requires approx. 2 litres.

Depending on the level of dust in the project area, cleaning may be required as often as every month escalating the water demand to 181,440 litres.

Mitigation – The Contractor to drill a dedicated borehole for the project operations at the facility.

E8 Grievance Management/Redress Mechanism

A Grievance Redress Mechanism GRM has been formulated to receive and facilitate resolution of complainants (project affected people, local community and workers) concerns and grievances regarding the project’s performance during the construction, operation and decommissioning phases of the project.

The mechanism will be able to address the concerns and complaints in a timely fashion by using an easy to understand, transparent and effective grievance redress process that is readily accessible to all segments of the project area population including workers and community members.

E9 COMMUNITY DEVELOPMENT ACTION/Framework

The Consultant engaged with the local community and from these consultations, certain socio-economic areas were found to be inadequate, a list of which has been provided under Chapter 9 of this report.

E10 CONCLUSION AND RECOMMENDATIONS

E10.1 Conclusion

The proposed Solar PV Power Plant is not expected to cause any significant adverse effects on the surrounding environment. On the other hand, it will increase the available power on the national grid and contribute to the reduction of GHG emissions.

E10.2 Recommendation

Port Loko site is neither a protected nor a key biodiversity area. Furthermore, the site has no wetland areas or IUCN red list species. It is therefore considered that the proposed project will not have major impacts on biodiversity if the proposed mitigation measures are adhered to. The Solar PV Plant Project can therefore be implemented at the proposed site. Environmental, Social and Health issues of the project will need to be monitored, data analysed and used to improve the safeguards performance of the project.

Health and Safety of the workers and community members have also been identified as key areas that require dedicated observance.