05/01/2026

FINAL ENVIRONMENTAL IMPACT STATEMENT REPORT FOR THE PROPOSED INSTALLATION AND OPERATION OF A 500MW FLOATING PV SOLAR POWER PLANT ON KARIBA NORTH IN SIAVONGA DISTRICT BY LTI REENERGY CLEANTECH PROJECT DEVELOPMENT & INVESTMENTS ZAMBIA LIMITED

CLIENT:

LTI RE ENERGY
CLEANTECH PROJECT DEVELOPMENT & INVESTMENTS ZAMBIA LTD.

PREPARED BY

Tsalach Global Limited
Office #7 - A and E Building,
Plot No. 83/16/4586,
Chilumbulu Road,
New Chilenje, Lusaka.
Call/Whatsapp: +260 955 187 750
+260 977 603 021
Email: tsalachglobalItd@gmail.com

EXECUTIVE SUMMARY

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited (LRCPDIZL) is a private Company incorporated in Zambia on the 14th of January, 2025 with the core business of electric power generation, transmission and distribution. The company along with its directors has been in business outside the country for over a longtime thereby acquiring substantial experience as well as knowledge which they intend to put to use in this particular proposed project in Zambia.

Zambia as a country has for a longtime been faced with an energy crisis due to the poor rainfall pattern. For this reason, several stakeholders have come on board to help mitigate this challenge by coming up with alternative solutions such as use of solar energy. Solar energy can be harnessed in various ways and one of them is through the Floating PV system. The Floating PV is a growing solar solution, which sees solar panels installed on a floating system or structure on a water body.

In trying to meet the energy demand in the country, LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is proposing to install and operate a Floating PV Solar power plant generating approximately 500MW. The proposed project will occupy 500ha on the Kariba dam and this will include all associated infrastructure onshore which will have about 20hectares for the Temporal Assembly point with another 10 hectares for the substation.

Project Description

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is proposing to develop a 500MW FPV Solar Power Plant to cover about 500Ha of Lake Kariba in Siavonga district. The project will generate electrical power by converting solar radiation into direct current (DC) electricity using silicon panels that exhibit the photovoltaic effect, and converting the DC power to AC by inverters that plug into a medium voltage (MV) transformer which is connected to high voltage (HV) transformer. The project output will be Photovoltaic (PV) power.

The other associated facilities will include installation of 3 Smart Transformers Stations for 25,2MVA/ 30,636MWdc area cluster energy evacuation on medium voltage, 20hectares of land off shore reserved for a temporal assembly point, Substation that will occupy 10 hectares of land and a 330KV Transmission line that will feed power into the National Grid.

Project Objectives and Benefits

The sole objective of the proposed project is to set up a floating PV Solar power plant to generate and supply 500MW of power in Zambia.

The specific objectives of the project are as follows:

i. To increase the capacity and maintain the reliability of the power generation system in the country;
ii. To contribute to the alleviation of power shortage challenges in the country;
iii. To make use of the raw material (water resources) found in the area;
iv. Contributing to the diversification of energy sources in the country;
v. To help avoid challenges of land scarcity in the country;
vi. Contributing to the diversification of the developers wealthy creation; and
vii. Contribute to enhancing the nation's economy through paying of taxes.

Shareholders

The name of the legal entity that will develop, manage and operate the project and hold all the approvals is LTI ReEnergy Cleantech Project Development & Investments Zambia Limited.

The details for the developer of the proposed project and particulars are as indicated in the table below.

Shareholder	Nationality/ NRC.	Shares held	Shares As %
Green Horizons Investment	Company Registration No. 120251018137/Zambia	6,000	30
LTI ReEnergy Cleantech Project Development & Trading FZ LLC	Company Registration No. 16178/2020 United Arab Emirates	14,000	70
Total			**100**

Project Implementation Date and Cost of the Project

The estimated cost of developing the Project is **US$650,000,000.** Implementation of the Project has been planned to commence once approval has been granted by ZEMA and it is anticipated to be the first quarter of 2026.

Regulatory framework and corporate requirements

A number of local and international environmental management and protection Acts and relevant to the implementation of the proposed project

will be reviewed before project implementation. Some of these legislations include:

i. Environmental Management Act of 2011;
ii. The Environmental Impact Assessment (EIA) Regulations, SI 28 of 1997;
iii. Environmental Management (Licensing) Regulations, SI No. 112 of 2013;
iv. The Land and Land Acquisition Act of 1995;
v. The Urban and Regional Planning Act No. 3 of 2015;
vi. National Council for Construction Act No. 10 of 2020;
vii. The Water Resources Management Act, No. 21 of 2011;
viii. The Forest Act No. 4 of 2015;
ix. The Energy Regulation Act No.12, 2019;
x. Local Government Act, No. 2 of 2019;
xi. The National Heritage Conservation Act (CAP 173);
xii. The Public Health Act, 1996; and
xiii. The Public Health (infected Areas) Coronavirus Disease) Regulations, 2020, Statutory Instruments 21 and 22.

Zambia is a signatory and a ratified party to a number of international conventions. Though most of these agreements are non-committal, they are very vital in ensuring that individual countries operate while conscious of the locally but think globally. The following are some of the conventions that relate to the proposed project:

i. United Nations Framework Convention on Climate Change Ratified 1997 UN-FCCC;
ii. Convention on International Trade in Endangered Species of Wild Fauna and Flora Ratified: 1975;
iii. UN Conversion on Biological Diversity (1992);
iv. Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment Due to Air Pollution; and
v. Conversion on Control of Trans boundary Movements of Hazardous Wastes and their Disposal (1992).

Analysis of Project Alternatives

The alternatives considered for the implementation of the project are limited and have been analysed to determine how feasible they are in terms of helping to achieve the project objectives. The best alternatives will be adopted for implementation.

Site alternative: The location of the project was dependant on the type of waterbody and the proximity to the ZESCO substation.

The following factors were also considered in the selection of the site:

- The site is within reasonable distance of the ZESCO substation making it possible for the construction of permanent evacuation of power to the grid.
- The total extent of the site is large enough to provide enough space for the proposed Project
- The site is ideally located for its solar exposure which is the type of development intended.

Kariba Dam was chosen to be the location mainly because of its close proximity to the ZESCO substation as compared to the other waterbodies, this will additionally help cut on costs of having to install transmission lines to cover longer distances.

Technology/Process alternative- The solar power generation technologies considered include the photovoltaic (PV) flat plate technologies, which use Global Horizontal Irradiation (GHI) and Global Tilted Irradiation (GTI), and the Concentrating Photovoltaic (CPV) and the Solar Thermal Power Plants (also referred to as Concentrating Solar Power (CSP) plants), which use Direct Normal Irradiation (DNI) (IFC, 2015). The GHI and the GTI are the solar resources used for assessment of PV technology while DNI is a solar resource for CSP and CPV technologies. The PV system was found to be the most viable technology for the proposed project.

Power alternative- The principal source of electricity during construction phase of the project is Diesel Generator energy before connecting to a nearby ZESCO main which is found within reach of the project site. The following are the power alternatives;

A: **Diesel Generator**

Alternatively, diesel generator would be utilised. The cost of running a diesel generator would be manageable as it will run only during construction.

B: **Connecting to the ZESCO Electricity Grid**
The site is near to the national grid but not yet connected to the ZESCO line.

Option A is preferred for being both economical and easily accessible for the construction activities unlike waiting to connect to the national grid just for construction.

Water supply and sewer disposal- The Project site is located in an area that is not serviced. The options considered for water supply was to collecting water from Boreholes or Connecting a service line. The use of bore hole for

water supply was analysed against connecting to a local water supply utility company and buying of disposable water bottles for domestic use.The use of boreholes was preferred for the project operations and domestic use as an alternative which seemed to be cheaper and appropriate.

Sewage management options include a septic tank and soak away system or having a sewerage treatment plant. Presently, the project area is not connected to any sewer and water system; this leaves the developer with no option but to settle for onsite sewage treatment system. The buildings will be designed with separate sewage and grey water systems to minimize water usage and wastage. Expected grey water from wash hand basins, sinks, and floor drains will be channeled through designated drains that do not mix with sewage.

Project Potential Impacts

The proposed project area has potential environmental and social impacts. A distinction should be made between significant positive and negative impacts, direct and indirect impacts, and immediate and long–term impacts. Also, identify impacts which are unavoidable and/or irreversible. The following are some of the impacts that were identified during the ESIA study:

Positive Impacts

Employment Opportunities: The proposed project will provide direct and indirect employment opportunities to workers. This will have skilled and un-skilled labour as well as many employment opportunities.

Increased Public revenue: The facility will be paying revenue and taxes thus increase revenue and taxes for both the central and local authorities. This includes taxes and potential export income and other indirect taxes resulting from VAT on materials and services, PAYE as well as revenue to pension funds such as NAPSA.

Increased Capacity Building: Individuals and organizations that will be attached to the project will obtain, improve, and retain the skills, knowledge, tools, equipment and other re-sources needed to do their jobs competently. It also allows individuals and organizations to perform at a greater capacity (larger scale, larger audience, larger impact, etc.).

Boost Local Businesses in the Local Area: The project will be an opportunity for local business men to expand their businesses. This may be attributed to the increase in demand for food and other necessities by the workforce.

Multiplier Effect: The developer enhances local participation throughout the various phases of its operation by focusing on local suppliers, employees and consumers and intends to maximize the multiplier.

Increase Supply of Electricity to the National Grid: The project will contribute about 500MW of power to the National Grid hence alleviating the power shortages in the Country. Siavonga District will have the opportunity of having power within the district due to the establishment of the floating PV solar power plant.

Land use efficiency: Utilizing water bodies for solar power generation frees up land for other purposes.

Cooling effect: Water can naturally cool the solar panels, increasing energy production efficiency.

Water conservation: The shade created by the floating solar panels can reduce water evaporation from the water body. Furthermore, the project shall take a major role in gradually restoring higher water levels of Kariba Dam widely replenish during the recent years and therefore contributing to rescue the overall the Zambezi River Basin as natural preserved zones with a likely significant overall climate impact.

Negative Impacts

- **Air Quality Impacts** Construction of offices offshore will result in temporary impacts to air quality due to the increase in dust generation in the Project area. This in addition to combustion emissions from the machinery and vehicles may negatively impact sensitive receptors near the Project site.
- **Noise Generation** due construction activities such as excavation and construction of the project infrastructures will result in increase in noise levels in the project area.
- Aquatic Ecology and Fisheries: Shading may affect plankton distribution, which is critical for kapenta and other fish species. Mooring systems can entangle nets, and exclusion zones could displace local fishermen, creating conflicts.
- **Water Pollution:** The use of floating solar platforms introduces a potential risk of chemical leaching into aquatic environments. Particularly when low-quality materials are used, there's an increased likelihood of hazardous substances seeping into the water. Additionally, Routine cleaning of floating solar panels can generate wastewater containing dust, bird droppings, algae, and fine particles from panel surfaces. If this runoff is allowed to flow directly into the water body, it can degrade water quality and harm aquatic life. The risk is significantly higher when workers use washing agents or detergents, as these may contain chemicals that can cause algal blooms, reduce oxygen levels, and disrupt aquatic ecosystems

- Socio-economic and Tourism: The project may restrict access to traditional fishing grounds and alter the scenic landscape of Kariba, potentially affecting tourism activities such as boating and game viewing.
- Safety and Navigation: Floating platforms could break loose during storms, creating hazards for other lake users. Increased maintenance traffic may also heighten collision risks with smaller fishing vessels.
- **Electrical Faults:** Electrical equipment, especially those that are directly in contact with water, could create electric fields, which might have an impact on the environment
- **Waste Generation:** Waste might be generated from different sources including; the kitchen waste, office waste, etc.
- Influx of people in the project area which may strain health and housing facilities and increase HIV/AIDS prevalence.

Mitigation Measures

Many of the impacts mentioned above can be mitigated by thoroughly implementing and monitoring the measures outlined in the Environmental and Social Management Plan (ESMP), with no or only minor negative impacts remaining. The following are some of the mitigations measures to be followed;

- **Impact on Air Quality:** Periodic monitoring of air quality will be done, Regular maintenance of construction vehicles to reduce exhaust emissions and Water shall be sprayed along the access roads and open spaces using water bowsers.
- **Noise generation impact:** Limit construction activities to during daytime hours. Regular maintenance of construction vehicles and equipment. Periodic noise monitoring. Locate noise generating equipment away from sensitive receptors.
- **Impact on aquatic ecology and fisheries:** Employing innovative designs, such as using transparent or reflective materials for floats , optimizing panel spacing, and incorporating features to promote water mixing and allowing proper sunlight penetration for photosynthesis purposes. Careful planning and ecological assessments will be done to mitigate these impacts and ensure that the benefits outweigh the environmental costs.
- **Impact on water Quality:** The adoption of non-toxic and durable sustainable materials in the construction of floating solar arrays is essential. Materials should be selected based on their resistance to degradation and their minimal environmental impact, ensuring they do not introduce harmful substances into the water. Additionally, regular cleaning and maintenance of the panels will be done using environmentally friendly techniques and these can include Installing a

gutter system along panel edges to capture runoff water, channel it into floating or shore-based collection drums, and process it through a three-stage filtration system.

- **Socio-economic impact:** The proposed FPV will be installed in areas were fishing activities are scarcely done and ≥ 50% of the water body will be left accessible for fishing and other activities. Additionally, Involve local communities and tourism operators in site planning, create benefit-sharing opportunities through jobs and local supply chains, and conduct visual impact assessments in sensitive areas.
- **For Safety and navigation** clear navigation markers around arrays will be installed, employees and local boat operators on safety measures will be trained, and emergency protocols for extreme weather events or equipment failure will be established.
- **Electrical Faults:** To minimize electrical faults in a floating solar plant, the company will ensure install waterproof cables, robust grounding, utilizing suitable monitoring systems and installing safety shut-off systems, implementing a comprehensive maintenance plan, developing a comprehensive Operation & Monitoring procedures as well as adherence to strict safety protocols. An Emergency Response procedure with trained personnel for handling electrical faults will be put in place in case of a fault.
- A waste management system will be developed and implemented on-site. Solid waste shall be sorted according to types. Garbage cans will be installed for temporary disposal of domestic waste. These have to be collected and disposed of according to the regulation of solid waste management and approved by the local authorities.
- In terms of employment, locals will be prioritised in order to avoid the influx of people in the area with an exception of certain skills that may not be found within the district.

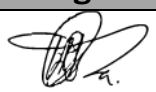
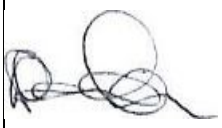
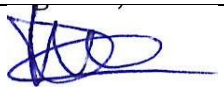
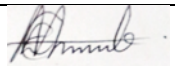
Recommendation

The proposed project by LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is without a doubt in line with Zambian Government effort to create employment opportunities and boost development in the district and the country at large with this expansion project. This is why the company adds value to Zambian Government's vision in the sector.

.....

Director- LTI ReEnergy Cleantech Project Development & Investments Zambia Limited

EIA TEAM MEMBERS

Name	Responsibility/Qualifications	Roles	Signatures
Peter M. Mwanza	**Environmentalist/Team Leader** Masters of Science in Project Management, Bachelor of Science in Wood Science and Technology, International Diploma in Environmental Management	ESIA Coordinator and provider of environmental management information	
Nephas Mapiki	**GIS and Land use Expert**	GIS information and conduct a land use assessment on the project area.	
Fidelis Silungwe	**Air and Noise Expert** B.Eng Metallurgy, Diploma in Environmental Management, Certificate in Environmental Management and Ethics. Certificate in Sustainability and Climate Change	The expert will conduct Air Quality and Noise assessment in the project area	
Esther Banda	**Assistant Air & Noise Expert** BEng in Environmental Engineering	Will work in collaboration with the Air and Noise expert in Conducting Air Quality and Noise assessment in the project area	
Valerie Kalinso	**Social Economic Expert** Masters Fellow – Master of Mass Communication, Degree in Mass Communication	Social Experts to specialize in gathering information on the Population, distribution. Conduct a Gender assessment, social and economic gender patterns in the project area.	
Dickson Kabwe	**Ecologist Expert** Bachelor Degree of Science (Ecology), Certificate in Environmental Management, Certificate in Compliance and Enforcement of Environmental Law	The Ecologist will focus on the assessment of the Flora, Fauna, Aqua-flora and Identify areas of high biodiversity on the site.	
Christopher Mutale	**Assistant Ecologist Expert** Bachelor of science in Wildlife Management (CBU), Certificate in Monitoring and evaluation, Certificate in fundamentals of project management and Current registered student of Masters of Engineering in Environmental Engineering (UNZA)	The Assistant Ecologist will work hand in hand with the senior ecologist as they focus on the assessment of the Flora, Fauna, Aqua-flora and Identify areas of high biodiversity on the site.	

William Sinkala	**Hydrologist Expert** **BSc** (Civil and Environmental Engineering), **Diploma** (Water Engineering)	The Hydrologist will identify significant impacts from existing uses and interference with the water resource, surface water flow that may result either directly or indirectly from the proposed project and identify and comment on the risks and consequences of polluting surface water from proposed project activities.	
Masuzyo.S. Nyirenda	**Aquaculture Specialist** **MSc.** Tropical Ecology and Biodiversity**, BSc.** Biological Sciences	The Aquatic specialist will conduct an assessment on the existing aquatic species and their environment, conduct water quality monitoring, identify and mitigate any risks and consequences that may arise as a result of the proposed project.	
Namakau Muyumbana	**Assistant Aquaculture Specialist** **MSc**. Limnology and wetlands management **BSc.** Ecology and Wildlife management	The Assistant will work hand in hand with the Aquaculture specialist in assessing the aquatic environment and how the proposed project will affect the proposed project area.	

NON-TECHNICAL EXECUTIVE SUMMARY IN ENGLISH

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited (LRCPDIZL) is a private company incorporated in Zambia on 14 January 2025. The company specializes in power generation, transmission, and distribution. Its directors have extensive international experience in the energy sector, which they intend to apply to the proposed project in Zambia.

Zambia has faced ongoing electricity shortages mainly due to reduced rainfall affecting hydropower generation. To address this challenge, alternative energy sources such as solar power are increasingly important. One innovative solution is Floating Photovoltaic (FPV) solar technology, where solar panels are installed on water bodies instead of land.

In response to the country's growing energy demand, LRCPDIZL proposes to develop and operate a **500 MW Floating Solar Power Plant** on **Lake Kariba in Siavonga District**. The project will cover approximately 500 hectares of the lake surface. Supporting onshore facilities will include a temporary assembly area (20 hectares), a substation (10 hectares), and a 330 kV transmission line to connect the power plant to the national electricity grid.

Project Description

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited proposes to develop a 500 MW floating solar power plant on approximately 500 hectares of Lake Kariba in Siavonga District. The project will generate electricity by capturing sunlight using solar panels installed on floating platforms. The electricity produced will then be converted into a form suitable for transmission and supply to the national power system.

The project will also include supporting infrastructure such as smart transformer stations, a temporary onshore assembly area covering about 20 hectares, a substation occupying approximately 10 hectares, and a 330 kV transmission line that will deliver the generated electricity to the national grid.

Project Objectives and Benefits

The main objective of the project is to generate and supply 500 MW of clean, renewable electricity to Zambia. The project aims to improve power reliability, reduce electricity shortages, diversify energy sources, and reduce pressure on land resources. It will also contribute to economic growth through job creation, skills development, and payment of taxes.

Project Implementation Date and Cost of the Project

The estimated cost of developing the Project is **US$650,000,000.** Implementation of the Project has been planned to commence once approval has been granted by ZEMA and it is anticipated to be the first quarter of 2026.

Regulatory framework and corporate requirements

A number of local and international environmental management and protection Acts and relevant to the implementation of the proposed project will be reviewed before project implementation. Some of these legislations include:

xiv. Environmental Management Act of 2011;
xv. The Environmental Impact Assessment (EIA) Regulations, SI 28 of 1997;
xvi. Environmental Management (Licensing) Regulations, SI No. 112 of 2013;
xvii. The Land and Land Acquisition Act of 1995;
xviii. The Urban and Regional Planning Act No. 3 of 2015;
xix. National Council for Construction Act No. 10 of 2020;
xx. The Water Resources Management Act, No. 21 of 2011;
xxi. The Forest Act No. 4 of 2015;
xxii. The Energy Regulation Act No.12, 2019;
xxiii. Local Government Act, No. 2 of 2019;
xxiv. The National Heritage Conservation Act (CAP 173);
xxv. The Public Health Act, 1996; and
xxvi. The Public Health (infected Areas) Coronavirus Disease) Regulations, 2020, Statutory Instruments 21 and 22.

Zambia is a signatory and a ratified party to a number of international conventions. Though most of these agreements are non-committal, they are very vital in ensuring that individual countries operate while conscious of the locally but think globally. The following are some of the conventions that relate to the proposed project:

vi. United Nations Framework Convention on Climate Change Ratified 1997 UN-FCCC;
vii. Convention on International Trade in Endangered Species of Wild Fauna and Flora Ratified: 1975;
viii. UN Conversion on Biological Diversity (1992);
ix. Convention Concerning the Protection of Workers Against Occupational Hazards in the Working Environment Due to Air Pollution; and
x. Conversion on Control of Trans boundary Movements of Hazardous Wastes and their Disposal (1992).

Analysis of Project Alternatives

The alternatives considered for the implementation of the project are limited and have been analysed to determine how feasible they are in terms of helping to achieve the project objectives. The best alternatives will be adopted for implementation.

Site alternative: The location of the project was dependant on the type of waterbody and the proximity to the ZESCO substation.

Kariba Dam was chosen to be the location mainly because of its close proximity to the ZESCO substation as compared to the other waterbodies, this will additionally help cut on costs of having to install transmission lines to cover longer distances.

Technology/Process alternative- Several solar power technologies were considered for the project. These included standard photovoltaic (PV) solar panels, which capture sunlight directly, and other technologies that concentrate sunlight to produce power. After comparing these options, the photovoltaic (PV) system was identified as the most suitable and practical technology for the proposed project due to its reliability, efficiency, and suitability for the local conditions.

Power alternative- During the construction phase, electricity will mainly be supplied using **diesel generators** before the project is connected to the nearby ZESCO power line. Two options were considered: using diesel generators or connecting to the national grid. Although the site is close to the grid, it is not yet connected. Diesel generators were therefore chosen as the most practical and cost-effective option, as they will only be used temporarily during construction and will avoid delays associated with grid connection.

Water supply and sewer disposal- The project site is not connected to existing water and sewer services. Different options for water supply were considered, including drilling boreholes, connecting to a public water supply, and using bottled water. Boreholes were selected as the most practical and cost-effective option for both project operations and domestic use.

For sanitation, options such as a septic tank and soak-away system or a full sewer treatment plant were assessed. Since there is no existing sewer network in the area, the project will use an on-site sewage treatment system. Buildings will be designed with separate sewage and grey water systems to reduce water use and prevent wastage. Grey water from sinks and wash basins will be safely drained separately from sewage.

Project Potential Impacts

The proposed project area has potential environmental and social impacts. A distinction should be made between significant positive and negative impacts, direct and indirect impacts, and immediate and long–term impacts. Also, identify impacts which are unavoidable and/or irreversible. The following are some of the impacts that were identified during the ESIA study:

- Creation of direct and indirect employment for skilled and unskilled workers
- Increased government revenue through taxes and statutory contributions
- Skills transfer and capacity building for local workers and institutions
- Growth of local businesses supplying goods and services
- Contribution of 500 MW of clean energy to the national grid
- Improved energy security and power reliability
- Efficient use of water surfaces, reducing land pressure
- Reduced water evaporation from Lake Kariba
- Contribution to climate change mitigation and reduced greenhouse gas emissions.

Negative Impacts

- **Air Quality Impacts** Construction of offices offshore will result in temporary impacts to air quality due to the increase in dust generation in the Project area.
- **Noise Generation** due construction activities.
- Shading may affect fish species and other aquatic life. The project could displace local fishermen, creating conflicts.
- **Water Pollution:** The use of floating solar platforms introduces a potential risk.
- **Socio-economic and Tourism**: The project may restrict access to traditional fishing grounds and disturb the scenic landscape of Kariba, potentially affecting tourism activities such as boating and game viewing.
- **Safety and Navigation**: Floating platforms could break loose during storms, creating hazards for other lake users.
- **Electrical Faults:** Electrical equipment, especially those that are directly in contact with water, could create electric fields, which might have an impact on the environment

- **Waste Generation:** Waste might be generated from different sources including; the kitchen waste, office waste, etc.
- Influx of people in the project area which may strain health and housing facilities and increase HIV/AIDS prevalence.

Mitigation Measures

Many of the impacts mentioned above can be mitigated by thoroughly implementing and monitoring the measures outlined in the Environmental and Social Management Plan (ESMP), with no or only minor negative impacts remaining. The following are some of the mitigations measures to be followed;

- **Impact on Air Quality:** Periodic monitoring of air quality will be done.
- **Noise generation impact:** Limit construction activities to during daytime hours. Regular maintenance of construction vehicles and equipment. Periodic noise monitoring.
- **Impact on aquatic ecology and fisheries:** Transparent or reflective materials for floats will used and the company will ensure that there is panel spacing to allow light penetration.
- **Impact on water Quality:** The adoption of non-toxic and durable sustainable materials in the construction of floating solar arrays will be used. Additionally, regular cleaning and maintenance of the panels will be done using environmentally friendly techniques and these can include Installing a gutter system along panel edges to capture runoff water, channel it into floating or shore-based collection drums, and process it through a three-stage filtration system.
- **Socio-economic impact:** The proposed FPV will be installed in areas were fishing activities are scarcely done and ≥ 50% of the water body will be left accessible for fishing and other activities. Additionally, Involve local communities and tourism operators in site planning, create benefit-sharing opportunities through jobs and local supply chains, and conduct visual impact assessments in sensitive areas.
- **For Safety and navigation** clear navigation routes around arrays will be installed, employees and local boat operators on safety measures will be trained, and emergency protocols for extreme weather events or equipment failure will be established.
- **Electrical Faults:** To minimize electrical faults in a floating solar plant, the company will ensure install waterproof cables, robust grounding, utilizing suitable monitoring systems and installing safety shut-off systems, implementing a comprehensive maintenance plan, developing a comprehensive Operation & Monitoring procedures as well as adherence to strict safety protocols. An Emergency Response procedure with trained personnel for handling electrical faults will be put in place in case of a fault.

- A waste management system will be developed and implemented on-site. Solid waste shall be sorted according to types. Garbage cans will be installed for temporary disposal of domestic waste. These have to be collected and disposed of according to the regulation of solid waste management and approved by the local authorities.
- In terms of employment, locals will be prioritised in order to avoid the influx of people in the area with an exception of certain skills that may not be found within the district.

Recommendation

The proposed project by LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is without a doubt in line with Zambian Government effort to create employment opportunities and boost development in the district and the country at large with this expansion project. This is why the company adds value to Zambian Government's vision in the sector.

……

Director- LTI ReEnergy Cleantech Project Development & Investments Zambia Limited

TABLE OF CONTENTS

EXECUTIVE SUMMARY II
1.0 INTRODUCTION 1
1.2 Summary description of the project including project rationale 2
1.3 Objectives of the project 3
1.4 Brief Description of the location 3
1.5 Particulars of Shareholders/Directors 6
1.6 The developer's physical address and the contact person 6
1.7 Track Record/Previous Experience of Enterprise Elsewhere 6
1.8 Project Cost Investment and Proposed Project Implementation Date 7
1.9 Scope of Study 7
1.9.1 Scope of Work 7
1.9.2 Study Methods 7
2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK 11
2.1 Environmental Policy Framework 11
2.1.1 Regulatory Framework 11
2.1.2 The Environmental Management Act No. 12 of 2011 as amended by Environmental Management (Amendment) Act No. 8 of 2023 12
2.2 Institutional Framework 24
3.0 PROJECT DESCRIPTION 30
3.1 Project Location 31
3.2 Nature of the Project 37
3.3.4 Raw materials 40
3.3.5 By-Products and Products 40
3.4 Main project activities 41
3.4.1 Preparation phases: Site Selection and feasibility study 41
3.4.2 Installation phase 41
3.4.3 Operational Phase 41
3.4.4 Decommission Phase 42
3.5 Anticipated wastes from the project cycle 42
3.6 Schedule and life time of the project 43
4.0 PROJECT ALTERNATIVES 44
4.1 Project Location Alternative 44
4.2 Technology 44
4.3 Power Alternative 44
4.4 Water Supply 45
4.5 The "No Action" or "No Project Alternative" 45
4.7 Analysis of Alternatives 45
5.0 DESCRIPTION OF THE BASELINE ENVIRONMENT 47

5.1 Climate 47
5.2 Flora 50
5.3 Drainage and Hydrology 53
5.3.1 Hydrogeology 53
5.4 Soils 54
5.5 Noise Quality 55
5.6 Air Quality 57
5.7 Description of the Social Economic Environment 59
5.7.1 Social Services and Amenities 59
5.7.2 Health and Education 60
5.7.3 Settlement 61
5.7.4 Traditional Practices and Rites 61
5.7.5 Ethnic Groups 62
5.7.6 Land Tenure System 62
5.7.9 Economic Activities 62
5.7.10 Agriculture 64
5.7.11 Tourism 65
5.7.12 Employment 65
5.7.13 Water Supply and Sanitation 66
6.0 ENVIRONMENTAL AND SOCIAL IMPACTS 67
6.1 The Nature and Evaluation of Impacts 67
6.2 Evaluation of Potential Impacts 68
6.3 Anticipated Project Impacts 69
6.3.1 Positive Impacts (Socio – economic impacts) 69
6.3.1.2 Increased Public revenue 69
6.3.1.3 Increased Capacity Building 70
6.3.1.4 Boost Local Businesses in the Local Area 70
6.3.1.5 Multiplier Effect 70
6.3.1.6 Increase Supply of Electricity to the National Grid 70
6.3.2 Negative Impacts 70
6.3.2.1 Impact on Air quality 70
6.3.2.2 Noise 71
6.3.2.3 Water Resources and waste 71
6.3.2.4 Soils 71
6.3.2.5 Biodiversity 72
6.4 Impact of Socio-Economic 72
6.5 Landscape and visual impacts 73
6.6 6.7 Cultural and archaeological heritage 73
6.8 Occupational Health and Safety 73

6.9 Community Health and Safety 74
6.10 Solid Waste generation 74
7.0 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP) 83
7.1 Positive Social-Economic Impacts 83
a) Provision of employment: 83
b) Increased Public revenue 83
c)Increased Capacity Building 83
d) Boost Local Businesses in the Local Area 83
e) Multiplier Effect 84
f) Increase Supply of Electricity to the National Grid 84
g) Increase in Water Levels in the Kariba 84
7.2 Impact Mitigation Plan 84
7.2.1 Impact on Air quality 84
7.2.2 Impact on Noise 85
7.2.3 Impact on Water Resources 85
7.2.4 Impact on Soil 85
7.2.5 Impacts on Biodiversity 85
7.2.6 Impact on Socio-Economic 86
7.2.7 Cultural and archaeological heritage 86
7.2.8 Occupational Health and Safety 87
7.2.9 Community Health and Safety 87
7.2.10 Waste Disposal and Management 87
7.2.11 Landscape and Visual Impact 88
8.0 DECOMMISSIONING AND CLOSURE PLAN 93
8.1 Objectives 93
9.0 Bibliography 97
10.0 DECLARATION OF AUTHENTICITY OF REPORT CONTENTS 99
11 APPENDICES 100

List of Figures

Figure 1 shows the EIA process in Zambia.....10
Figure 2: Shows the Location of the project site.....33
Figure 3 Shows the Google Map for the Floating Solar Plant.....34
Figure 4 show the google map for the project component.....35
Figure 5 shows the project overview.....36
Figure 6: Showing an example of the solar module.....37
Figure 7: showing module mounting.....38
Figure 8: Showing Step-up Transformer.....38
Figure 9: showing historical average rainfall.....48
Figure 10:Showing the vegetation cover of the project site.....50
Figure 11: shows the Species Distribution.....51
Figure 12:Showing the hydrology of the project site.....53
Figure 13 Hydrogeology of the project area (Extract of the Hydrogeological Map of Zambia).....54
Figure 14 Shows Noise sampling at the Temporal Assembly Area.....57
Figure 15 shows the Dust Sampling in the project area.....58
Figure 16 shows the Siavonga District Hospital.....60
Figure 17 shows some of the settlements in Siavonga District.....61
Figure 18 shows the Fishing Rig in the Lake.....63
Figure 19 Shows some of the shops.....64
Figure 20: Physical Disclosure Meeting Attendance List.....110
Figure 21: Scoping Meeting Pictures.....114

List of Tables

Table 1:The plot's corner coordinates are as below and a location map for the project site:.....4
Table 2: shows the coordinates for the area allocation for Onshore and Offshore project components.....4
Table 3: Directors and Shareholding.....6
Table 4 shows the Acts and Regulations reviewed.....13
Table 5: shows Institutions important in terms of Environmental Management of Natural Resources.....24
Table 6 shows the international conventions.....28
Table 7:The plot's corner coordinates are as below and a Google map for the project site has been attached as an appendix:.....31
Table 8: shows the coordinates for the area allocation for Onshore and Offshore project components.....32
Table 9: shows the raw materials.....40
Table 10: List of Birds observed near the site.....52
Table 11 shows the results of the noise levels in area.....56
Table 12 shows the results for ambient air quality.....58
Table 13: Significance Ranking Matrix.....68
Table 14: Positive/Negative Mitigation Ratings.....68
Table 15 shows the evaluation of the impacts during the Preparation, Construction and Operational phases.....75
Table 16: Summary of Environmental and Social Monitoring Plan.....89

Table 17: Summary decommissioning activities & costs.....95

LIST OF ACRONYMS AND ABBREVIATIONS

AIDS	Acquired Immune Deficiency Syndrome
ARC	Anti-Reflective Coating
BAT	Best Available Technology
DNI	Direct Normal Irradiation
EIA	Environmental Impact Assessment
EIS	Environmental Impact Statement
EMP	Environmental Management Plan
EMF	Electromagnetic Field
ESIA	Environmental and Social Impact Assessment
EMA	Environmental Management Act
EPF	Environmental Protection Fund
GIIP	Good International Industry Practice
GRZ	The Government of the Republic of Zambia
HIV	Human Immunodeficiency Virus
RHC	Rural Health Centre
SD	Sustainable Development
SI	Statutory Instrument
STI	Sexually Transmitted Infections
ToRs	Terms of Reference
ZEMA	Zambia Environmental Management Agency

1.0 INTRODUCTION

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited (LRCPDIZL) is a private Company incorporated in Zambia on the 14th of January, 2025 with the core business of electric power generation, transmission and distribution. The company along with its directors has been in business outside the country for over a longtime thereby acquiring substantial experience as well as knowledge which they intend to put to use in this particular proposed project in Zambia.

Zambia as a country has for a longtime been faced with an energy crisis due to the poor rainfall pattern. For this reason, several stakeholders have come on board to help mitigate this challenge by coming up with alternative solutions such as use of solar energy. Solar energy can be harnessed in various ways and one of them is through the Floating PV system. The Floating PV is a growing solar solution, which sees solar panels installed on a floating system or structure on a water body.

In trying to meet the energy demand in the country, LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is proposing to install and operate a Floating PV Solar power plant generating approximately 500MW. The proposed project will occupy 500ha in total with about 200ha of the Kariba dam to be utilized in the first phase of the project and this will include all associated infrastructure onshore too.

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited wishes to exploit the Solar Power potential of Zambia to meet some of the anticipated energy demand with the fast-growing economy and electricity market in Zambia.

Power generation in Zambia is predominantly hydro based. In 2021, the installed capacity had increased significantly owing to the construction and commissioning of two (02) Hydro Power generation machines at Kafue Gorge Lower power project. The national installed electricity capacity increased to 3,318.4 from 3,011.2 MW in 2020. This was attributed to the commissioning of 300 MW out of the total 750 MW installed capacity at Kafue Gorge Lower hydro power plant and commissioning of 6 MW out of the 15 MW installed capacity at Lusiwasi Upper hydro power plant. The national electricity generation sent out increased by 16.3 percent to 17,636 GWh in 2021 from 15,159 GWh recorded in 2020. Overall, hydro generation accounted for 16,072.9 GWh of the electricity produced in 2021 compared to 14,210.71 GWh in 2020, reflecting a 13.1 percent growth. This was attributed to improved rainfall patterns experienced in the 2020/2021 season.

The Government of Zambia (GoZ) set a goal for universal electricity access for

all Zambians by 2030. Energy has been identified as an important driving force behind economic development in Zambia, and the government has declared its commitment to developing and maintaining energy infrastructure and services.

The report is being prepared on behalf of LTI ReEnergy Cleantech Project Development & Investments Zambia Limited for the proposed installation and operation of a Floating PV Solar Power plant on Kariba dam of Siavonga District.

In line with the provisions of the Environmental Management (Amendment) Act No. 8 of 2023 read together with the Environmental Management Act No. 12 of 2011 which is the principal Act on environment in Zambia and is read together with the Environmental Impact Assessment Regulations SI No. 28 of 1997, an Environmental and Social Impact Assessment (ESIA) of the proposed development which will include the components highlighted above is required to be submitted to the Zambia Environmental Management Agency for consideration and further approval.

The ESIA of the project will be conducted and will incorporate views, concerns and contributions from interested and affected parties (stakeholders). Site location suitability studies for the project within the project area and the proposed project catchment area and ecological surveys of the project area will be conducted to determine the feasible design of the proposed project.

These preliminary issues will be raised with the stakeholders as a significant component of the issues to be addressed by or to be incorporated into the EIA and the EMP.

1.2 Summary description of the project including project rationale

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is proposing to install and operate a Floating PV Solar power plant generating approximately 500MW. The proposed project will occupy 500ha in total on the Kariba dam to be utilized for project and this will include all associated infrastructure off shore at a total cost of **US$650,000,000**.

The proposed floating solar project on Lake Kariba in Zambia is aimed at diversifying the country's energy mix, enhancing climate resilience, and improving power security. Zambia's heavy reliance on hydropower has left the national grid vulnerable to droughts and fluctuating water levels, which frequently disrupt electricity generation. By installing solar panels on the lake's surface, the project maximizes the use of existing water bodies without competing for scarce land, reduces evaporation, and improves the efficiency

of the panels through natural cooling. In addition, the project supports Zambia's transition to renewable energy, aligns with national development goals, and contributes to reducing greenhouse gas emissions while stimulating local economic opportunities.

1.3 Objectives of the project

The sole objective of the proposed project is to set up a floating PV Solar power plant to generate and supply 500MW of power in Zambia. The specific objectives of the project are as follows:

i. To increase the capacity and maintain the reliability of the power generation system in the country;

ii. To contribute to the alleviation of power shortage challenges in the country;

iii. To make use of the raw material (water resources) found in the area;

iv. Contributing to the diversification of energy sources in the country;

v. To help avoid challenges of land scarcity in the country;

vi. Contributing to the diversification of the developers wealthy creation;

vii. Contribute to enhancing the nation's economy through paying of taxes;and

viii. Contributing to the Local Community Development.

1.4 Brief Description of the location

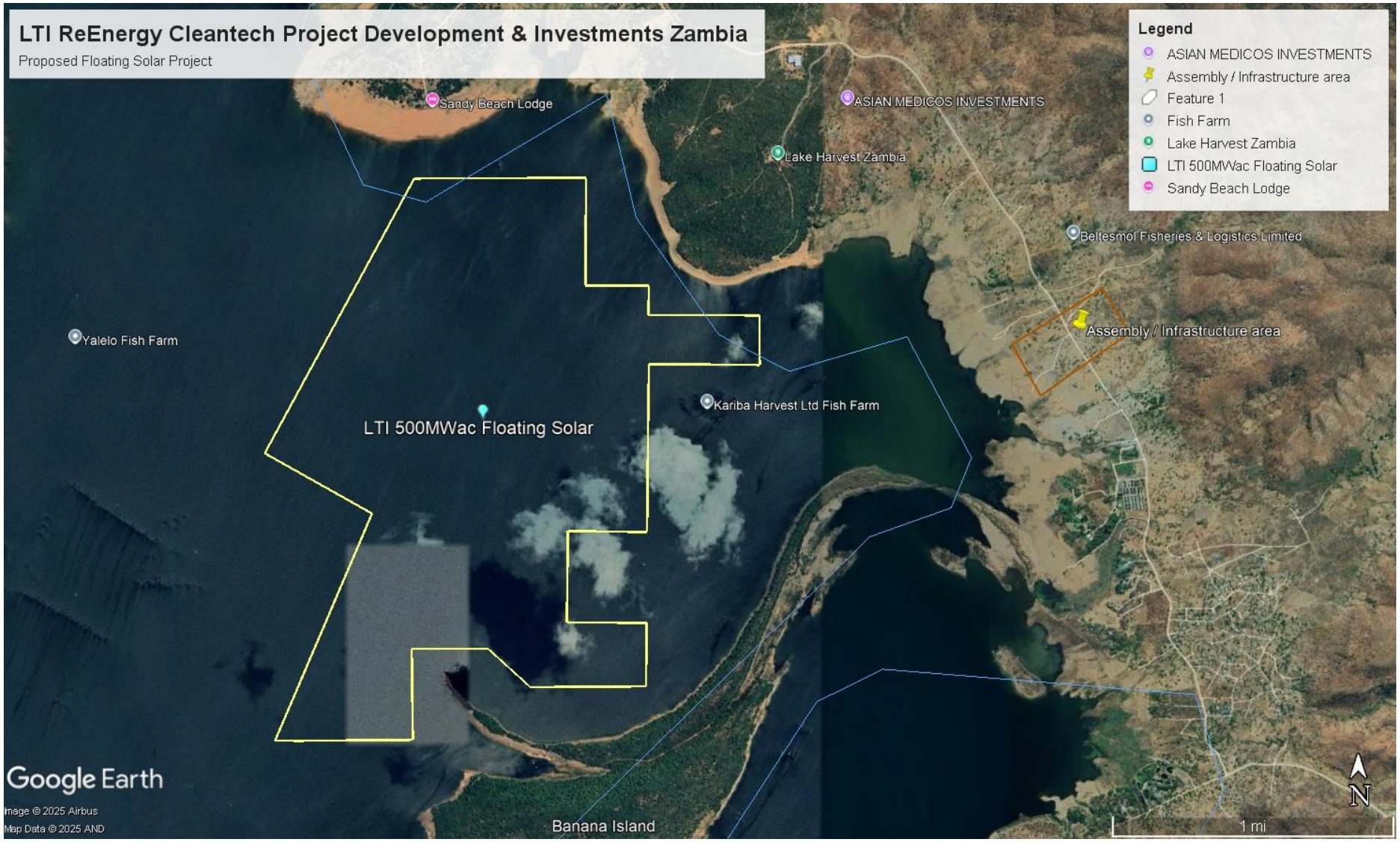
The proposed project is located in Siavonga district on the Southern Province of Zambia. The Floating PV solar plant will be installed on Lake Kariba which is located approximately 12.2km Northwest of Siavonga CBD. The proposed project is located near notable facilities like Lake Harvest Fish Farm, Yalelo Fish Farm, Banana Island and Beltsmol Fisheries & Logistics Limited. The proposed project site coordinates are as given below.

Table 1:The plot's corner coordinates are as below and a location map for the project site:

NO.	LATITUDE	LONGITUDE
1	16°31'04.42"S	28°39'50.76"E
2	16°30'51.04"S	28°39'50.91"E
3	16°30'50.91"S	28°40'5.92"E
4	16°30'58.11"S	28°40'14.16"E
5	16°30'57.93"S	28°40'36.58"E
6	16°30'46.15"S	28°40'36.66"E
7	16°30'45.87"S	28°40'21.28"E
8	16°30'28.78"S	28°40'21.47"E
9	16°30'29.05"S	28°40'36.86"E
10	16°29'57.57"S	28°40'37.14"E
11	16°29'57.75"S	28°40'58.72"E
12	16°29'48.48"S	28°40'58.62"E
13	16°29'48.69"S	28°40'37.38"E
14	16°29'43.00"S	28°40'37.13"E
15	16°29'42.82"S	28°40'24.75"E
16	16°29'22.76"S	28°40'24.94"E
17	16°29'22.77"S	28°39'51.27"E
18	16°30'14.33"S	28°39'22.17"E
19	16°30'25.45"S	28°39'43.11"E
20	16°31'8.16"S	28°39'24.33"E

Table 2: shows the coordinates for the area allocation for Onshore and Offshore project components

	Latitudes	**Longitude**
Assembly and Infrastructure Area	16°29'54.04"S	28°41'48.23"E
	16°29'43.49"S	28°42'05.52"E
	16°29'51.69"S	28°42'10.67"E
	16°30'03.37"S	28°41'53.67"E
Substation Area	16°29'11.39"S	28°43'29.70"E
	16°29'07.71"S	28°43'38.48"E
	16°29'17.09"S	28°43'43.88"E
	16°29'22.23"S	28°43'34.89"E


LTI ReEnergy Cleantech Project Development & Investments Zambia
Proposed Floating Solar Project
Legend
ASIAN MEDICOS INVESTMENTS
Assembly / Infrastructure area
Feature 1
Fish Farm
Lake Harvest Zambia
LTI 500MWac Floating Solar
Sandy Beach Lodge
Sandy Beach Lodge
ASIAN MEDICOS INVESTMENTS
Lake Harvest Zambia
Beltesmol Fisheries & Logistics Limited
Assembly / Infrastructure area
Yalelo Fish Farm
Kariba Harvest Ltd Fish Farm
LTI 500MWac Floating Solar
Google Earth
Image © 2025 Airbus
Map Data © 2025 AND
Banana Island
1 mi
N

1.5 Particulars of Shareholders/Directors

The Directors/shareholders for the proposed project and their particulars are as indicated in the table below;

Table 3: *Directors and Shareholding*

Shareholder	**Nationality/ NRC.**	**Shares held**	**Shares As %**
Green Horizons Investment	Company Registration No. 120251018137/Zambia	6,000	30
LTI ReEnergy Cleantech Project Development & Trading FZ LLC	Company Registration No. 16178/2020 United Arab Emirates	14,000	70
Total			**100**

1.6 The developer's physical address and the contact person

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited
Plot No. 52, Alick Nkhata Road,
Massmedia, Lusaka**.**

Contact Person
Name: Chanda Monique
Position: Manager
Mobile: +260 976226303
Email : chandamonique3@gmail.com

1.7 Track Record/Previous Experience of Enterprise Elsewhere

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited has established a strong track record in developing and managing renewable energy projects across diverse regions. It currently has active projects in the Dominican Republic, Nigeria, South Africa, Algeria, Kyrgyzstan, and Bangladesh, demonstrating its ability to operate successfully in varied geographical, climatic, and regulatory environments. In addition to these ongoing projects, the company has several new initiatives in the pipeline, with Zambia being one of the priority countries, alongside Malawi, Tanzania, and Botswana. This proven experience reflects the company's technical expertise, adaptability, and commitment to expanding sustainable energy solutions across emerging markets.

1.8 Project Cost Investment and Proposed Project Implementation Date

The project is scheduled to be implemented by the first quarter of 2026. The total cost of the project is **US$650,000,000**.

1.9 Scope of Study

The Environmental and Social Impact study adheres to the requirements of the Environmental Impact Assessment (EIA) regulations of 1997. The EIA regulations demand that socio - economic and environmental impacts consequential to the operation of the project are assessed well in advance. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited commissioned the development of an Environmental and Social Impact Assessment (ESIA) to assess the baseline, environmental trends and socio-economic data of the project area, identify significant environmental and socio-economic impacts of the project and propose possible mitigation measures. This study addresses positive as well as negative impacts and recommends measures for mitigating negative environmental effects.

1.9.1 Scope of Work

The full scope of work and core issues considered when conducting the EIA are as stated in the TORs for this assignment attached as Appendix.

1.9.2 Study Methods

a. Desk Study

The desk study was conducted to collect available data including project briefs, satellite imagery, relevant site reports, records and materials. A preliminary review of these datasets was done in order to set foundation for pre-planning phase.

b. Reconnaissance site visit

A reconnaissance site visit was undertaken to the project site to provide an idea on the local bio-physical and socio-economic conditions. Consultations were made with the stakeholders in the project area in Siavonga District.

c. Fieldwork Planning

The study team used the scoping data and additional information collected to plan a more detailed field assessment of the biophysical and socio-economic aspects, the project design and to facilitate a basis for elaboration of impacts and determine mitigation.

d. Stakeholder Consultation

Visits were conducted to relevant government and other institutions to collect information and undertake interviews. Public consultation and information disclosure activities were also conducted in the project area.

e. Field Data Collection

Necessary field studies were conducted, as supplements to previous studies and to fulfil special requirements of the EIS. The field studies, baseline descriptions and impact assessments were also conducted.

f. Data Analysis and Interpretation

Information on the ecological conditions of the site and surroundings was also obtained from published information and records. Records and information compiled from previous studies on soils, vegetation, water use and terrain were accessed and existing maps were obtained. This valuable information was used to identify and map the bio-physical sensitivities and determine the mitigation measures on expected impacts. Findings and recommendations in reports of consultations previously held with local stakeholder communities and earlier surveys, have also given important input to this EIA study. Baseline and field data were analysed using standard methods as follows:

- A review of the current policy and regulatory framework was done. Relevant environmental legislation and regulations that would apply to this project were collected from relevant stakeholders and considered;
- A temporal analysis of baseline and field data on climate was applied to determine rainfall patterns, temperature regimes, humidity and sunshine levels;
- Due to non-availability of detailed studies on air quality, the portable ambient air sampler was used to sample the air within the project area in order to determine the baseline status of the project site;
- Similarly, available national level geological and hydro-geological studies and maps were assessed and correlated to the project site. The baseline data were supplemented with field survey data analysis on hydrology & hydrogeology with specific consideration to quality of surface and ground water;
- Topographic, land use, land cover and landscape data were assessed;
- Available baseline data on water use was considered and correlated with underlying poverty conditions;
- Due to non-availability of detailed studies on noise and vibration, a sound level meter was used to obtain the baseline noise levels of the project site;

- Field survey for archaeological and cultural environment, fauna and flora were also conducted; and
- Available baseline data on socio-cultural and economic setup was supplemented with field data collection.

g. Environmental Impact Statement Preparation

The EIA Team used the ZEMA guidelines in preparing the EIS report. The Environmental Impact Assessment process is an open process that involves interested and affected parties. The EIA itself is defined as a systematic investigation of conditions within the environment of the proposed development or project followed by an assessment of the impacts that the development or project will have on the environment in its totality i.e. physical, biological and socio economic aspects. The following are the stages that comprise the process:

1. Stage 1: Preliminary Actions
2. Stage 2: Scoping (or Identification of Potential Impacts)
3. Stage 3: Baseline Study
4. Stage 4: Impact Evaluation
5. Stage 5: Public participation in Environmental Impact Study
6. Stage 6: Identification of Mitigation Measures
7. Stage 7: Assessment (or Comparison of Alternatives)
8. Stage 8: Decision making by the Developer
9. Stage 9: Submission of the report to ZEMA
10. Stage 10: Decision Making by ZEMA

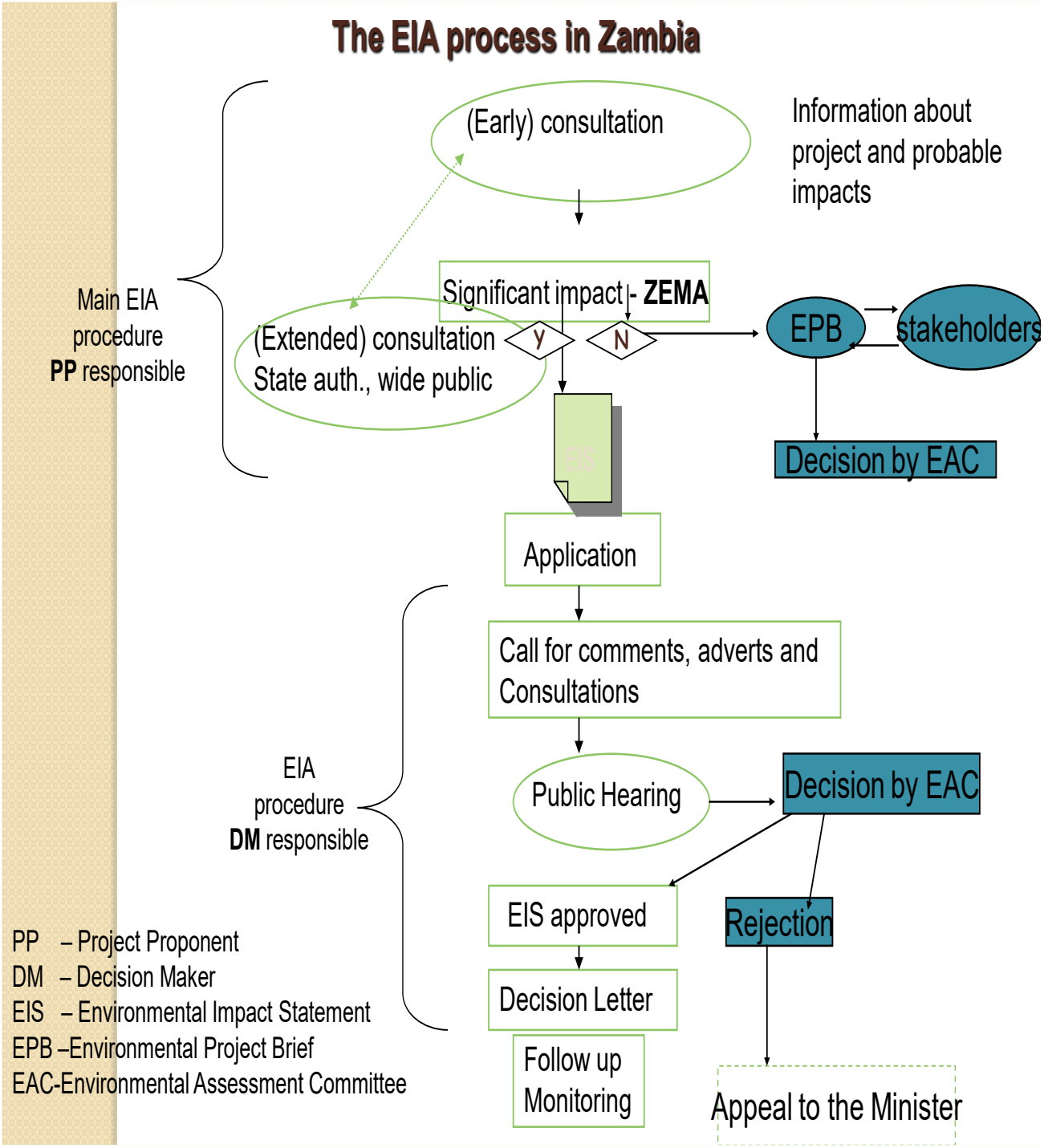


Figure 1 *shows the EIA process in Zambia*

2.0 POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

This section will cite all policy, legal and institutional framework relevant to the project.

A number of local and international environmental management and protection Acts and relevant to the implementation of the proposed project will be reviewed before project implementation. The preliminary work done thus far indicates that the following Acts and Regulations are relevant to the project:

The core pieces of legislation and associated regulations governing environmental management of energy activities and environmental protection are the Environmental Management Act (EMA) of 2011 and the Urban and Regional Planning Act No. 3 of 2015.

The EMA renamed the established Environmental Council of Zambia (ECZ) to Zambia Environmental Management Agency (ZEMA). It is responsible for enforcing environmental regulations and coordinating of government agencies involved in environmental management in their sectors.

2.1 Environmental Policy Framework

The 2010 National Water Policy was a policy document developed by the Government of Zambia to guide water resource management and water supply and sanitation services in the country. It sought to create institutions for cost-effective and sustainable services and was based on Integrated Water Resources Management principles. The policy was designed to provide a coherent framework for the sector and was later followed by the Water Resource Management Act of 2011. The Policy calls upon all institutions, Non-Governmental Organizations (NGOs), and community based or people's organizations whose activities affect water resource in any way to carry out their activities judiciously in order to maintain the productivity and integrity of the environment.

The Policy recognizes the need for ESIA studies in all development projects in order to eliminate or mitigate adverse environmental impacts and enhance the benefits of the projects. The National Policy on Water states that "stakeholders shall follow a sustainable approach in the management and utilization of water at all levels".

2.1.1 Regulatory Framework

The core pieces of legislation and associated regulations governing environmental management of water management are the Environmental Management Act (EMA) of 2011, Water Resource Management Act, No. 21 of 2011 and the Water Supply and Sanitation Act No. 28 of 1997. The EMA

renamed the established Environmental Council of Zambia (ECZ) to Zambia Environmental Management Agency (ZEMA). It is responsible for enforcing environmental regulations and coordinating government agencies involved in environmental management in their sectors. Water Resource Management Act, No. 21 of 2011 provides for regulation of water resources management. Water Supply and Sanitation Act No.28 of 1997 provides for regulation of water supply and sanitation services.

The EMA through Statutory Instruments (SIs) also sets environmental and water quality standards and makes the developer responsible for meeting them.

2.1.2 The Environmental Management Act No. 12 of 2011 as amended by Environmental Management (Amendment) Act No. 8 of 2023

The Environmental Management Act is currently the Principal Act on environmental governance and regulation in Zambia that was passed in April 2011 to replace and repeal the Environmental Protection and Pollution Control Act (EPPCA) of 1990. Section 29 of this Act provides that a developer shall not implement a project for which an ESIA is required. Since an ESIA is required for this project, the following ESIA Statutory Instruments (SIs) and Regulations (Table 1) of the EMA will govern this particular project.

Table 4 shows the Acts and Regulations reviewed

ACTS/ REGULATIONS	DESCRIPTION OF THE ACT/REGULATIONS	RELEVANCE TO THE PROJECT	COMPLIANCE
The Environmental Management Act No. 12 of 2011 as amended by Environmental Management (Amendment) Act No. 8 of 2023	The primary environmental legislation in Zambia is the "Environmental Management Act, 2011". The Environmental Management Act (EMA) No. 12 of 2011 repeals and replaces the Environmental Protection and Pollution Control Act (EPPCA) No. 12 of 1990 as well as renaming the Environmental Council of Zambia (ECZ) as the Zambia Environmental Management Agency (ZEMA).	In Part III, Section 29(1), the Environmental Management Act prohibits developers to implement projects that have an impact on the environment, without approval by ZEMA. In Section 30, the Act also requires a project developer to conduct an Environmental Impact Assessment and prepare and submit an Environmental Project Brief (EPB) report or an EIS to ZEMA prior to any development activities.	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will ensure that all activities are performed in accordance with all Zambian environmental regulations. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited has prepared and submitted this report to ZEMA for approval before the commencement of project activities.
The Water Resources Management Act, No. 21 of 2011	Provides for the main functions and powers of managing and protecting water resources in line with environmental sustainability.	The project is relevant under **Section 6(a)**, which outlines the principle of sustainable water resources management. This requires that all projects using or affecting water resources must be designed and operated in a manner that promotes equitable, reasonable, and environmentally sound use of water. Since floating solar can influence evaporation, aquatic life,	The company will be compliant to ensure that all works are conducted in a manner that they do not affect other water users, aquatic life and the water resource.

		and other water users, compliance with this principle is essential. In addition, **Section 25(a)** directs that projects should be undertaken in a way that ensures **catchment protection and conservation**. For the floating solar project, this means adopting measures such as pollution prevention during panel cleaning, controlling runoff, safeguarding aquatic ecosystems, and maintaining water quality to protect the reservoir and its catchment area	
The Energy Regulation Act No.12, 2019	An Act provides for the licensing of enterprises in the energy sector; continue the existence of the Energy Regulation Board (ERB) and re-define its functions; reconstitute and revise the functions of the board; repeal and replace the Energy Regulation Act of 1995	In compliance with the Act, the proposed floating solar project will be licensed by the Energy Regulation Board (ERB) as an energy generation facility. The Act is relevant to ensure that the project meets technical and safety standards, protects the interests of water users and surrounding communities, and contributes to Zambia's renewable energy targets	The company will ensure to comply to the stipulated conditions in the act
The Electricity Act No. 11 2019	An Act to regulate the generation, transmission, distribution and supply of electricity so as to enhance the security and reliability of the supply of	The project will establish a Solar PV Plant and will be generating electricity from solar energy. The electricity will be transferred into	LTI ReEnergy Cleantech Project Dev. & Inv.(Z) Limited will establish and operate the Solar

	electricity; provide for the sale and purchase of electricity within and outside the Republic; facilitate the achievement of the efficient, effective, sustainable development and operation of electricity infrastructure; provide the roles and responsibilities of various participants in the electricity sector; facilitate adequate levels of investment in the electricity sector; provide for a multi-year tariff framework; promote transparency in the identification and allocation of risks, costs and revenues within and between participants in the electricity sector; ensure the protection and safety of consumers of electricity and the public; repeal and replace the Electricity Act, 1995; and provide for matters connected with, or incidental to, the foregoing.	the national grid.	PV Plant in accordance with the regulations (Part II). Generation of electricity for this particular project will be regulated as provided for.
The Environmental Impact Assessment) Regulations, Statutory Instrument No. 28 of 1997	The Environmental Impact Assessment (EIA) Regulations, Statutory Instrument (SI) 28 of 1997, demands that before a developer commences implementing a project, an EIA report must be prepared and submitted to the relevant regulatory authority for review and approval.	According to the EIA regulations, an Impact Statement is required for all projects listed in the Second Schedule to the Regulations, including projects of such magnitude.	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will ensure that all activities are performed in accordance with all Zambian environmental regulations. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited has prepared

			and submitted this report to ZEMA for approval before the commencement of project activities.
The Factories Act, 1999	The Act regulates the conditions of employment in factories and other places of work as regards the safety, health and welfare of persons employed therein. The Act also provides for the examination and inspection of certain plant and machinery in order to ensure safety.	All places of work as defined under this act will be deemed a 'factory' where safety, health and general welfare of employees will be required to be upheld	To ensure that the occupational health and safety of employees is upheld during the construction and operational periods, all employees will be trained in health and safety protocols.
The Urban and Regional Planning Act No. 3 of 2015	Provides for development, planning and administration principles, standards and requirements for urban and regional planning processes and systems; provide for a framework for administering and managing urban and regional planning for the Republic; provide for a planning framework, guidelines, systems and processes for urban and regional planning for the Republic; establish a democratic, accountable, transparent, participatory and inclusive process for urban and regional planning that allows for involvement of communities, private sector, interest groups and other stakeholders in the planning	The proposed project falls within the jurisdiction of Siavonga Town Council and all planning and land use development activities are regulated by this Council. The Council is constantly engaged in development activities and LTI ReEnergy Cleantech Project Development & Investments Zambia Limited shall continue with this relationship as a way of ensuring that activities are compliant with the Act	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will comply with the provision of the Act by obtaining a 'no objection' from Siavonga Town Council before implementation of the project.

National Council for Construction Act No. 10 of 2020	An Act to provide for the promotion, development and regulation of the construction industry so as to promote economic growth and competitiveness and create sustainable employment; continue the existence of the National Council for Construction and provide for its functions; enhance contractor capacity development and technical compliance in the construction industry; collaborate with professional bodies engaged in activities in the construction industry; continue the existence of the Construction School and rename it as the National Construction School; provide for a complaints and appeals procedure; repeal the National Council for Construction Act, 2003; and provide for matters connected with, or incidental to, the foregoing	There will be construction works taking place on site which should be done in accordance to this Act and in conjunction with the National Council for Construction.	All contractors engaged on site will be registered with the National Council for Construction.
Local Government Act, No. 2 of 2019	An Act to provide for an integrated local government system; give effect to the decentralisation of functions, responsibilities and services at all levels of local government; ensure democratic participation in, and control of, decision making by the people at the local level; revise the functions of local authorities; provide for the review of tariffs, charges	The Second Schedule, Section 61 of the Act highlights the functions of the local councils, which include: conservation of natural resources, maintaining, protecting and control of local forests and - Woodside, and - establishing and maintaining environmental health services	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will work with the local planning authorities in advancing development and will recognize and comply with environmental specifications with insofar as this project is concerned.

	and fees within the area of a local authority; provide for the proceedings of the council and committees; provide for the role of traditional leadership in democratic governance.		
National Council for Construction Act No. 10 of 2020	An Act to provide for the promotion, development and regulation of the construction industry so as to promote economic growth and competitiveness and create sustainable employment; continue the existence of the National Council for Construction and provide for its functions; enhance contractor capacity development and technical compliance in the construction industry; collaborate with professional bodies engaged in activities in the construction industry; continue the existence of the Construction School and rename it as the National Construction School; provide for a complaints and appeals procedure; repeal the National Council for Construction Act, 2003; and provide for matters connected with, or incidental to, the foregoing	There will be construction works taking place on site which should be done in accordance to this Act and in conjunction with the National Council for Construction.	All contractors engaged on site will be registered with the National Council for Construction.
The National Heritage Conservation Act (CAP 173)	The Act provides for the conservation of ancient, cultural and natural heritage, relics and objects of aesthetic,	In Part V Section 33, the Act requires that no person shall, without the written consent of the Commission "alter, remove,	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will immediately inform the NHCC if any artefact

	historical, pre – historical, archaeological or scientific interest.	destroy, damage, excavate or export as the case may be, from Zambia, any ancient heritage or relic or part of it; or disfigure, destroy, remove, alter or damage any national monument, memorial tablet, plaque, seal or sign erected or affixed by the Commission	were found during site preparation.
The Public Health Act 1996	The Act was passed in 1930 with several amendments along the way, particularly in this case 1996. The Act empowers a Council to prevent unhealthy activities and for disease prevention in relation to drainages, pit latrines and disposal of sewerage.	The proposed site, being stand-alone, shall have its own drain and sewer system	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited shall comply with the provisions of the Act in order to safeguard human life by ensuring that measures to prevent diseases and pollution harmful to human health are taken into account.
Roads and Road Traffic Act No. 2 of 2011	The Roads and Traffic Control Act, provides for the control of traffic, and for the regulation of storm water disposal structures	The traffic during transportation of construction materials has potential to cause accidents hence traffic control measures have to be observed and company will comply with provisions of the Act.	Management will ensure adherence to the Road Traffic Act with regard to the haulage of various products and the supply of goods and services. Specific Applicable Sections include Part III (Registration of Vehicles), Part IV (Vehicle Licensing), Part V (Licensing of Drivers), Part VII (Third Party Insurance), and Part IX (Fitness Certification). Management will use company

			vehicles and those of contractors ensure comply with these provisions.
Zambia Development Agency (Amendment) Act 17 of 2013	This is an Act to foster economic growth and development by promoting trade and investment in Zambia through an efficient, effective and coordinated private sector led economic development strategy; to establish the Zambia Development Agency as a one stop facility which will ensure, among other matters, client focus, dialogue with the private sector and create confidence in public sector support for business; to provide for the functions and powers of the Agency; to attract and facilitate inward and after care investment; to provide and facilitate support to micro and small business enterprises;	The developer has to apply for an investor's license from the Zambia Development Agency (ZDA) as provided for in section 68 of the Act.	The developer will get a license from ZDA and will be required to comply all conditions therein.
The Employment Code Act No. 3, 2019	An Act to regulate the employment of persons; prohibit discrimination at an undertaking; constitute the Skills and Labour Advisory Committees and provide for their functions; provide for the engagement of persons on contracts of employment and provide for the form and enforcement of the contracts of employment; provide for employment entitlements and other benefits; provide	The construction and operation phases of the project will involve the employment of skilled and unskilled manpower. These will include labourers, surveyors, engineers, drivers, office managers, etc	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will ensure that individuals employed at the project are of legal employment age, and are provided with conditions of service that meet or exceed the minimum conditions of service. Employees will not be subjected to exploitation and

	for the protection of wages of employees; provide for the registration of employment agencies; regulate the employment of children and young persons; provide for the welfare of employees at an undertaking; provide for employment policies, procedures and codes in an undertaking; repeal and replace the Employment Act,1965, the Employment (Special Provisions) Act,1966, the Employment of Young Persons and Children Act, 1933 and the Minimum Wages and Conditions of Employment Act, 1982; and provide for matters connected with, or incidental to, the foregoing		abuse of their rights through casualization
The Occupational Health and Safety Act, No. 36 of 2010	This Act is promulgated to provide for the health, safety and welfare of persons at work; provide for the duties of manufacturers, importers and suppliers of articles, devices, items and substances for use at work; provide for the protection of persons, other than persons at work, against risks to health or safety arising from, or in connection with, the activities of persons at work.	Section 11 of Part III requires that an employer of ten or more persons at any workplace establishes a health and safety committee. The operation of the project might raise the risks of occupational health hazards as a result of working on a water body.	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will ensure that all the workers are provided with adequate and appropriate personal protective equipment. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will also provide information, instruction, training and supervision to ensure the health and safety of

			the employees at their workplace.
Solid Waste Regulation and Management Act No 20, 2018	An Act to provide for the sustainable regulation and management of solid waste; general and self-service solid waste services; the incorporation of solid waste management companies and define their statutory functions; the licensing and functions of solid waste service providers, operators and self-service solid waste providers and provide for their functions; the regulation, operation, maintenance and construction of landfills and other disposal facilities; the setting and approval of tariffs for management of solid waste and provision of solid waste services; and matters connected with, or incidental to, the foregoing.	The Facility will generate waste, such as empty oil tins and other packaging waste and domestic waste arising from the communal kitchen and the offices, that will have to be managed in accordance with the Act.	All other solid waste will be stored in appropriate solid waste bins separated into Domestic Waste, Industrial Waste and Hazardous Waste. The waste will be managed in- accordance with the Act as provided for in section 23 and 24.
The Workers' Compensation Act No. 10 Of 1999	An Act to make provision for the establishment and administration of a Fund for the compensation of Workers disabled by accidents to, or diseases contracted by, such Workers in the course of their employment, and for the payment of compensation to dependants of Workers who die as a result of such accidents or diseases; for the payment of contributions to such Fund by employers; for the grant of	It is relevant because projects of this nature tend to have accidents, the project shall comply with the provisions of the Act as provided for in section 6.	The developer will comply with this act by making sure all employees are registered.

	pensions and allowances to certain dependants of Workers who, being in receipt of pensions for such disablement, die from causes not connected with such accidents or diseases; for the appointment and powers of a Workers' Compensation Commissioner and the establishment and powers of a Workers' Compensation Board and an Appeal Tribunal; and for matters incidental to and connected with the foregoing.		

2.2 Institutional Framework

This section shows the most important institutions in terms of Environmental Management of natural resources in the country and institutions which might interact with the project implementation.

Table 5: *shows Institutions important in terms of Environmental Management of Natural Resources*

Policy	Relevance to the project
National Energy Policy-2019	This policy replaced the National Energy Policy of Zambia in 2008. The main objective of National Energy Policy is to achieve an optimal energy resources utilization to meet Zambia's domestic and non-domestic needs at the lowest total economic, financial, social, environmental cost. Therefore, the Solar Project implementation will benefit from its measures set out to achieve their established objective. These include: • Raising public awareness of the benefits and opportunities and developing the capacity for their implementation; • Promote efficient use of energy resource in order to conserve natural resources and increase socio-economic development; • Increase easy access to electricity in order to improve livelihoods of people living near the project area; • Strengthening the institutional framework for Research and Development; and • Providing appropriate financial and fiscal instruments for stimulating the implementation of renewable energy technologies.
2010 National Water Policy	2010 National Water Policy was meant to underpin and bring the water sector reforms to a conclusion. There are three subsectors under the water sector namely: Water Resources Development (WRD); Water Supply and Sanitation (WSS); and Water Resources Management (WRM). Common to the three sub-sectors is the aspect of water resources planning which requires an integrated approach to ensure

	coordinated water resource development, management, and utilization. The project of such magnitude will require coordinated water resource management.
Energy Regulation Board	**Energy Regulations Board (ERB)** The Government established the **Energy Regulation Board** through the Energy Regulation Board Act CAP 436 of the Laws of Zambia and its mandate is to regulate the energy sector in Zambia. The functions are as follows: • The ERB regulates undertakings or companies in the energy sector (providers of goods and or services for Electricity, Fossil Fuels, Renewable Energy, Biofuels and Coal sub-sectors) through licenses, standards, codes, guidelines and other regulatory interventions issued and developed by the ERB. • This role balances the needs of the industry with the needs of energy (electricity and petroleum) consumers. The affairs of the Board are managed by a Board of Directors appointed by the **Minister of Energy** and has a mandate of five (5) years.
Ministry of Agriculture and Livestock (MAL)	• In Zambia, Agriculture plays a key role of supporting industries by the production of the required raw materials, producing exportable agricultural goods, generating employment particularly in rural areas, as well as providing food stuffs essential for the sustenance of acceptable nutrition standards and levels. The main roles of the ministry are to effectively plan, monitor and evaluate agricultural sector programmes; promote agricultural production by providing policy guidelines to action programmes, facilitate the policies that would ensure national and regional food security through dependable annual production of adequate supplies basic food stuffs at competitive prices;

National Heritage Conservation Commission	The National Heritage Conservation Commission is responsible for the identification and conservation of sites of cultural and historical interest. The commission is also responsible for the enforcement of the national heritage conservation Act.
Water Resources Management Authority (WARMA)	The Water Resources Management Authority (WARMA) was established by the Water Resources Management Act to ensure the management, development, conservation, protection and preservation of the water resource and its ecosystems as well as equitable and sustainable utilisation of the water resource. Permits will thus need to be sought from WARMA and the company will abide by any condition, limitation, restriction or prohibition that WARMA may impose for the sustainable utilisation of the water from the dam.
Zambia Environmental Management Agency	The Zambia Environmental Management Agency (ZEMA) is a statutory body created by an act of parliament and falls under the Ministry of Green Economy and Environment. The ZEMA is responsible for the enforcement of the EMA on pollution control, natural resources management and solid waste management.
Siavonga Town Council	Siavonga Town Council is recognised under the Urban and Regional Planning Act, in consultation with the Provincial Planning Authority as a planning authority whose main responsibilities are the preparation, approval and revocation of development plans. LTI ReEnergy Cleantech Project Dev. & Inv.(Z) Limited recognises that the company operates in the jurisdiction of the local authority and will observe the by-laws and regulations set up by the local authorities. Planning and building permission will need to be sought from the local authority.
National Council for Construction	The aim of the National Council for Construction is to promote and build the capacity of the Zambian construction industry. The National Council for Construction has the mandate to Register, Regulate and Promote Contractors.

2.3 International Environmental Conventions to which Zambia is a Signatory

Zambia is a signatory and a ratified party to a number of international conventions. Though most of these agreements are non-committal, they are very vital in ensuring that individual countries operate while conscious of the locally but think globally. These agreements are meant to encourage countries to operate on agreed principles to enhance environmental, social and economic development.

Table 6 shows the international conventions

Convention	Description	Relevance to the Project
United Nations Framework Convention on Climate Change Ratified 1997 UNFCCC	This aims at stabilizing greenhouse gas (GHGs) concentration in the atmosphere at the level that would prevent 'dangerous interference with climate'. It urges countries to take steps in reducing the GHGs.	There will be not much emission of GHGs from this project except CO_2 from fossil fuel consumption. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will endeavour to use best technology and practices to reduce emissions of GHGs.
UN Conversion on Biological Diversity (1992)	This convention promotes conservation of biological diversity and sustainable use of its components.	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will continue to implement measures that encourage the conservation and protection of biodiversity.
Rio Declaration on Environment and development.	It established important principles for sustainable development	This declaration is important in that it involves the use of natural resources in a sustainable way to ensure that future generation also benefit. LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will implement the project in line with this declaration. It will incorporate sustainability principles in all in all its operation.
UNCCD Convention on Desertification	Convention established to combat desertification in those countries experiencing serious drought and/or desertification, particularly in Africa	This Convention has no bearing on LTI ReEnergy Cleantech Project Development & Investments Zambia Limited as the project site is not prone to serious drought/desertification.
Montreal Protocol Protocol for the Protection of the Ozone Layer Ratified : 1990	The protocol is aimed at ensuring measures to protect the ozone layer	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited needs to ensure its compliance by excluding all products and equipment making use of CFCs. LTI ReEnergy Cleantech Project Development & Investments

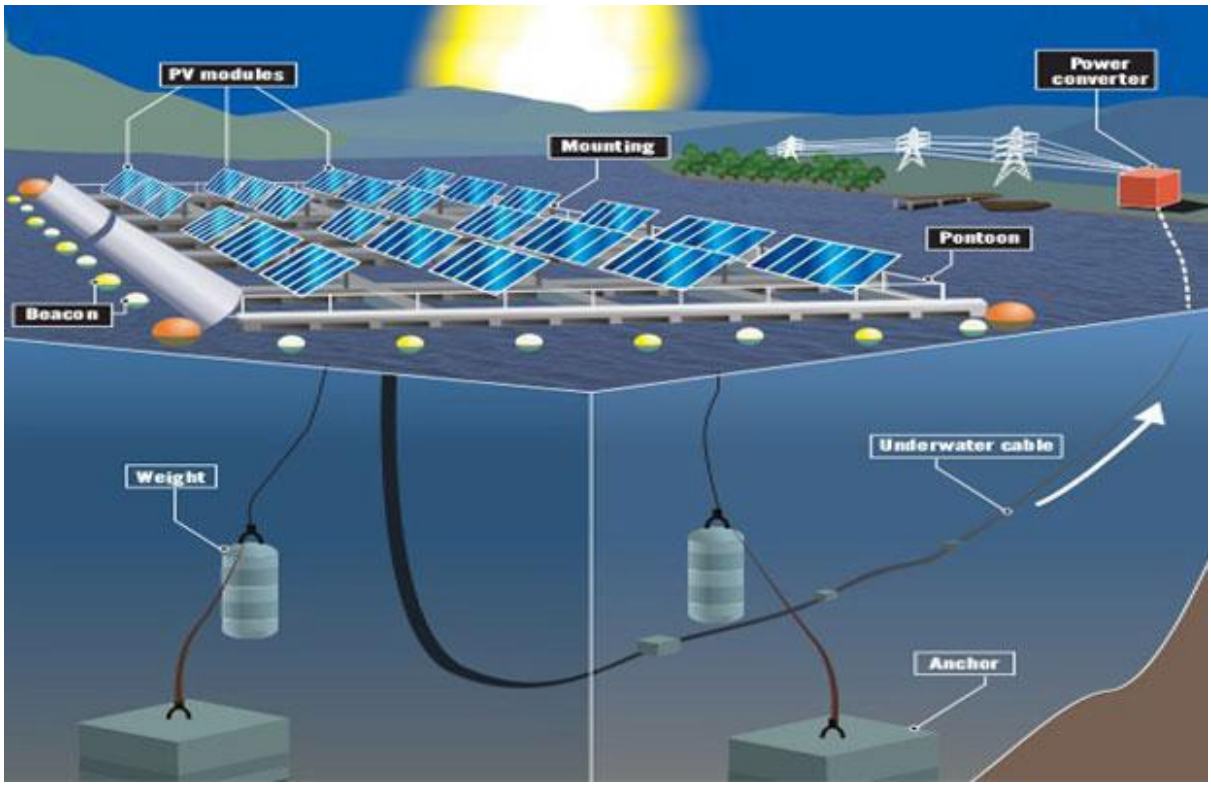
		Zambia Limited will not use anything that will contribute to ozone layer depletion
African Convention on the Conservation of Nature and Natural Resources (Algiers, 1968), (Maputo, 2003)	To encourage individual and joint action for the conservation, utilization and development of soil, water, flora and fauna for the present and future welfare of mankind, from an economic, nutritional, scientific, educational, cultural and aesthetic point of view.	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will ensure the conservation of important habitats as well as habitat corridors to promote biological diversity. The EMP deals with these aspects of ensuring habitat diversity and sustainable utilisation of natural resources.
Basel Convention Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal Ratified: 1994	Aims at the reduction of the production of hazardous waste and the restriction of transboundary movement transboundary movement and disposal of hazardous waste.	No direct impact on LTI ReEnergy Cleantech Project Development & Investments Zambia Limited project as the company will not be transporting any of its waste across any international boundaries.

3.0 PROJECT DESCRIPTION

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited is proposing to develop a 500MW FPV Solar Power Plant to cover about 500Ha of Lake Kariba in Siavonga district. The project will generate electrical power by converting solar radiation into direct current (DC) electricity using silicon panels that exhibit the photovoltaic effect, and converting the DC power to AC by inverters that plug into a medium voltage (MV) transformer which is connected to high voltage (HV) transformer. The project output will be Photovoltaic (PV) power.

The other associated facilities will include installation of 3 Smart Transformers Stations for 25,2MVA/ 30,636MWdc area cluster energy evacuation on medium voltage, 20hectares of land off shore reserved for a temporal assembly point, Substation that will occupy 10 hectares of land and a 330KV Transmission line that will feed power into the National Grid.

The Project is a grid tied utility solar PV electricity generation plant. A Summary of the process is shown in Figure 1 below.



3.1 Project Location

The proposed project is located in Siavonga district on the Southern Province of Zambia. The Floating PV solar plant will be installed on Lake Kariba which is located approximately 12.2km Northwest of Siavonga CBD. The proposed project is located near notable facilities like Lake Harvest Fish Farm, Yalelo Fish Farm, Banana Island and Beltsmol Fisheries & Logistics Limited. The proposed project site coordinates are as given below.

Table 7:The plot's corner coordinates are as below and a Google map for the project site has been attached as an appendix:

NO.	LATITUDE	LONGITUDE
1	16°31'04.42"S	28°39'50.76"E
2	16°30'51.04"S	28°39'50.91"E
3	16°30'50.91"S	28°40'5.92"E
4	16°30'58.11"S	28°40'14.16"E
5	16°30'57.93"S	28°40'36.58"E
6	16°30'46.15"S	28°40'36.66"E
7	16°30'45.87"S	28°40'21.28"E
8	16°30'28.78"S	28°40'21.47"E
9	16°30'29.05"S	28°40'36.86"E
10	16°29'57.57"S	28°40'37.14"E
11	16°29'57.75"S	28°40'58.72"E

12	16°29’48.48”S	28°40’58.62”E
13	16°29’48.69”S	28°40’37.38”E
14	16°29’43.00”S	28°40’37.13”E
15	16°29’42.82”S	28°40’24.75”E
16	16°29’22.76”S	28°40’24.94”E
17	16°29’22.77”S	28°39’51.27”E
18	16°30’14.33”S	28°39’22.17”E
19	16°30’25.45”S	28°39’43.11”E
20	16°31’8.16”S	28°39’24.33”E

Table 8: shows the coordinates for the area allocation for Onshore and Offshore project components

	Latitudes	**Longitude**
Assembly and Infrastructure Area	16°29'54.04"S	28°41'48.23"E
	16°29'43.49"S	28°42'05.52"E
	16°29'51.69"S	28°42'10.67"E
	16°30'03.37"S	28°41'53.67"E
Substation Area	16°29'11.39"S	28°43'29.70"E
	16°29'07.71"S	28°43'38.48"E
	16°29'17.09"S	28°43'43.88"E
	16°29'22.23"S	28°43'34.89"E

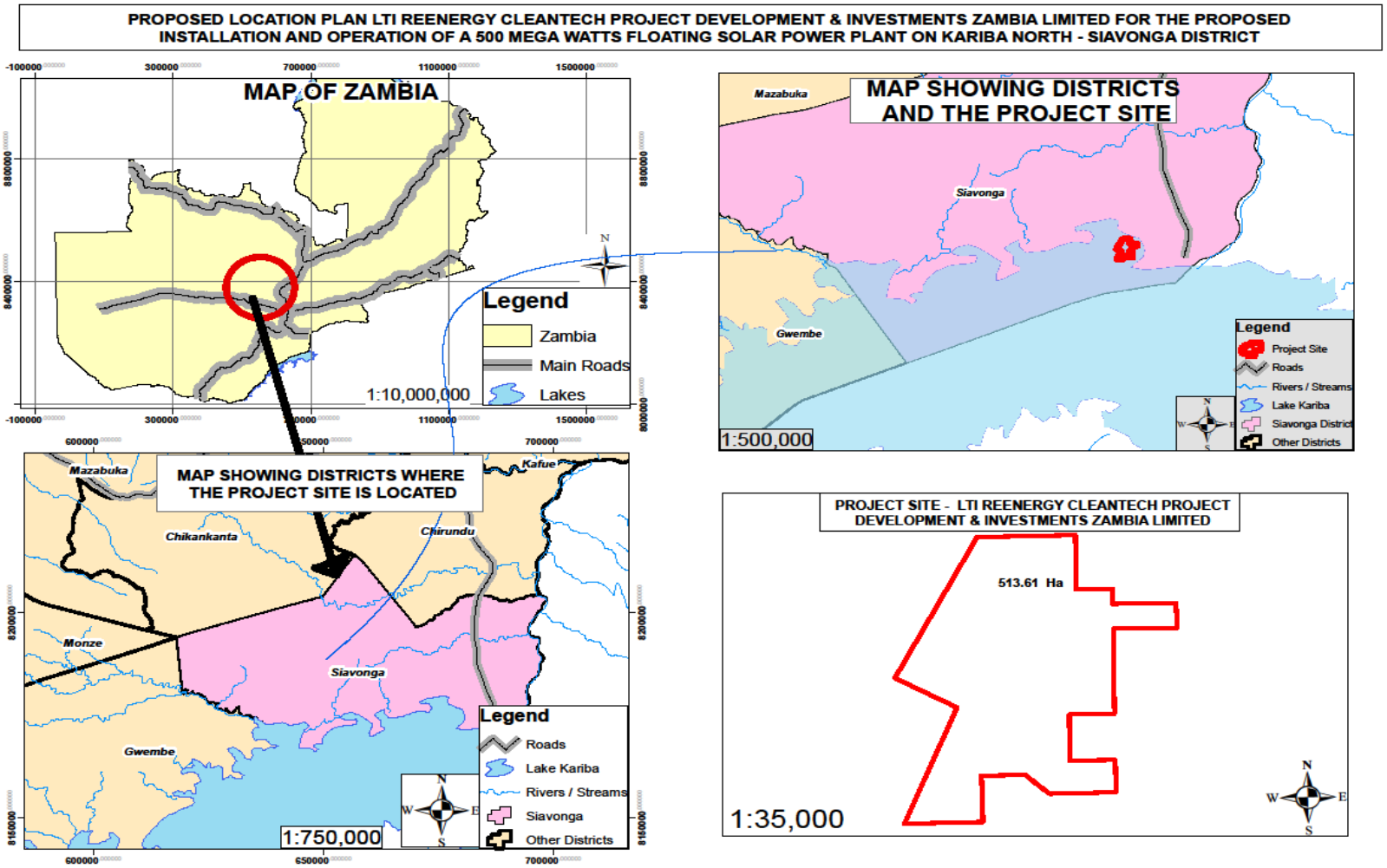


Figure 2: Shows the Location of the project site

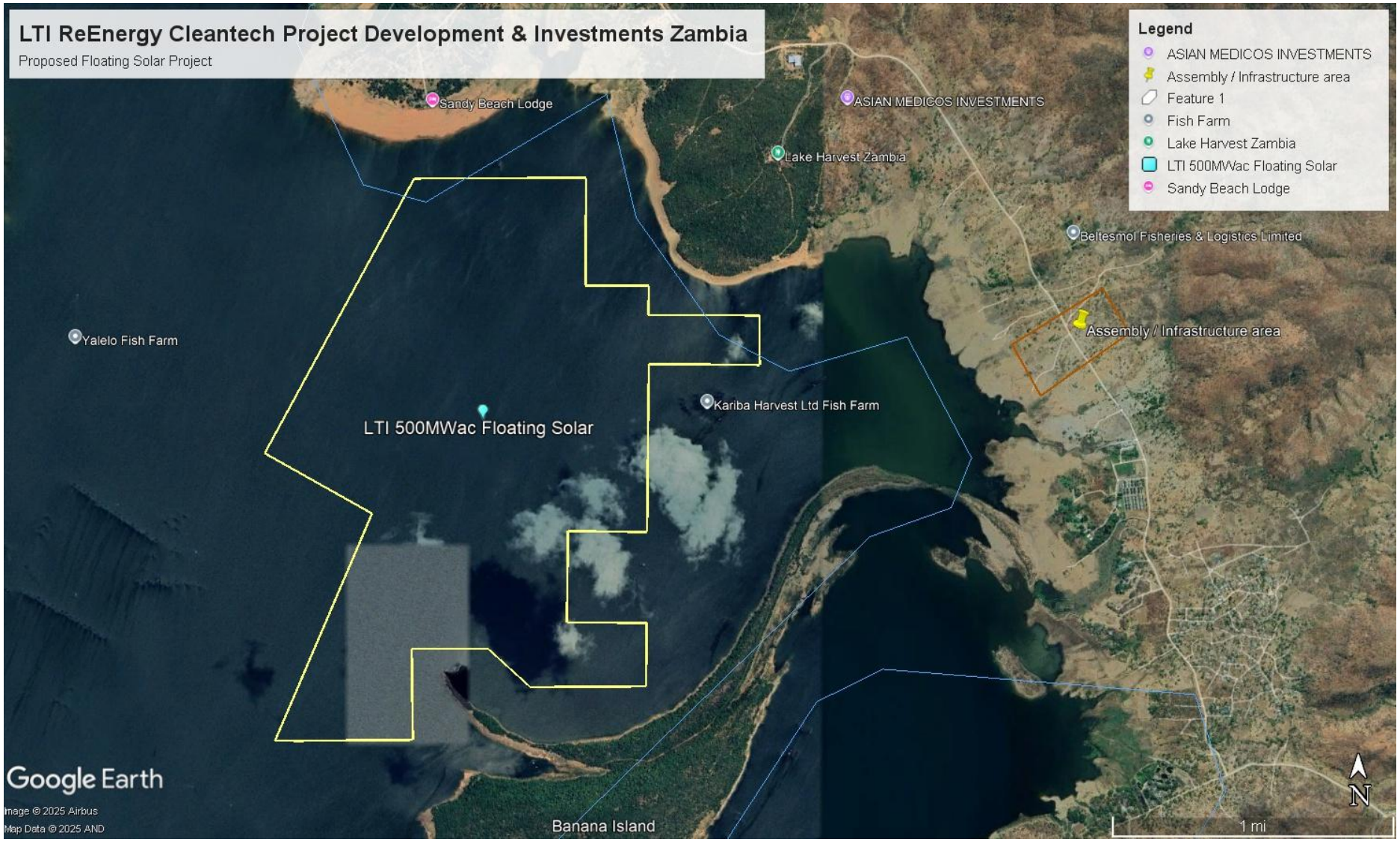


Figure 3 Shows the Google Map for the Floating Solar Plant

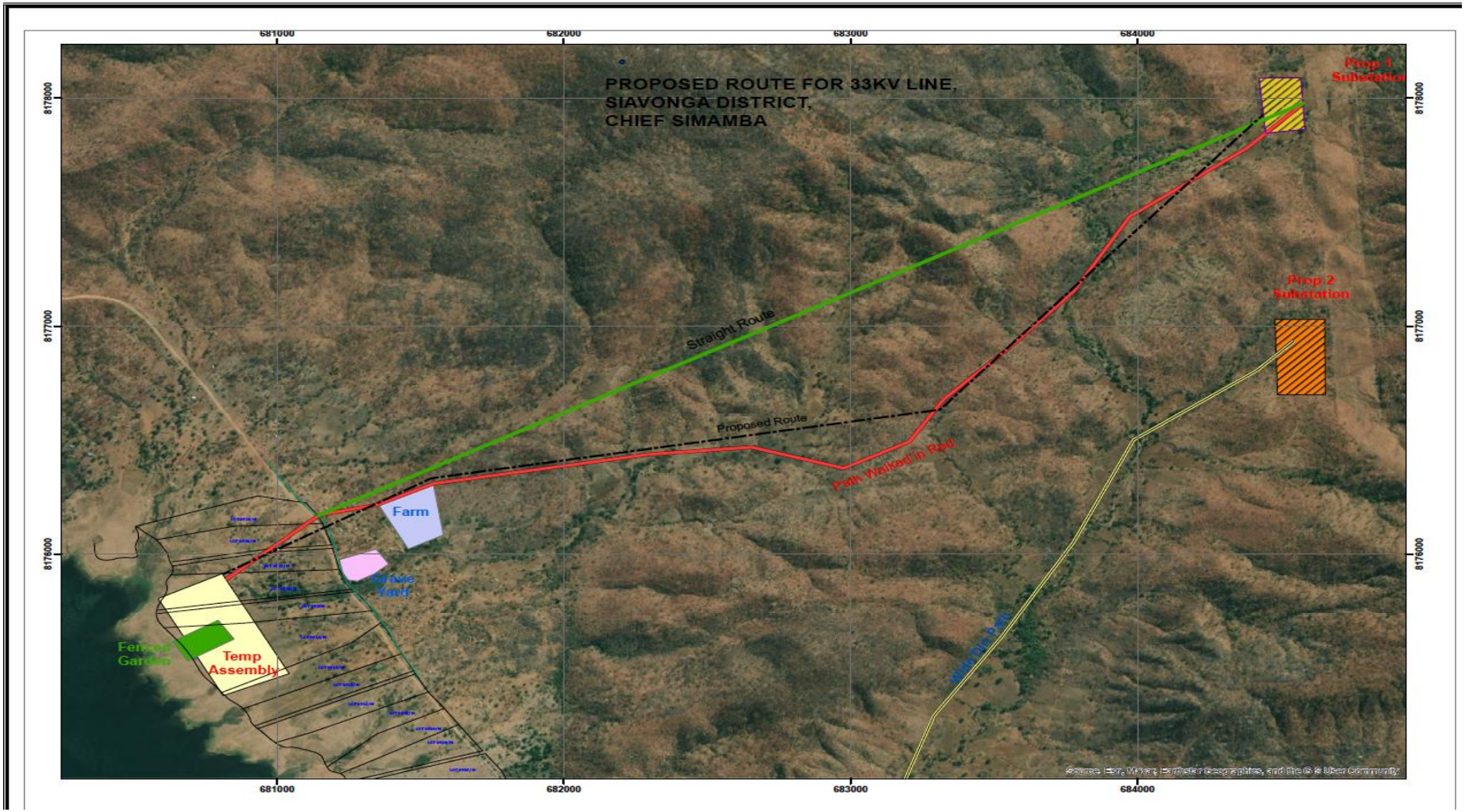


Figure 4 show the google map for the project component

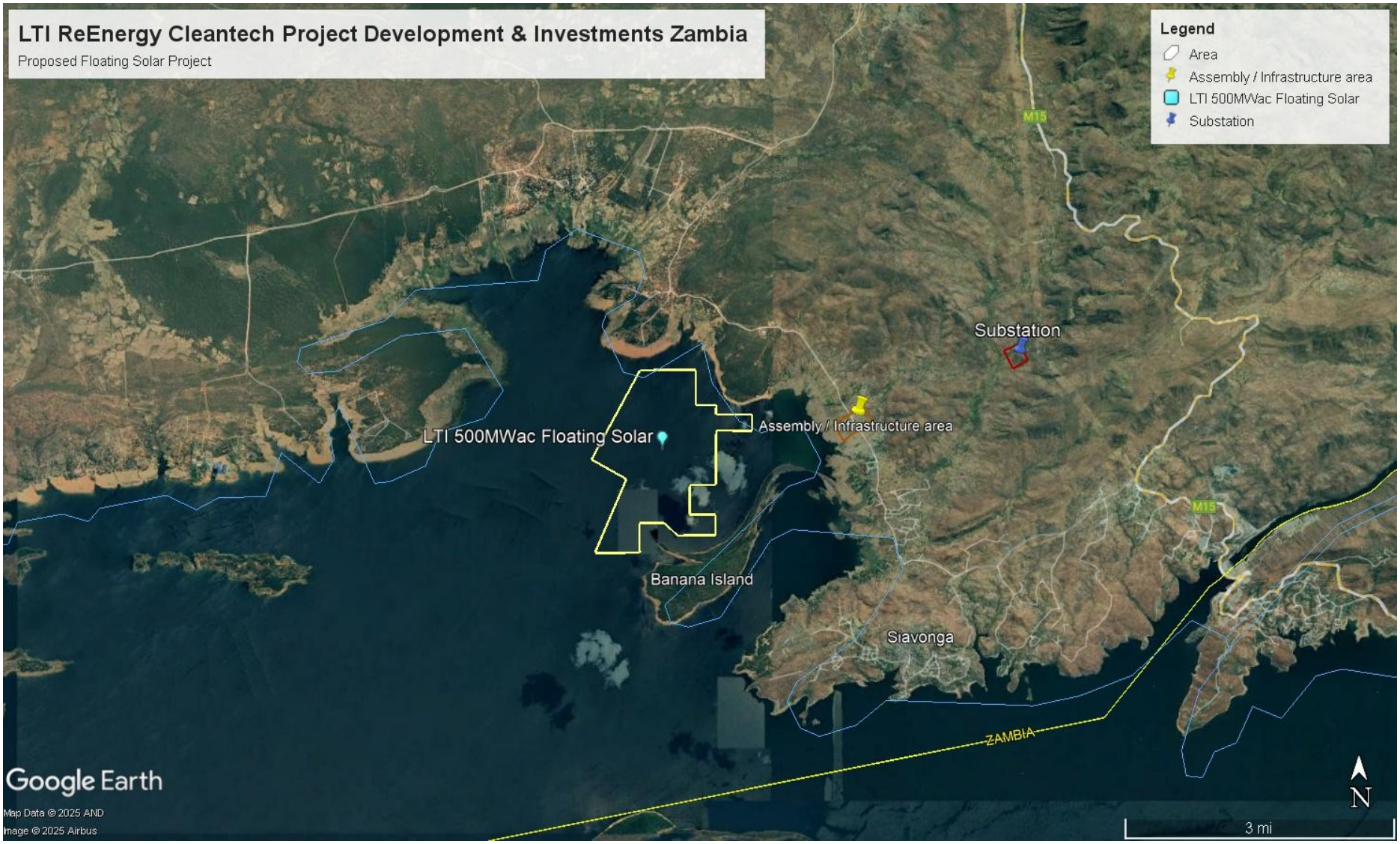


Figure 5 shows the project overview

3.2 Nature of the Project

The Company is proposing to develop a 500MW FPV Solar Power Plant to cover about 500Ha of Lake Kariba in Siavonga district. The proposed project will cover a total area of 500 hectares. In addition, about 20 hectares of land will be set aside for the Temporal assembly area together with all associated onshore structures, while a further 10 hectares will be allocated for the development of the substation and a 330KV Transmission line that will feed power into the National Grid. The project output will be 500MW of solar power supply

The project will generate electrical power by converting solar radiation into direct current (DC) electricity using silicon panels that exhibit the photovoltaic effect, and converting the DC power to AC by inverters that plug into a medium voltage (MV) transformer which is connected to high voltage (HV) transformer. The project output will be Photovoltaic (PV) power. The project will involve the following production process and activities:

Solar PV modules: These convert solar radiation directly into electricity through the photovoltaic effect in a silent and clean process that requires no moving parts. The PV effect is a semiconductor effect whereby solar radiation falling onto the semiconductor PV cells generates electron movement. The output from a solar PV cell is DC electricity. A FPV power plant contains many cells connected together in modules and many modules connected together in strings to produce the required DC power output.

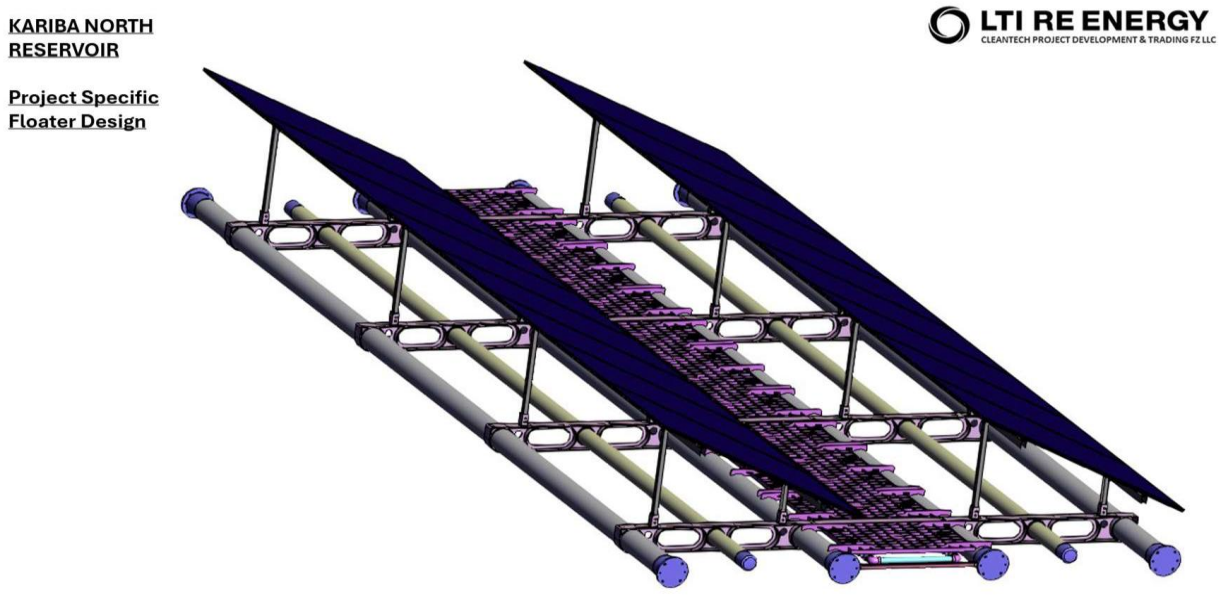


Figure 6: Showing an example of the solar module

Inverters: These are required to convert the DC electricity to alternating current (AC) for connection to the utility grid. Many modules in series strings and parallel strings are connected to the inverters.

Module mounting on tracking systems: These allow PV modules to be securely attached to the ground on sun-tracking frames on a single axis.

Figure 7: showing module mounting

Step-up transformers: The output from the inverters generally requires a further step-up in voltage to reach the AC grid voltage level. A transformer shall step up the power produced to the required voltage, as the power from the plant would be evacuated to the local substation away from the project site.

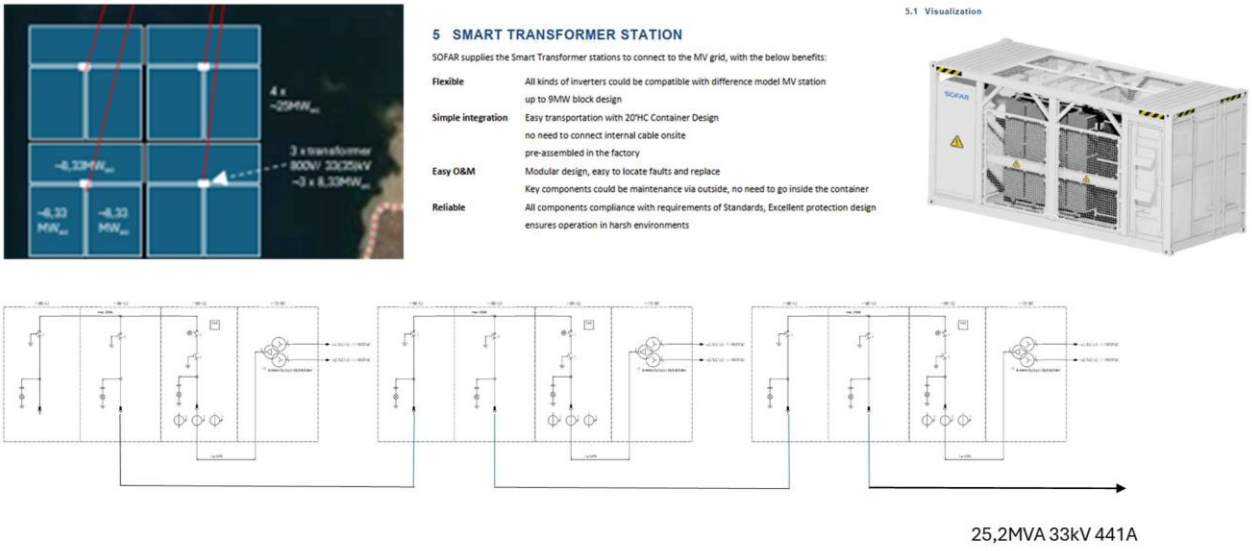


Figure 8: Showing Step-up Transformer

The grid connection interface: This is where the electricity is exported into the grid network. The substation will also have the required grid interface switchgear such as circuit breakers (CBs) and disconnects for protection and isolation of the PV power plant, as well as metering equipment. The substation and metering point are often external to the PV power plant boundary and are typically located on the network operator's property.

Other key project components

Service Infrastructure

Infrastructure for water, sewerage, and electricity will be installed and constructed at the site. There project area has no centralised public water supply and sanitation infrastructure currently existing in the project area. Therefore, water supply will be from the nearest Water Supply & Sanitation Line and borehole.

Electricity Supply and Reticulation

An overhead electrical reticulation system comprising armoured cables will be built to service the plant project. As such, all electrical infrastructures such as transformers, cables, etc., will be located or routed on the project site.

Water Demand and Supply

Water will be centrally supplied through the water supply line that will pump water into a water tank for use onsite. In addition, water tanks will be installed for emergency purposes.

Solar Field Components will include;

Building Infrastructures on site will include:

i. Operational and maintenance control centre;
ii. Warehouse/workshop for storage of materials;
iii. Ablution facilities;
iv. Inverter station;
v. On-shore substation building;
vi. On-site accommodation camp for construction workers (temporal); and
vii. Fencing; and Guard House.

3.3.4 Raw materials

Major raw materials to be used in production process will include

i. Floating Platform:
ii. PV Modules;
iii. Mooring and Anchoring system;
iv. Electric components (cables, inverters among others); and
v. Grid Connection interface.

Table 9: shows the raw materials

Raw materials	Use
Floating platform	Provide buoyancy and structural support for the solar panels and other equipment
PV Modules (Solar panels)	Convert sunlight into direct current (DC) electricity
Mooring and Anchoring system	Holding the floating solar array in place to prevent drifting due to wind , waves or currents
Electric components (Cables, Inverters)	Inverters: Coverting DC electricity from PV modules into alternating current (AC) Cables: Transmitting the generated electricity from PV modules to inverters and lastly to the power grid.
Grid Connection Interface	Linking the floating solar system to the power grid

3.3.5 By-Products and Products

The following are the anticipated by-products from the project cycle;

1. **Installation phase:** During the **installation phase** of the floating solar project, the main by-products expected include packaging materials such as plastics, cartons, wooden pallets, and strapping from delivered equipment, as well as scrap materials like broken panels, defective floats, metal off-cuts, and surplus wires. In addition, domestic solid waste such as food wrappers and bottles may be produced by workers on site.
2. **Operation Phase:** During the **operation phase**, the by-products are generally limited to those arising from maintenance and replacement activities. These may include damaged or defective PV modules, worn-out cables and connectors, and used inverters or transformers. Minor oil residues may result from equipment servicing, while the eventual end-of-life disposal of floating platforms, typically made of HDPE plastic. Small quantities of solid waste from maintenance employees and wastewater from periodic panel cleaning may also be generated.

3.4 Main project activities

The project will consist of three implementation phases; these will include the following;

3.4.1 Preparation phases: Site Selection and feasibility study

This phase will include the activities mentioned below;

- Consultations with the relevant regulatory institutions such as Zambezi River Authority, WARMA, Ministry of Energy, ZEMA, District Council:
- Site feasibility studies;
- Importation and transportation of machinery and equipment to the project site; and
- Project management and administration (which will involve setting up **safety arrangements**, including barriers, signage, and emergency access routes)

3.4.2 Installation phase

It is anticipated that the construction phase of the project works will last between 8-10 months. The construction phase related works will comprise:

i. Assemble floating platforms onshore or near water;
ii. Mount PV modules onto the floating structures;
iii. Install mooring and anchoring systems (anchors, weights, or shoreline moorings);
iv. Lay floating and underwater cables for electricity transmission;
v. Install inverters, transformers, and switchgear;
vi. Connect the system to the grid interface; and
vii. Conduct testing, commissioning, and performance verification.

3.4.3 Operational Phase

The operational phase of project development will comprise the following:

i. **Monitoring and Performance Management** - Regular checking of PV module output, inverters, and transformers will be done using various control systems

ii. Maintenance Works will be conducted which will include; Cleaning PV modules to remove dust, bird droppings, or algae (usually periodic washing).Inspect and replace worn or defective electrical components (cables, connectors, inverters). Additionally, inspecting mooring and anchoring systems to prevent drifting or damage will be conducted.

iii. Manage minor wastewater from panel cleaning.

iv. Monitor water quality near the floating solar array for potential impact.

v. Properly collect and dispose of maintenance-related waste (scrap materials, oils, defective components).

vi. Conduct periodic safety inspections for staff and equipment.

vii. Ensure emergency protocols and access routes are maintained

3.4.4 Decommission Phase

The main activity during the decommissioning phase is the removal of used solar modules, associated electrical components and cabling for disposal or recycling and demolition of site buildings. The buildings may not be demolished if alternative use for them is agreed upon with other stakeholders. The site will need to be restored to near pre-project conditions.

3.5 Anticipated wastes from the project cycle

The floating solar project on Lake Kariba is designed to generate clean energy with minimal environmental impact. However, like any engineered project, certain wastes and by-products are expected throughout its life cycle. These wastes arise mainly from the installation, operation, maintenance, and eventual decommissioning of the system. These will include the following;

1. **Installation phase:** During installation, the main wastes are primarily related to the handling and assembly of equipment. These include packaging materials such as plastics, cartons, wooden pallets, and strapping from PV modules, floats, electrical components, and inverters. Minor construction scrap, including broken or defective panels, float segments, metal off-cuts, and surplus wires, may also be generated. Small amounts of cement or concrete residues from anchoring works at the shoreline can occur, along with domestic solid waste produced by workers on site.
2. **Operation Phase:** During the operation phase, wastes are generally associated with routine maintenance and component replacement. These include damaged or defective PV modules, worn-out cables, connectors, and inverters, as well as broken or degraded floats at the end of their service life. Minor solid waste from the workers and residues from panel cleaning may also be produced.
3. **Decommissioning Phase:** At the end of the project's life, decommissioning will generate larger volumes of materials requiring careful handling. This includes removal of PV modules, floats, inverters, transformers, cables, and ancillary structures. A project decommissioning plan will be developed as part of the ESIA to ensure safe removal and disposal of all project components at their end of life or which are no longer required for the continuous use at the project. Once all the waste resulting from dismantling works is removed from the site, the site will be restored by removing all equipment and debris,

recycling reusable materials, and ensuring the shoreline and lake area are left clean and free from residual waste.

3.6 Schedule and life time of the project

The actual implementation of the proposed project will be after approval of the EIA by ZEMA and surely after all the necessary paper work has been concluded which is scheduled to be in the first quarter of 2026. The project lifespan is estimated to be 25years.

The actual implementation of the proposed project will be after approval of the EIA by ZEMA and surely after all the necessary paper work has been concluded. The developer envisages to take about 9 months to conclude with the necessary preparations on the site before the plant can be fully function.

4.0 PROJECT ALTERNATIVES

The proposed implementation of the project may be undertaken considering other viable options such as but not limited to site location, Power, Water Supply and Sewer Disposal, and Technology.

4.1 Project Location Alternative

The lake was chosen as the most sustainable and technically feasible location because it provides a large, stable water surface that is ideal for deploying floating photovoltaic arrays. Using the lake minimizes land use conflicts and avoids the need for large land acquisition or vegetation clearing, which could disrupt terrestrial ecosystems. Additionally, the water body offers a natural cooling effect for the PV modules, improving efficiency and reducing overheating losses.

Alternative locations, such as land-based sites, would require significant land preparation, higher costs, and could compete with agricultural or community land uses.

4.2 Technology

Photovoltaic (PV) modules were selected for this floating solar project because of their proven reliability, high efficiency, and adaptability to modular deployment on water. Compared to alternative technologies such as **concentrated solar power (CSP)** or **solar thermal systems**, PV modules are simpler to install, require minimal maintenance, and perform well under variable sunlight conditions. Floating PV modules also benefit from the cooling effect of the water, which enhances electricity generation efficiency compared to land-based PV systems. Overall, PV technology offers the most cost-effective, scalable, and low-impact solution for electricity generation on Lake Kariba.

4.3 Power Alternative

The principal source of electricity during construction phase of the project is Diesel Generator energy before connecting to a nearby ZESCO main which is found within reach of the project site. The following are the power alternatives;

A: Diesel Generator
Alternatively, diesel generator would be utilised. The cost of running a diesel generator would be manageable as it will run only during construction

B: Connecting to the ZESCO Electricity Grid
The site is near to the national grid but not yet connected to the ZESCO line.

Option A is preferred for being both economical and easily accessible for the construction activities unlike waiting to connect to the national grid just for construction.

4.4 Water Supply

The two options selected for water supply were onsite boreholes and Lake Kariba water treatment. Onsite boreholes involve drilling into the groundwater to provide a reliable year-round water source, while lake water treatment would require pumping water from the lake and treating it for potable and operational use.

The company opted for onsite boreholes because they provide a consistent and independent water supply, reduce reliance on complex treatment systems, and are easier to manage and maintain for the daily needs of the project site.

4.5 The "No Action" or "No Project Alternative"

The alternative of not implementing the Project was rejected because the project under review is a much-needed development to the nation and to the local district. Under the "No Project Alternative", any potential adverse environmental and social impacts associated with the project would not occur. However, the preliminary assessment indicates that the disadvantages with the no project scenario include the following:

ii. Increased power deficit and load shedding;
iii. Lost opportunity to promote renewable energy;
iv. Loss of employment opportunities for the local people who could have been employed during the construction and operation phase of the project;
v. Loss of government revenue through reduced taxes; and
vi. Loss of business for suppliers and contractors.

4.7 Analysis of Alternatives

The alternatives considered for the implementation of the project are limited and have been analysed to determine how feasible they are in terms of helping to achieve the project objectives. The best alternatives will be adopted for implementation.

Site alternative: The lake was chosen as the most sustainable and technically feasible location because it provides a large, stable water surface that is ideal for deploying floating photovoltaic arrays.

Technology: The adopted technology and process preferred was The PV system which was found to be the most viable technology for the proposed project

Power alternative- The proposed energy source for the project site will be from the national power grid. The alternative power source considered was the use of generator and solar power once the project is completed.

Water supply- The adopted water supply alternative is boreholes because they provide a consistent and independent water supply, reduce reliance on complex treatment systems, and are easier to manage and maintain for the daily needs of the project site.

5.0 DESCRIPTION OF THE BASELINE ENVIRONMENT

The environment forms the basis for any development and is an integral part. This section takes cognisance of the existing environmental issues in Siavonga District area with focus to where the project site is located. The flora and fauna assessment were undertaken using two approaches, namely desk study and field survey.

The proposed project will occupy 500ha of the lake and 20 hectares which will include all associated infrastructure. The project output will be power solar power supply.

5.1 Climate

In view of the nature of the proposed project, the hydrological analysis was done to determine the hydrological setting of the area where the proposed mine is expected to be developed. Specifically, the following was done;

(i) Description of climatic factors (e.g., rainfall, evaporation, temperature, evapotranspiration) for the project and surrounding areas;
(ii) Determine rainfall reliability/design rainfall for the area;
(iii) Classification of landcover and vegetation type for the project area;
(iv) Analysis of morphological and drainage characteristics
(v) Catchment delineation and runoff estimation;

The project area is characterized by a subtropical climate that consists mostly of three seasons as follows;

(i) Cold season: June to August
(ii) Pre-rainy season: September to October
(iii) Rainy season: November to March.

The project area lies in the Zambezi valley where the temperature is relatively high throughout the year and particularly highest in October. Given the prevailing climate variations, the three seasons experience variations in terms of duration and onset. In some cases, the variations may affect the beginning of the rainy season, which may in turn affect water availability in time and space.

Annual Rainfall

Rainfall records for the past 42 years (1983 to 2023) show that the area receives 687mm as mean annual rainfall. This is consistent with the long-term rainfall occurrence in Agro-ecological region I. In some years this amount is exceeded and it is expected due to seasonal variations. As is the case with other parts of the country, rainfall in Siavonga District is mainly influenced by the movement of the Inter-Tropical Convergence Zone (ITCZ).

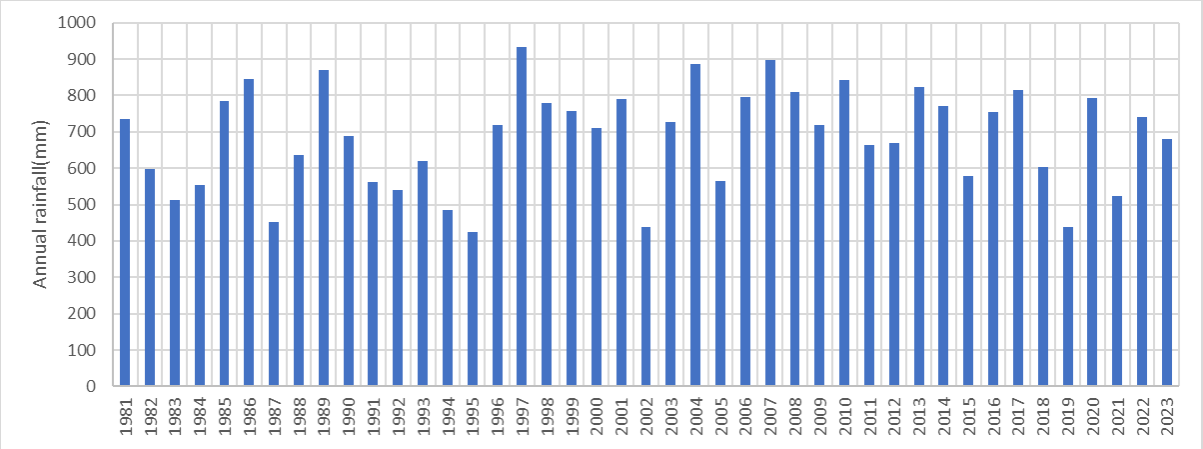


Figure 9: showing historical average rainfall

Temperature

The temperature in this area is typical of what prevails in the valleys, where the mean annual temperature is relatively higher than in the highland areas. The temperature in Siavonga and surrounding areas. The monthly mean annual temperature ranges from 21°C in June to 35°C in October.

Table 2: Showing the minimum and maximum temperatures of the project area

Month	Min Temp (°C)	Max Temp(°C)	Humidity (%)	Wind (km/day)	Sun (hours)	Rad (MJ/m²/day)	Eto (mm/day)
Jan	21.6	30.5	76	121	6.9	21.3	4.68
Feb	23.2	35.2	36	233	9.2	24.0	7.48
Mar	21.6	30.5	76	121	6.9	21.3	4.68
Apr	23.2	35.2	36	233	9.2	24.0	7.48
May	21.6	30.5	76	121	6.9	21.3	4.68
Jun	23.2	35.2	36	233	9.2	24.0	7.48
Jul	21.6	30.5	76	121	6.9	21.3	4.68
Aug	23.2	35.2	36	233	9.2	24.0	7.48
Sept	21.6	30.5	76	121	6.9	21.3	4.68
Oct	23.2	35.2	36	233	9.2	24.0	7.48
Nov	21.6	30.5	76	121	6.9	21.3	4.68
Dec	23.2	35.2	36	233	9.2	24.0	7.48
Average	**18.2**	**30.4**	**58**	**156**	**8.5**	**20.9**	**4.93**

Wind

The predominant dry season wind direction is from the east-southeast. The average wind speed in Siavonga experiences significant seasonal variation over the course of the year.

The windier part of the year lasts for 3 months, from August to November, with average wind speeds of more than 9.2 miles per hour. The windiest month of the year in Siavonga is October, with an average hourly wind speed of 11.6 miles per hour.

Sunshine

Approximately 12 days of frost are recorded annually and sunshine ranges between 11 hours per day from May to June, and down to 4 hours per day in February. Information on sunshine around the project area was very limited, throughout literature reviewed. This formed part of project information sourcing limits and study information gaps.

Humidity

Relative humidity varies throughout the year, reaching peak in the wet season. Wet season humidity levels are high reaching 78%, while dry season humidity levels can reach lows at 38%, with mean relative humidity of the area recorded at an average of 65%. (Kenneth Kaunda International Airport Weather Station obtained from the Zambia Meteorological Department

Evaporation

Lake Kariba extent is 280 kilometres in length and 32 kilometres in width at full supply level. This extent, at full supply level, holds 185 x 109 m^3 of water. On an annual basis, the mean annual evaporation is 156 meters (www.zambezira.org). The trend shows that monthly evaporation ranges from 120mm to 189mm, with the highest being experienced between September and November. Evaporation is an important element in water resources assessments due to its influence on the availability of water in the lake.

5.2 Flora

Terrestrial Flora

The Siavonga area is dominated by typical southern Zambian savanna vegetation, characterised by mixed woodlands, shrubs, and hardy grasses that thrive in the hot and semi-arid climate surrounding Lake Kariba. The project exbited low diversity near the proposed site, the One of the most notable species in the near the banks of Lake Kariba was the Pink Morning Glory (*Ipomoea carnea*). Other species include *Vachellia tortilis* (Umbrella thorn) and *Vachellia nilotica* (Gum arabic tree).

Aquatic Flora

The aquatic flora of Lake Kariba is dominated by submerged and emergent macrophytes, many of which serve as critical feeding and breeding habitats for fish. A common group is the submerged hairy aquatic plants, often consisting of species like Spirogyra, filamentous algae, and other soft submerged vegetation.

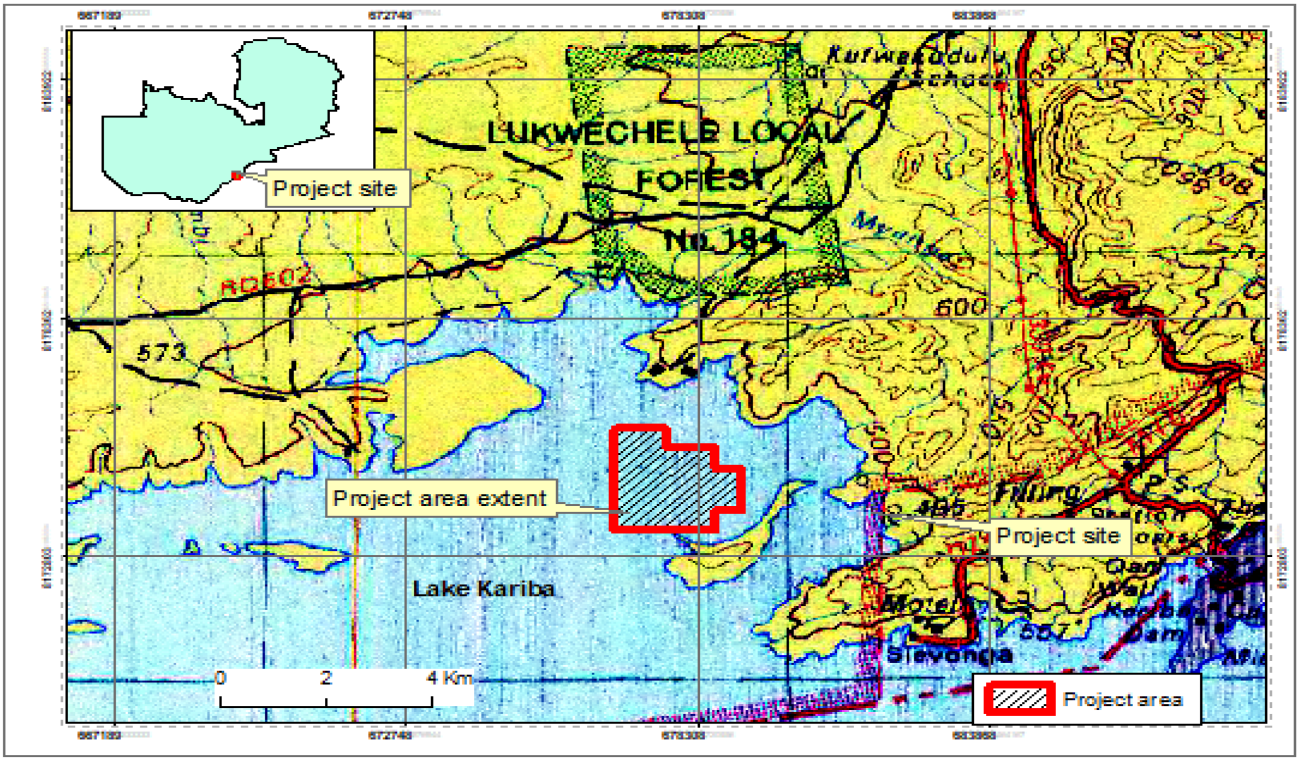


Figure 10:Showing the vegetation cover of the project site

Fauna

Aquatic Specie

The distribution of various fish species on Lake Kariba is reflective of the limnological gradient of the Lake. The eastern region of the Lake is dominated by more potamodromous species (Cyprinidae and Distichodontidae) whilst the western region forms habitat for sedentary species such as Cichlids (Begg, 1974).

It has been estimated that there are up to 39 fish species occurring on Lake Kariba of which 14 species have been determined to be endemic to the region. Additionally, 17 fish species are considered to be of economic importance for the region's fisheries, these include: *Hydrocynus vittatus, Coptedon rendalli, Oreoochromis mortimeri, Heterobranchus longifilis, Mormyrops deliciosus*. Cichlids are the mainstay of the Kariba inshore fishery. They are pre-adapted lacustrine fish and their biomass increased substantially soon after water impoundment of the Zambezi River at Kariba (Balon, 1974), and it has also been suggested that cage-aquaculture has equally contributed to the increased standing biomass of cichlids. Other Taxonomic Families with representation on Lake Kariba include: *Cyprinidae, Mormyridae, Clariidae, Mochokidae, Schilbeidae, Characidae.*

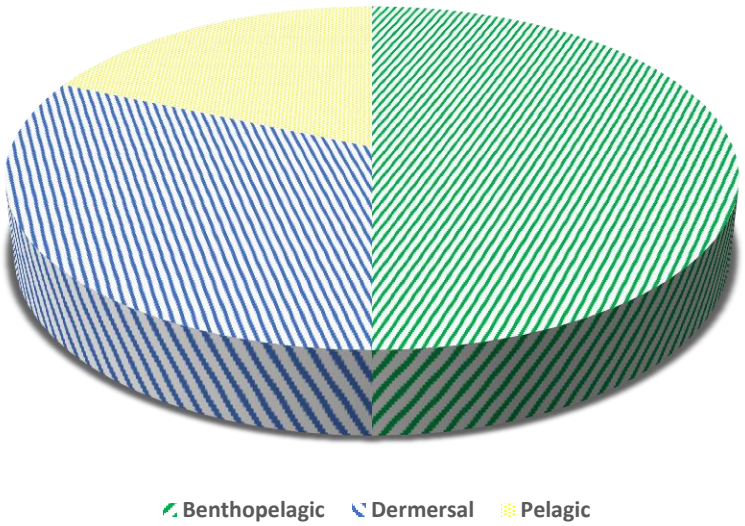


Figure 11: shows the Species Distribution

Birds

The following birds were identified at the proposed site during the field surveys.

Table 10: List of Birds observed near the site

NO.	SCIENTIFIC NAME	COMMON NAME
1.	*Haliaeetus vocifer*	Fish eagle
2.	*Ardea cinerea*	Grey Heron
3.	*Ardea alba*	Egret
4.	*Anastomus lamelligerus*	African Openbill Storks
5.	*Numida meleagris*	Guinea Fowl
6.	*Bucorvus leadbeateri*	Ground Hornbill
7.	*Actophilornis africanus*	African jacana
8.	*Charadrius tricollaris*	Plover
9.	*Anas undulata*	Duck

Reptiles

The Siavonga and Lake Kariba region supports a wide variety of reptiles due to its warm climate and diverse habitats. Common species include Nile Monitors (*Varanus niloticus*), which are frequently seen along the shorelines searching for fish, eggs, and small animals. Smaller lizards and skinks inhabit the rocky outcrops and bushy areas around the lake, benefiting from the warm sun and abundant cover.

The lake itself is also home to crocodiles, particularly the Nile Crocodile (*Crocodylus niloticus*), which occupies the deeper and calmer waters and uses the sandy banks for basking and nesting.

Insects

Insect survey at the project site was done and a number of insects were observed in the area. Insect life included a variety of species of dragonfly, wasp, bees, crickets, grasshoppers, termites, mosquitoes, ants, red ants, lady bugs, butterflies and moths.

Presence of Invasive species

No Invasive or exotic species for both Flora and Fauna were noted on the proposed project site.

Sensitive Habitats

There were no sensitive or fragile habitats on the study area with respect to the magnitude and extent of the project being proposed that could cause a serious environmental upset in the stability of the existing ecosystem.

5.3 Drainage and Hydrology

The project area is located on Lake Kariba which acts as the main hydrological feature in Siavonga. Local drainage is influenced by the surrounding hilly terrain, where surface runoff from rainfall flows through small seasonal streams and channels before entering the lake. These drainage lines are most active during the rainy season and help transport sediments and nutrients into the lake system.

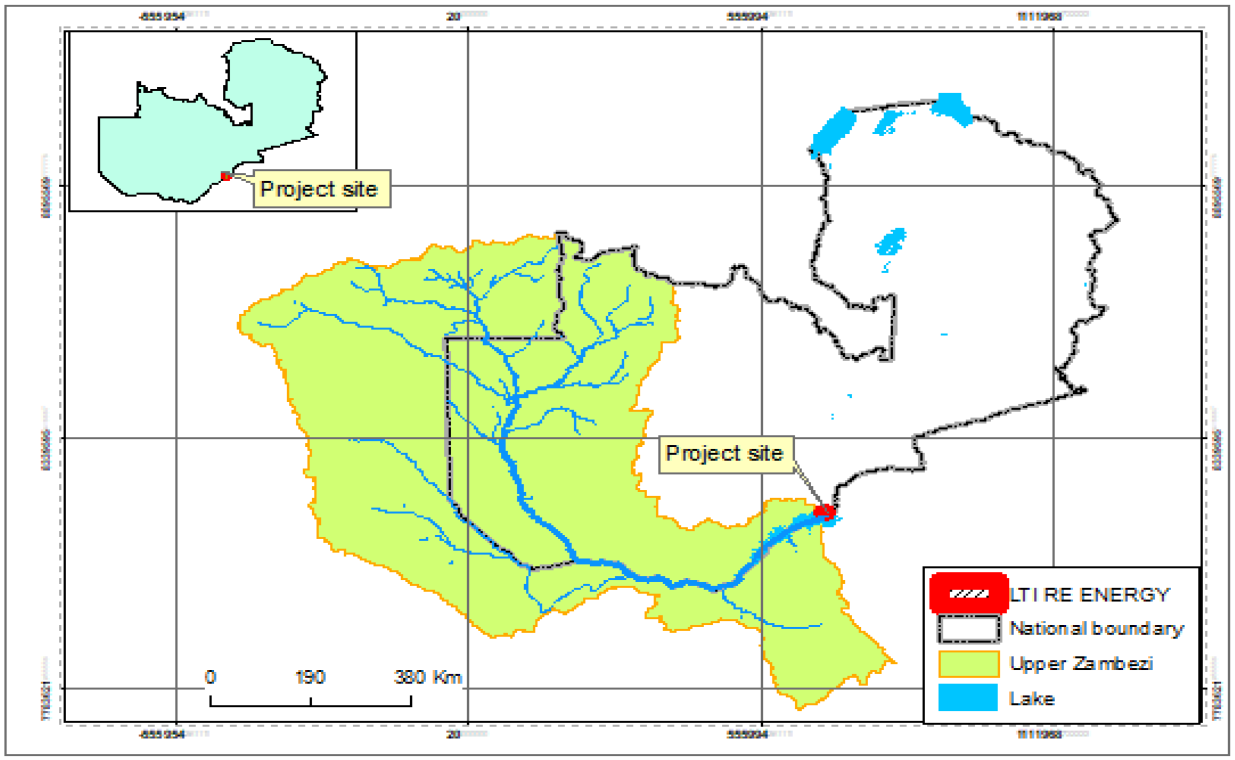


Figure 12:Showing the hydrology of the project site

5.3.1 Hydrogeology

Hydrologically, Lake Kariba experiences natural seasonal changes in water levels due to rainfall, upstream inflows, controlled releases for hydropower generation, and evaporation. The lake's large surface area and depth create slow-moving water conditions, with circulation mainly influenced by wind, temperature differences, and inflow patterns.

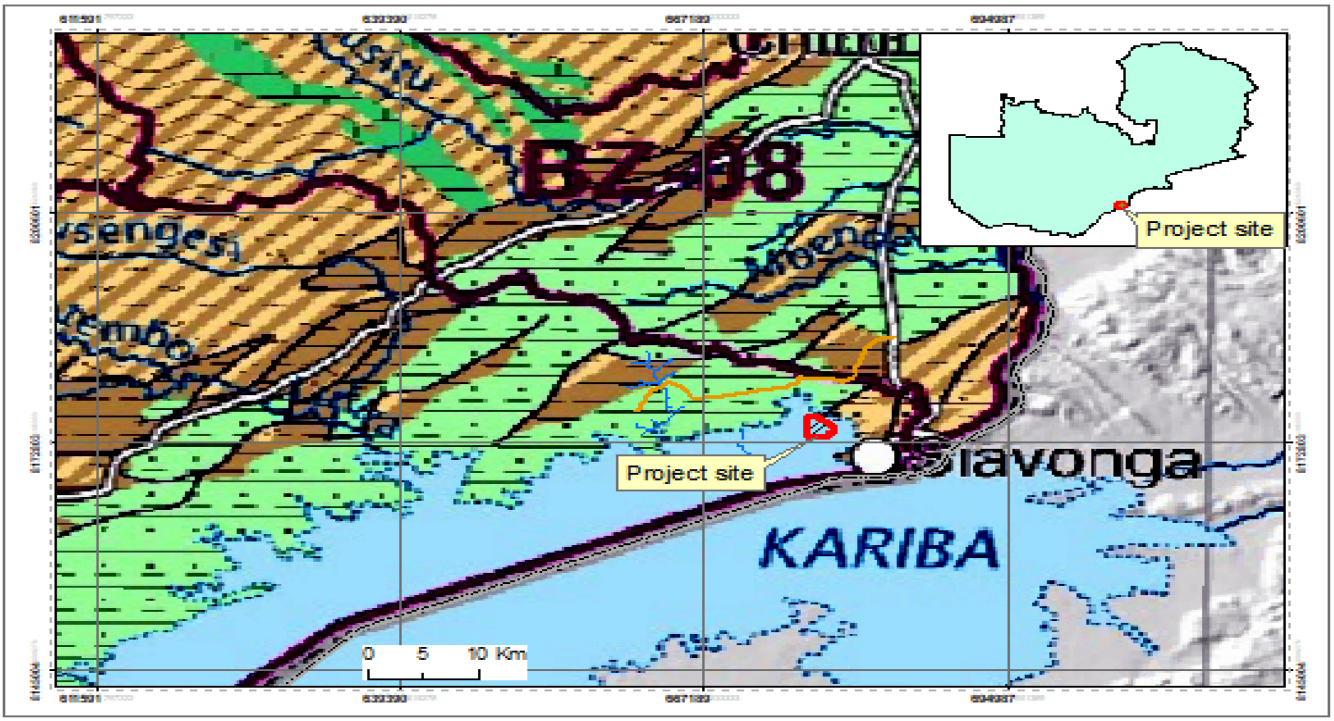


Figure 13 Hydrogeology of the project area (Extract of the Hydrogeological Map of Zambia)

Groundwater Development Prospect

Aquifers in which intergranular flow is significant

	B	Moderately productive, intergranular, predominately unconsolidated aquifer (0,1 - 15 l/s) (mainly alluvial sands and gravels & Kalahari Group)

Aquifers in which flow is dominantly in fissures, channels or discontinuities

	C	Highly productive aquifer (0,1 - 70 l/s) (mainly Upper Roan dolomite and Kundelungu limestone)
	D	Moderately productive, fissured aquifer (0,1 - 15 l/s) (mainly Karoo sandstones)
	E	Locally productive, fissured aquifer (0,1 - 10 l/s) (mainly undifferentiated Kundelungu, Lower Roan quartzites, Muva sediment granites)

Aquifers of limited potential or regions without significant groundwater

	E - F	Stratum with intermediate characteristics (0 - 2 l/s) (mainly low yielding formations of Karoo basalts, Mine series shales and basement gneiss)
	F	Unproductive formations (mainly Karoo shales, metamorphic and igneous rocks)

5.4 Soils

The soils in the Siavonga area are generally shallow, stony, and moderately fertile, typical of the rocky escarpment terrain surrounding Lake Kariba. Much of the landscape is dominated by granitic and basalt-derived soils, which are coarse-textured, well-drained, and often reddish to brown in colour. These soils tend to have low organic matter and moderate nutrient levels, requiring vegetation that is well adapted to dry and nutrient-limited conditions.

Along the shoreline, alluvial soils occur in small pockets where sediments have accumulated over time. These soils are finer in texture, slightly more

fertile, and support denser vegetation such as reeds, grasses, and other moisture-loving plants.

5.5 Noise Quality

There is no historical data for the project area. Current noise levels are associated with fishing activities and other water users and natural elements i.e., wind, rains and thunderstorms.

The main objective of this study was to obtain baseline data on the noise levels in the project area. A noise level measurement and zoning assessment was also undertaken to ascertain the noise level baseline as it will also be of concern throughout the project lifecycle.

The objectives in summary are as follows:

- To establish the levels of ambient dust (PM_{10}) and ($PM_{2.5}$) in the project area. Atmospherically, these gases are found in the ambient air within and around the proposed site prior to project implementation. The levels obtained will represent baseline information of the project area.
- To establish the levels of noise in the project area as it will be a critical issue throughout the project lifecycle.
- To ascertain if the noise levels in the project site are within or exceed the International Financing Corporation limits for noise generation.

The Noise levels study was conducted, in which Noise Levels data was obtained by way of periodical measurements in the four (4) sampled sites for Noise. The four (4) sampled points for noise levels were measured at different points. The sample results were obtained for each sampling point and analyzed for Noise levels in the project area.

The instrument used was the 213 Noise level Meter. This equipment is a hand-held noise logger machine and noise levels were sampled at close range to the source where 1.5m above the ground.

The following methodology was employed to determine the levels of noise at the project site;

- ✓ Identification of the stationery and mobile sources of noise
- ✓ Classification of noise level range using the sound level meter (range between 30-80dB for low;80-100 for medium and 100-130 for high level noise generation)
- ✓ Determination of activity leading to noise generation.

This assessment was conducted to establish baseline data for the project site. Readings were obtained for each sampling point and for each point 10 to 15 minutes was used as duration for the determination of acceptable or non-acceptable noise levels. The noise guidelines limits followed were the IFC/World Bank guide lines. The following are the results for the noise that was sampled in the project area.

Table 11 shows the results of the noise levels in area

Sampling Location	**Noise level-dB(A)**		**Duration (min)**	**IFC Standard**	**Remarks**	**Noise Source & Receptor**	
	Min	**Max**				**Source**	**Receptors**
SP1	38.8	59.6	10	85dB	Normal	Vehicles, people, Wind and animal Noise	Surrounding neighborhood
SP2	40.7	55.5	10	85dB	Normal	Vehicles, people, Wind and animal Noise	Surrounding neighborhood
SP3	42.9	45.8	10	85dB	Normal	Vehicles, people, Wind and animal Noise	Surrounding neighborhood
SP4	38.6	49.6	10	85dB	Normal	Vehicles, people, Wind and animal Noise	Surrounding neighborhood

IFC noise standards key: *D=Disruptive :> 85 dB; I=Institutional levels: 55dB; C=commercial levels: 70 dB*

Figure 14 Shows Noise sampling at the Temporal Assembly Area

Five points were sampled for noise generation and the results were generally low to medium levels according to the International Finance Corporation (IFC) standards. The major source of noise within the project site was the existing plant and people working near the site.

Analysis of Noise Results: Noise levels are associated with activities in the project area which is industrial. The other noise levels associated with the area are natural elements i.e. aquatic life, people, and natural elements. The instrument used was the 213 Noise level Meter.

5.6 Air Quality

This section highlights the baseline information of the Air quality of the area. The air within the proposed area was sampled and the ambient air (dust) in the project area is good in terms of quality. This might be attributed to the factor that the project site doesn't have any much activities.

The main objective of this study was to obtain baseline data on the Dust levels in the project area. This data will be analyzed and culminate into a comprehensive EIA report to be submitted to ZEMA. The study was limited to the existing ambient concentrations of Dust (PM_{10}) and ($PM_{2.5}$) in the project area. This is aimed at understanding the atmospheric conditions of

the project area prior to implementation of the project. The Air quality study was conducted in which ambient air quality data was obtained by way of periodical measurements in the four (4) sampled sites ambient air. The Sampling was done using the Particulate Dust Sampler (Temtop 2000). The equipment was used on each sampling point to determine the comparative readings of $PM_{2.5}$ and PM_{10} on the respective points. Below are the results for the air quality sampled.

Figure 15 shows the Dust Sampling in the project area

Table 12 shows the results for ambient air quality

Location	**Parameter**	**Results** (ug/m³)	**ZEMA Standards**	**Duration (min)**	**Remark**
SP1	$PM_{2.5}$	**4.8**	50ug/m³	60	Acceptable Limit
	PM10	**8.8**	50ug/m³	60	Acceptable Limit
SP2	$PM_{2.5}$	**3.8**	50ug/m³	60	Acceptable Limit
	PM_{10}	**9.8**	50ug/m³	60	Acceptable Limit

SP3	$PM_{2.5}$	**3.1**	50ug/m³	60	Acceptable Limit
	PM_{10}	**9.7**	50ug/m³	60	Acceptable Limit
SP4	$PM_{2.5}$	**4.5**	50ug/m³	60	Acceptable Limit
SP5	$PM_{2.5}$	**3.9**	50ug/m³	60	Acceptable Limit
	PM_{10}	**8.9**	50ug/m³	60	Acceptable Limit

The sampling revealed the levels of dust both $PM_{2.5}$ and PM_{10} were within ZEMA Standards for the Four sampled points. Generally, the project site has little anthropogenic activities that can significantly impact the air quality of the area. On analysis of the area, it was concluded that the air quality is generally good within the project site and the surrounding areas.

5.7 Description of the Social Economic Environment

The core purpose of the Socio – Economic Baseline study was to ensure that all identified social and economic issues associated with the Project area assessed thoroughly.

The main objective of the study was to facilitate an understanding of the elements of the existing baseline conditions that are relevant to resources/receptors that could be significantly impacted by the Project. Other objectives include to identify the impacts of the operations to those that live in the area, to those that use the natural resources of the area, and to give a baseline overview of the socio-economic scenario in the project area that has a direct or indirect bearing on the project.

5.7.1 Social Services and Amenities

Siavonga District is served by a variety of social amenities that support the well-being and daily needs of its residents. The district has a network of primary and secondary schools, including both government and community-run institutions, which cater to basic education and literacy development. Markets and trading centers are scattered across the district, providing access to food, household goods, and fishing supplies, especially near lakeshore settlements. The district also hosts recreational facilities, which serve as venues for cultural events, sports, and social gatherings. Access to government offices, police posts, and post offices ensures administrative services are available to residents. While amenities are concentrated in Siavonga town and larger lakeshore villages, more remote hillside and upland settlements often have limited access, highlighting disparities in service delivery that may influence project engagement and socio-economic planning. With the development of the proposed project, the local market is expected to expand to accommodate the incoming workforce. Given the limited existing

amenities in the area, the project is not anticipated to disturb any significant social services or infrastructure.

5.7.2 Health and Education

Siavonga district is serviced with one (1) District Hospital, 1 Hospital Affiliated Health Centre (8) Rural Health centers and twelve (12) Health Posts. All these facilities provide primary and curative health services to the general populations (*Siavonga IDP, 2021-2030*). Despite this, access to healthcare in remote hillside and upland communities remains limited, with residents often traveling long distances to reach the nearest clinic.

Figure 16 shows the Siavonga District Hospital

Siavonga District has a total of 43 Schools comprising of 7 Community Schools, 26 primary schools, 4 secondary schools and 6 private schools against the required 55 schools, which serve the district's population. The majority of schools are concentrated in Siavonga town and larger lakeshore settlements, providing access to formal education, literacy programs, and vocational training. However, the area near the proposed floating solar project site does not have any schools within immediate proximity. The closest educational facility is Mubuyu Christian Academy, located approximately 5 km northwest of the site, while major institutions such as Siavonga Secondary School and other government schools are located further away, requiring students to travel significant distances.

5.7.3 Settlement

Siavonga District exhibits a diverse settlement pattern shaped by both topography and proximity to Lake Kariba. The district is generally hilly, with elevated areas interspersed by valleys and lakeshore plains. Communities are distributed across these landscapes in ways that reflect access to resources, livelihood activities, and infrastructure. People living uphill tend to occupy sparsely populated areas, often in small clusters of homesteads, where agriculture on terraced or sloped land is common. These hillside settlements are generally more remote and may have limited access to social amenities such as schools, health facilities, and markets.

Figure 17 shows some of the settlements in Siavonga District

People living downhill are more concentrated, forming larger villages or small towns that benefit from easier access to water, transportation, and fishing or aquaculture activities. Lakeshore communities often have clustered homesteads, reflecting both social cohesion and proximity to economic activities such as fishing, tourism services, and boat transport.

Settlement patterns in Siavonga are thus a mix of dispersed hillside homesteads, clustered lakeshore villages, and small urban centers, reflecting the interplay of terrain, economic activities, and social networks. While the district is generally hilly, the area near the proposed project site is gently undulating, with moderately spaced homesteads and small clusters, reflecting a sparsely populated landscape.

5.7.4 Traditional Practices and Rites

Siavonga District operates under a well-established traditional governance system that complements statutory administration. The district is primarily

overseen by chiefs primarily under **Chief Simamba (XI)**, with **Chief Sinadambwe** who supervise several headmen and village elders. These traditional leaders manage customary land, resolve local disputes, and play a central role in community decision-making.

The district is predominantly inhabited by the Tonga people, who are the major ethnic group in Southern Province. The district maintain rich cultural traditions such as the annual "Chuundu Lwindi" festival, a significant local ceremony that celebrates communal values, harvest cycles, and the connection to Lake Kariba.

5.7.5 Ethnic Groups

The population of Siavonga District is predominantly made up of the Tonga people, who are the major ethnic group in Southern Province. The Tonga have historically settled along Lake Kariba and surrounding areas, with livelihoods closely linked to fishing, small-scale agriculture, and trade. Other ethnic groups are present in smaller numbers, mainly as migrants drawn to the district by employment opportunities in tourism, fisheries, and emerging industries. The dominance of the Tonga shapes the district's social norms, cultural practices, and community interactions, while the presence of other groups contributes to modest cultural diversity in urban centers and lakeshore settlements.

5.7.6 Land Tenure System

Land in Siavonga District is governed through a combination of customary and statutory tenure systems. The majority of land, particularly in rural and lakeshore areas, is under customary ownership, managed by traditional leaders. Under this system, land is allocated to families or individuals for settlement, agriculture, and fishing activities, often guided by local customs and communal agreements. The statutory system, overseen by the District Commissioner and local councils, governs urban areas, public infrastructure, and formal land allocations.

5.7.9 Economic Activities

Fishing is one of the primary economic activities in Siavonga District, particularly along Lake Kariba, which provides a rich source of fish for both local consumption and commercial purposes. Artisanal and small-scale fishers dominate lakeshore communities, using traditional methods such as gill nets, traps, and longlines. Fish species commonly harvested include Kapenta (Tanganyika sardine), tilapia, and bream, which support household income and nutrition. In the proposed project area, commercial aquaculture

operations such as Yalelo and Lake Harvest are active, employing modern techniques and providing jobs to local residents. These enterprises contribute significantly to the local economy, linking Siavonga to both domestic and regional markets.

Additionally, small-scale business entities and shops form another important part of Siavonga District's economy. These include retail shops, food stalls, general merchandise outlets, and small service providers, which cater to the daily needs of residents and visitors alike.

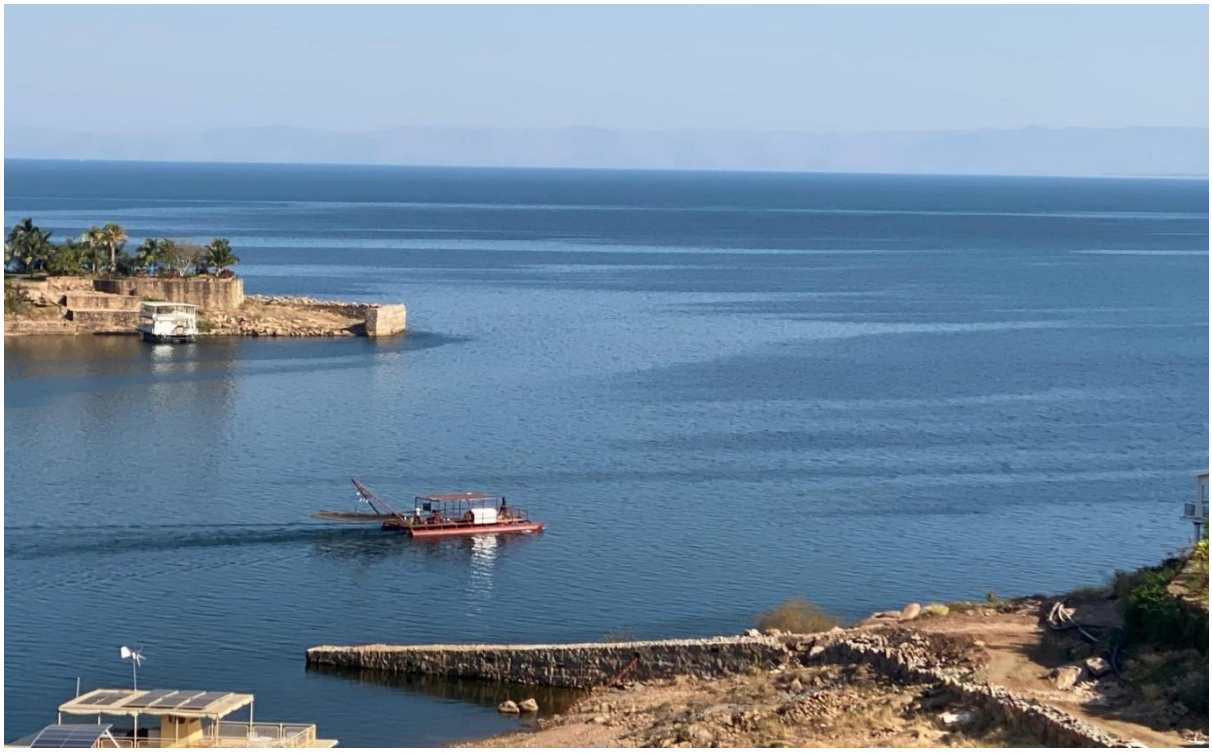


Figure 18 shows the Fishing Rig in the Lake

.

Figure 19 Shows some of the shops

In addition to capture fisheries, **aquaculture** is increasingly important in Siavonga, particularly in controlled fish farms near the lakeshore. Operations such as **Yalelo and Lake Harvest** cultivate fish intensively using cages and pens, supplying both local and export markets. These farms employ skilled labor, stimulate related economic activities such as feed supply and processing, and contribute to food security.

5.7.10 Agriculture

Agriculture remains a key livelihood activity, particularly in upland and gently undulating areas away from the lake. The main crops include maize, groundnuts, cassava, and vegetables, primarily grown for subsistence, with some surplus sold in local markets. Livestock keeping, including cows, goats, and chickens, complements crop production and provides additional household income. While agriculture is not dominant on the lake itself, lakeshore households often combine fishing and small-scale farming to diversify income sources and reduce vulnerability.

5.7.11 Tourism

Tourism is an important economic activity in Siavonga District, largely driven by the recreational and scenic value of Lake Kariba. The district attracts both domestic and international visitors for activities such as boating, sport fishing, bird watching, and lakeshore relaxation. Key recreational areas and lodges supporting tourism include Lake Kariba Inn, which offers accommodation, dining, and boating services, and other facilities that cater to both short-stay and longer-term visitors.

Near the proposed floating solar project site, notable tourism facilities include The Siavonga Baobab, located approximately 4 km from the site, and Sandy Beach Lodge, about 6 km northwest of the site. These provide recreational activities, and serve as hubs for tourism-related employment. Lakeshore tourism in Siavonga not only contributes to local income generation but also supports small businesses, hospitality services, and artisanal fishing, highlighting the interconnected nature of economic activities in the district.

5.7.12 Employment

Employment in Siavonga District is largely concentrated in the fishing, agriculture, tourism, and small-scale trading sectors. Lakeshore communities near Lake Kariba rely heavily on fishing and aquaculture for their livelihoods, with both artisanal fishers and employees of commercial operations such as Yalelo and Lake Harvest earning income from fish production and processing. Agriculture, including crop farming and vegetable gardening, provides additional household income.

The tourism sector also contributes to employment, with lodges, recreational facilities, and boating services providing jobs for local residents. Small-scale trading in local markets further supplements household income. Formal employment is limited, and many residents rely on informal livelihoods or multiple income sources to sustain their households. Communities near the proposed floating solar project site are primarily engaged in lakeshore-based activities.

Of the total potential workforce interviews (20 people), 61 percent claimed to be employed while 29 percent claimed to be self-employed (in this context self-employment will likely comprise of person that undertake small-scale farming or informal trade). The major formal employer in the district is the Government of the Republic of Zambia which has a workforce in the various Ministries. Owners of private mines also employ part of the population. The project area, then, has high labour force ready to be employed.

5.7.13 Water Supply and Sanitation

Siavonga water supply system depends on both surface and underground water. The water is abstracted from Lake Kariba and pumped to Siavonga Water Treatment Points (WTP). Both urban and peri urban areas are serviced by the Southern Water and Sewerage Company (SWASCO). They are 408 boreholes drilled in different wards of Siavonga district. The households within the CBD are provided with clean and safe water from SWASCO including peri urban areas such Fishing Camps (*Siavonga IDP, 2021-2030*). These sources provide water both for drinking and bathing.

6.0 ENVIRONMENTAL AND SOCIAL IMPACTS

The environmental and social impacts associated with the proposed project for installation of solar plant are likely to trigger both negative and positive impacts. This requires that the negative impacts be managed and the positive impacts be enhanced to minimise the potential impacts on the environment. The evaluation of impacts was based on the methodology described in the subsequent section below.

6.1 The Nature and Evaluation of Impacts

Studies undertaken on proposed installation of solar plants considered direct, indirect, cumulative, and residual environmental impacts associated with the construction of solar plant. These were assessed in terms of the following criteria: description of what causes the effect, what will be affected, and how it will be affected. The extent, wherein it is indicated whether the impact will be local (limited to the immediate area or site of development), regional, national or international. The following factors were considered in classifying each potential impact generated by the Project.

- **Frequency:** Occurrence of activity producing the impact, e.g., continuous, intermittent or a single event/less than once per year;
- **Likelihood**: Probability of impact occurrence (e.g., 100%, 50%, 0%);
- **Extent:** Spatial extent of the impact (e.g., within 2km of site boundary, outside the Project site but within 10km, within 50km, within Zambia, outside Zambia.
- **Duration:** Extent in time of the impact. Short term impact (less than the life of the project), medium term impacts (equal to the lifetime of the Project) and long-term impacts (greater than the lifetime of the Project);
- **Magnitude:** Impact magnitude defined in relation to the limit criterion specified by ZEMA or international standards where available.
- **Type of impact:** Positive or negative effect; direct or indirect action.
- **Potential significance:** A combination of all the factors described in the preceding bullet points is used to determine the type and significance of potential impact prior to mitigation. This is defined as low, medium or high.

6.2 Evaluation of Potential Impacts

An attempt is made in this section to evaluate the overall significance of each identified impact by assigning values to a set of criteria as follows:

Table 13: Significance Ranking Matrix

CONSEQUENCE (Magnitude Geographic Extent Duration of impact)															
LIKELIHOOD (Frequency of activity Frequency of impact)	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
	2	4	6	8	10	12	14	16	18	20	22	24	26	28	30
	3	6	9	12	15	18	21	24	27	30	33	36	39	42	45
	4	8	12	16	20	24	28	32	36	40	44	48	52	56	60
	5	10	15	20	25	30	35	40	45	50	55	60	65	70	75
	6	12	18	24	30	36	42	48	54	60	66	72	78	84	90
	7	14	21	28	35	42	49	56	63	70	77	84	91	98	105
	8	16	24	32	40	48	56	64	72	80	88	96	104	112	120
	9	18	27	36	45	54	63	72	81	90	99	108	117	126	135
	10	20	30	40	50	60	70	80	90	100	110	120	130	140	150

Table 14: *Positive/Negative Mitigation Ratings*

Significance Rating	Value	Negative Impact Management Recommendation	Positive Impact Management Recommendation
Very High	126-150	Propose mitigation measures	Improve current management
High	101-125	Propose mitigation measures	Improve current management
Medium-High	76-100	Propose mitigation measures	Improve current management
Low-Medium	51-75	Maintain current management	Propose mitigation measures
Low	26-50	Maintain current management	Propose mitigation measures
Very low	1-25	Maintain current management	Propose mitigation measures

- **Type of Impact** (Direct / Indirect)
- **Duration** (Intermittent / Temporary / Short Term / Medium Term (construction phase) / Long Term / Permanent)
- **Intensity / Severity** (Negligible / Low / Moderate / High)
- **Spatial Extent** (Site / Local (area surrounding the site) / Regional)
- **Likelihood** (Uncertain / Improbable / Probable / Highly Probable / Certain)
- **Sensitivity** [of the receptor; degree of change effected on natural processes or people's livelihoods] (Low / Moderate / High)
- **Overall Significance** (Insignificant / Low / Moderate / High)

6.3 Anticipated Project Impacts

The positive and negative adverse project impacts assessment was based on the following impact criteria during pre-construction, construction, operation phases and decommissioning phase as follows:

- Direction of Impact: Type of effect the activity would have on the affected environment,
- Positive or negative
- **Scale:** Physical scale / area over which the impact will be felt: Local, Regional, National or International
- **Duration:** The length of time the impact is likely to occur: Short, Medium or Long Term
- **Reversibility:** Reversible; where it is avoidable or has potential to be restored; Irreversible; where it is unavoidable or has no potential to be restored.
- **Pathway:** Indirect; where it is no direct result of the Project. Direct; where it is a direct result of the Project and associated activities; Cumulative; where it results from incremental changes caused by other past, present or reasonably foreseeable actions together with the Project.

6.3.1 Positive Impacts (Socio – economic impacts)

6.3.1.1 The proposed project will provide direct and indirect employment opportunities to workers. This will have skilled and un-skilled labour as well many employment opportunities.

6.3.1.2 Increased Public revenue

The facility will be paying revenue and taxes thus increase revenue and taxes for both the central and local authorities. This includes taxes and potential export income and other indirect taxes resulting from VAT on materials and services, PAYE as well as revenue to pension funds such as NAPSA.

6.3.1.3 Increased Capacity Building

Individuals and organizations that will be attached to the project will obtain, improve, and retain the skills, knowledge, tools, equipment and other resources needed to do their jobs competently. It also allows individuals and organizations to perform at a greater capacity (larger scale, larger audience, larger impact, etc.).

6.3.1.4 Boost Local Businesses in the Local Area

The project will be an opportunity for local business men to expand their businesses. This may be attributed to the increase in demand for food and other necessities by the workforce.

6.3.1.5 Multiplier Effect

The developer enhances local participation throughout the various phases of its operation by focusing on local suppliers, employees and consumers and intends to maximize the multiplier.

6.3.1.6 Increase Supply of Electricity to the National Grid

The project will contribute over 100MW power to the National Grid hence boost the power shortages in the Country. Ndola District will have the opportunity of having a power within the district due to the establishment of the solar farm plant.

6.3.1.7 Increase in Water Levels in the Kariba

Kariba is short on water, if the same electricity can be generated by solar rather then removing water from the dam, then this amount of water can be saved in the dam. This will help especially in the dry season, so in consequence the solar project is not only producing power, but keeping the water levels in Kariba higher and more flexible for water and energy management in the region.

6.3.2 Negative Impacts

6.3.2.1 Impact on Air quality

During the preparation and construction phases: During construction, air quality impacts may result from dust emissions caused by site clearance, transportation of materials, and movement of construction vehicles along access roads. Exhaust emissions from diesel-powered machinery and vehicles will contribute to localized air pollution, which may temporarily affect workers and nearby communities. However, these impacts are expected to be short-term and localized in nature

During the Operation phase: During operation, air quality impacts will be minimal as the floating solar system itself does not emit pollutants. Minor emissions may arise from maintenance vehicles and periodic cleaning activities, but these will be insignificant compared to baseline conditions. Below is the impact significance.

Impact Significance	Negative	Direct	Temporary	Unavoidable	Can be mitigated

6.3.2.2 Noise

During preparation and Construction phases: Construction activities such as construction of the Project infrastructure and setting of the panels might result in increase in noise levels in the Project area. The impact will, however, be temporary and can be mitigated by restricting noisy operations to daytime hours and ensuring equipment is well maintained.

Operation phase: During the operational phase, noise generation will be very minimal, limited mainly to maintenance activities and boat movements. The overall impact is expected to be negligible. Below is the impact significance.

Impact Significance	Negative	Direct	Temporary and long-term	Unavoidable	Can be mitigated

6.3.2.3 Water Resources and waste

Preparation and construction phases: Increased sedimentation from earthworks and shoreline activities may also temporarily affect water quality. The use of water for construction purposes may place minor demand on local sources, though this will be limited in scale.

Operational phase: During operation, the floating solar panels may slightly alter water temperature and light penetration beneath the panels, potentially affecting aquatic conditions. However, the impact is expected to be minor if the design allows for adequate water flow and sunlight diffusion.

Below is the impact significance.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Unavoidable	Can be mitigated

6.3.2.4 Soils

Preparation and Construction phases: Soil impacts will arise primarily from site clearance for access roads, equipment storage areas, and shoreline

anchoring points. Disturbance may lead to erosion, compaction, and potential contamination from oil or fuel leaks. Given the limited footprint of the project, impacts are expected to be localized.

Operational Phase: During operation, soil impacts will be minimal, confined mainly to the anchoring points and maintenance access paths.
Below is the impact significance.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Unavoidable	Can be mitigated

6.3.2.5 Biodiversity

Preparation and construction phases: The construction phase may temporarily disturb aquatic life due to noise, vibration, and water pollution from sediment. Installation of anchoring systems and movement of boats may displace fish and other aquatic organisms. If not managed, these disturbances could affect the availability of plankton and other food sources for fish.

Operation phase: During operation, the shading effect of floating panels may slightly reduce light penetration and photosynthetic activity beneath the arrays, potentially altering algae and plankton productivity in localized zones. This may have a minor influence on fish feeding behavior and distribution. However, with proper design spacing and monitoring, the impact is expected to be low and reversible

Below is the impact significance.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Unavoidable	Can be mitigated

6.4 Impact of Socio-Economic

Construction and: During construction, socio-economic impacts may arise mainly from the interaction between project activities and local water users, particularly fishermen who depend on Lake Kariba for their livelihoods. Temporary restriction of access to certain areas of the lake for safety reasons may disrupt fishing routes or reduce available fishing zones. Increased boat traffic associated with construction may also interfere with fishing operations and pose risks of collision or damage to fishing gear. Additionally, noise and

disturbance from construction activities could temporarily affect fish distribution, thereby influencing local catches and income.

Operational Phases: During operation, the presence of floating solar arrays may permanently restrict fishing or navigation in designated safety buffer zones, limiting access for local fishermen. This could reduce available fishing grounds and slightly impact household income for those who rely heavily on the lake's resources. However, with proper stakeholder engagement, clear demarcation of exclusion zones, and support measures such as alternative fishing sites or livelihood programs, these effects can be mitigated

Below is the impact significance.

Impact Significance	Positive	Direct and indirect	Temporary and long-term	Irreversible

6.5 Landscape and visual impacts

Preparation and Construction Phases: During construction, temporary visual impacts may result from movement of machinery, storage of materials, and general site activities along the shoreline. The natural scenic beauty of Lake Kariba may be affected in the short ter. Below is the impact significance.

Impact Significance	Negative	Direct and indirect	Long-term	Irreversible

6.6 6.7 Cultural and archaeological heritage

Preparation and Construction phases: Ground disturbing construction activities may potentially affect below-ground archaeological remains as well as heritage sites, which might have a cultural or natural significance.

Operational phases: The influx of workers hired by the Project as well as locals in the project area during operation of the Project may result in changes in the culture of the locals. Below is the impact significance.

Impact Significance	Negative	Direct	Long-term

6.8 Occupational Health and Safety

Construction and Operational phases: Occupational health and safety impacts occur during the construction, operation and decommissioning phases of the Project due to the activities inherent to the Project. Hazards may

arise from excavations, operation and movement of heavy machinery, injuries from hand tools.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Avoidable	Irreversible

6.9 Community Health and Safety

Construction Phase: Impacts to community health will arise from the influx of workers hired by the Project that may increase the spread of HIV/AIDS during construction of the Project.

Operational phase: During the operational phase, community health and safety concerns may relate to continued human activities around the project area, such as maintenance works or movement of personnel and boats on the lake. Below is the impact significance.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Unavoidable	Can be mitigated

6.10 Solid Waste generation

Preparation, Construction and Operational Phases: Solid waste will be generated from packaging materials, metal scraps, maintenance-related materials, occasional replacement parts and general domestic waste from the workforce.

Impact Significance	Negative	Direct and indirect	Temporary and long-term	Unavoidable	Irreversible

Table 15 shows the evaluation of the impacts during the Preparation, Construction and Operational phases

Aspect/ Issue	Potential Environmental Impact	Environmental Impact Characterization									
		Positive / Negative Impact	Intensity of Impact	Spatial Extent of Impact	Duration of Impact	Timing of Impact	Frequency of Impact	Likelihood of Impact Occurring	Significance of Impact	Sensitivity	Severity of the impact
Biophysical Impacts											
Air Quality	air quality impacts may result from dust emissions caused by site clearance, transportation of materials, and movement of construction vehicles along access roads	Negative	Low	Localized Project Area	Short term	During preparation, construction phases	Occasional	Possible	Moderate	Medium	Low
Water Quality and Resource	Increased sedimentation from earthworks and shoreline	Negative	Medium	Localized Project Area	Long term	During preparation, construction and	Occasional	Possible	Moderate	Low	Low

	activities may also temporarily affect water quality. The use of water for construction purposes may place minor demand on local sources, though this will be limited in scale					operation phases					
	During operation, the floating solar panels may slightly alter water temperature and light penetration beneath the panels, potentially affecting aquatic	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Infrequent	Possible	Low	Low	Low

	conditions. However, the impact is expected to be minor if the design allows for adequate water flow and sunlight diffusion										
Land and Soil	Soil impacts will arise primarily from site clearance for access roads, equipment storage areas, and shoreline anchoring points. Disturbance may lead to erosion, compaction, and potential contamination from oil or fuel leaks.	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Moderate	Medium	Medium

	Given the limited footprint of the project, impacts are expected to be localized.										
Biodiversity	The shading effect of floating panels may slightly reduce light penetration and photosynthetic activity beneath the arrays, potentially altering algae and plankton productivity in localized zones. This may have a minor influence on fish feeding	Negative	Low	Localized Project Area	Short term	During preparation, construction and operation phases	Infrequent	Probable	Low	Low	Low

	behavior and distribution										
Waste Generation and Management	Solid waste will be generated from packaging materials, metal scraps, maintenance-related materials, occasional replacement parts and general domestic waste from the workforce.	Negative	medium	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Medium	Medium
Noise generation	Noise generation will be very minimal, limited mainly to maintenance activities and boat movements	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
Socio-economic Impacts											

Employment Opportunities	The project will create employment opportunities for the communities within the project area.	Positive	High	Widespread	Long term	Preparation and Construction Phase	Continuous	Certain	High	High	High
Impact on Water Users and Fishermen	The presence of floating solar arrays may permanently restrict fishing or navigation in designated safety buffer zones, limiting access for local fishermen. This could reduce available fishing grounds and slightly impact household	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low

	income for those who rely heavily on the lake's resources										
Community Health and Safety	Other health impacts due to noise, water and air pollution may occur during the construction phase.	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low
	Increased transmission of STIs including HIV/AIDS associated with improved livelihoods, higher levels of disposable incomes and changes to the population	Negative	Low	Localized Project Area	Long term	During preparation, construction and operation phases	Occasional	Probable	Low	Medium	Medium

Impact on Visual landscape	During construction, temporary visual impacts may result from movement of machinery, storage of materials, and general site activities along the shoreline.	Negative	Low	Localized Project Area	Short term	During preparation, construction and operation phases	Occasional	Probable	Low	Low	Low

7.0 ENVIRONMENT AND SOCIAL MANAGEMENT PLAN (ESMP)

This section discusses the proposed enhancement and mitigation measures for each respective positive and negative Impact identified in the previous section. The proposed mitigation measures are designed to minimize or eliminate impacts triggered by the project.

The ESMP will include all the measures that are required for environmental protection, which will include the mitigation measures and the monitoring plan. The aim of an environmental management plan is to avoid, minimize, or ameliorate effects or impacts resulting from project implementation and where possible, enhance beneficial effects.

7.1 Positive Social-Economic Impacts

The development of the area and construction activities described in this report will lead to numerous positive social impacts during the various phases of the project;

a) Provision of employment: -

The proposed project will provide direct and indirect employment opportunities to workers. This will have skilled and un-skilled labour as well many employment opportunities.

b) Increased Public revenue

The facility will be paying revenue and taxes thus increase revenue and taxes for both the central and local authorities. This includes taxes and potential export income and other indirect taxes resulting from VAT on materials and services, PAYE as well as revenue to pension funds such as NAPSA.

c)Increased Capacity Building

Individuals and organizations that will be attached to the project will obtain, improve, and retain the skills, knowledge, tools, equipment and other resources needed to do their jobs competently. It also allows individuals and organizations to perform at a greater capacity (larger scale, larger audience, larger impact, etc.). As the drip irrigation and processing plant will be functioning, skills transference, knowledge exchange and acquisition of experience in the sector will benefit the wider population by potentially replicating skills learnt in other areas of the agriculture endeavors.

d) Boost Local Businesses in the Local Area

The project will be an opportunity for local business men to expand their businesses. This may be attributed to the increase in demand for food and other necessities by the workforce.

e) Multiplier Effect

The developer enhances local participation throughout the various phases of its operation by focusing on local suppliers, employees and consumers and intends to maximize the multiplier.

f) Increase Supply of Electricity to the National Grid

The project will contribute over 100MW power to the National Grid hence boost the power shortages in the Country. Ndola District will have the opportunity of having a power within the district due to the establishment of the solar farm plant.

g) **Increase in Water Levels in the Kariba**

Kariba is short on water, if the same electricity can be generated by solar rather then removing water from the dam, then this amount of water can be saved in the dam. This will help especially in the dry season, so in consequence the solar project is not only producing power, but keeping the water levels in Kariba higher and more flexible for water and energy management in the region.

The shade created by the floating solar panels can reduce water evaporation from the water body. Furthermore, the project shall take a major role in gradually restoring higher water levels of Kariba Dam widely replenish during the recent years and therefore contributing to rescue the overall the Zambezi River Basin as natural preserved zones with a likely significant overall climate impact.

7.2 Impact Mitigation Plan

The following are some of the mitigations measures to be followed;

7.2.1 Impact on Air quality

- Periodic monitoring of air quality.
- Provision of dust masks to the workforce at points of high dust generation.
- Dust suppression using a water bowser.
- Regular maintenance of construction vehicles to reduce exhaust emissions.
- The amount of dust generated will monitored to ensure that it conforms to the set standards and does not go above 50mg/Nm^3.
- All earth materials will be covered with appropriate material to suppress dust emission and during construction it shall be suppressed by spraying water.

7.2.2 Impact on Noise

- Limit construction activities to during daytime hours.
- Regular maintenance of construction vehicles and equipment.
- Periodic noise monitoring.
- Locate noise generating equipment away from sensitive receptors.
- It is expected that acoustic pressure level will be maintained at 70-85 dB which is an allowable limit. The noise will also be mainly confined to the project area.

7.2.3 Impact on Water Resources

Minimise impacts to Water Resources by following the measures below:

- Prohibit direct discharge of wastewater or chemicals into the lake.
- Collect and dispose of sewage and grey water through approved systems.
- Maintain sediment traps and erosion control structures near shoreline works.
- Limit refuelling activities to designated and protected locations.
- Avoid washing vehicles and equipment near the lake.
- Monitor water quality regularly for pH, turbidity, and oil residue.
- Prioritise efficient use of water resources.

7.2.4 Impact on Soil

- Avoid working during heavy rains to prevent erosion and sediment runoff.
- Implement proper drainage systems to manage stormwater.
- Compact only necessary working areas to reduce soil disturbance.
- Establish buffer zones along the shoreline to protect soil integrity.
- Any disposal of hazardous waste shall be done using a licensed waste collection company for appropriate disposal.

7.2.5 Impacts on Biodiversity

- Schedule construction to avoid fish breeding and spawning seasons.
- Restrict boat movement and in-water works to designated areas.
- Avoid dumping of waste, debris, or excess materials into the lake.
- Use non-toxic and environmentally friendly materials for floating structures.
- Maintenance of gaps between solar arrays to allow sunlight penetration and water flow will be implemented.
- Periodic monitoring of aquatic biodiversity and plankton composition will be conducted.
- Anchoring systems that damage benthic habitats will be avoided.
- Workers will be educated on aquatic ecosystem protection.

- The company will collaborate with the Department of Fisheries to manage and monitor fish health.

7.2.6 Impact on Socio-Economic

- Continuous consultations with local fishermen and water users will be conducted.
- Exclusion zones and navigation routes around the solar arrays will be clearly demarcated as shown in the figure below;

Note: Red marked pathways to reach West, North and South of the fishing area of the fishermen from the shore of the bay of Banana Island, foreseen already in the initial designs to accommodate local fishermen traditional passing through the Bay. Note that the graphic shows the maximum floating solar installation, with only the blue colored areas started in Phase 1.

- Schedule construction activities to minimize interference with fishing routines.
- A grievance mechanism to address community concerns will be established.
- Maintain open communication channels with local councils and fishing associations.

7.2.7 Cultural and archaeological heritage

- Conduct a Heritage Impact Assessment to survey known monuments and archaeological sites.
- Preparation and implementation of a project – specific Chance Find Procedure.
- ESMP to outline the Cultural Heritage Management Plan

7.2.8 Occupational Health and Safety

- Preparation and implementation of a Health and Safety Plan (HSP) and an Emergency Response Plan (ERP).
- Conduct regular safety meetings and induction on HSP and ERP.
- Conduct HIV/AIDS awareness meetings and distribution of condoms to the workforce.
- Ensure adequate management of all construction waste.
- Ensure proper storage of waste and placing of barricades and warnings around all sensitive and dangerous areas.
- Ensure good site management practice is implemented at the work sites to reduce health and safety risks.
- Provision of appropriate Personal Protective Equipment (PPE) to all workers.
- Regular maintenance of all construction equipment.
- Monitoring of all work activities and implementation of a near miss, incident and accident reporting and follow-up system.

7.2.9 Community Health and Safety

- Preparation and implementation of a community Health and Safety Management Plan to address health and safety risks for communities.
- Preparation and implementation of a Grievance Redress Procedure.
- Conduct HIV/AIDS awareness meetings and distribution of condoms to the locals.
- Ensure adequate management of all construction waste.
- Ensure proper storage of waste and placing of barricades and warnings around all sensitive and dangerous areas.
- Avoid idling of equipment when not in use.
- Communicate all hazardous activities to the surrounding communities at the start of each new phase of the Project and whenever needed during each phase.
- Regular maintenance of all construction equipment.
- Train all workers on appropriate interactions with communities and include workers code of conduct in contracts.

7.2.10 Waste Disposal and Management

- Ensure adequate storage, management and disposal of all construction, operation and maintenance waste.
- Preparation and implementation of the ESMP.
- Materials to be sourced with sustainable procurement principles and from as close as possible to the Project site so as to minimise impacts of production and transport.
- Identify beneficial uses or opportunities for recycling construction spoil and other wastes wherever possible.
- Develop and implement a Waste management plan and system.

- Proper housekeeping will ensure that all parts of the site are at all times clean and tidy.
- Bins will be provided throughout the development for the deposition of litter.
- Designated covered areas will be provided for the storage of normal solid waste arising within the project area.
- An approved waste removal company will be contracted by the developer to collect unrecyclable
- All hazardous wastes, material soiled with hazardous wastes and empty containers of hazardous materials shall not be disposed of on site.

7.2.11 Landscape and Visual Impact

- Maintain natural vegetation buffers along the shoreline to screen visual impacts.
- Limit the project footprint and avoid unnecessary land clearance.
- Use low-profile, color-neutral panels that blend with the water surface.
- Properly store materials and equipment to reduce visual clutter.
- Rehabilitate all temporary construction areas after completion.
- Avoid locating temporary facilities in scenic or tourist-sensitive areas.
- Implement housekeeping practices to maintain a neat and organized site.
- Engage communities and stakeholders on aesthetic considerations.
- Regularly inspect and maintain the visual condition of project structures.
- Include landscape restoration as part of the project's decommissioning plan.

7.3 Summary of Environmental and Social Monitoring Plan

Table 16: *Summary of Environmental and Social Monitoring Plan*

Aspect	Impact	Mitigation Measures	Time frame	Performance Indicator	Frequency of Monitoring	Responsible person	Environmental management Cost ZMW /year
Air Quality	Dust emissions during construction	Project roads will be routinely sprayed with water to suppress dust generated by the movement of vehicles. Water bowsers will be employed on site to suppress dust on all site roads during construction phase	Construction phase	Visible dust levels	Weekly during construction	Company Manager & Contractors representative	45,000.00

Noise	Noise from machinery and vehicles affecting nearby communities and aquatic life	Use well-maintained equipment, limit noisy activities to daytime	All project phases	Noise levels within acceptable limits	Project cycle	Company Manager & Contractors representative	50,000 per quarter

Water Resource	Potential contamination due to increased turbidity during the installation phase	All preparation activities will take place during the day and any work during night- time will be communicated to the state authorities and local community	During preparation, construction and operation phase	Water quality testing	Continuous through project cycle	Company Manager & Site Manager	25,000/annual
Biodiversity	Disturbance to fish habitats and food sources due to noise, shading, and boat movement	Restrict in-water work to designated zones, avoid breeding seasons, maintain light gaps between solar arrays	All the project phases	Aquatic biodiversity observed, fish population trends stable	Continuous through project cycle	Company Manager & Site Manager	35,000/quarter

Socio-economic	Restricted fishing zones, interference with fishing routes and income	Engage fishermen regularly, clearly demarcate exclusion zones, provide alternative access areas, support livelihood restoration if affected.	During construction and operation phases	Number of grievances resolved, access maintained for water users.	Continuous through project cycle	Company Manager & Site Manager	35,000/annual
Community Health and Safety	Spread of diseases, accidents near site, exposure to dust/noise	Conduct HIV/AIDS awareness programs, secure work areas, enforce speed limits	During construction and operation phases		Health awareness sessions held, no recorded community incident		
Creation of employment	The project might bring multiplier effects to the local people	Increased business opportunities through procurement of goods and services.	Project Lifecycle	New developmental activities introduced in the project area	Random	Company Manager	N/A
Solid waste	Improper disposal of construction or domestic waste	Provide waste bins, segregate waste, dispose at approved sites, recycle where possible	Site preparation and construction phase	Waste disposal records, site cleanliness	Continuous through project cycle	Site Manager	28,000/Annual

8.0 DECOMMISSIONING AND CLOSURE PLAN

Solar Plant construction activity closure planning primarily considers the best way to manage environmental changes and socio-economic effects associated with closing the project. Successful closure generally varies from place to place due to several factors. However, it is important that physical, chemical and biological stability is achieved and the final land use is appropriate.

8.1 Objectives

The target closure outcomes of the decommissioning plan are to:

- Restore the lake and surrounding areas to near-natural conditions without residual pollution;
- Ensure that the project site is left in a condition which poses an acceptable level of risk to the lake;
- Restore aquatic habitats to support normal ecological function, particularly fish breeding zones and aquatic plants;
- Remove all floating structures and submerged materials.
- Return the visual appearance of the lake to a natural scenic condition; and
- Comply with national and environmental regulations.

Restoration steps to be taken before abandonment are:

- Dismantling of floating structures;
- Draining and cleaning;
- Waste segregation and disposal
- Habitat Restoration; and
- Water Quality Monitoring.

Dismantling of floating structures, removal of anchoring systems, and proper waste management, the lake ecosystem will be safeguarded. Rehabilitation of disturbed aquatic habitats, monitoring of water quality, and engagement with local water users particularly fishermen will promote the recovery of biodiversity and sustain livelihoods dependent on the lake. Successful implementation of these restoration measures will ensure that Lake Kariba's natural beauty, ecological balance, and community value.

The following is the procedure for decommissioning;

a. Notify relevant authorities of the intention to cease activities: This will be done in order for the regulatory authorities that include ZEMA, Ndola City Council, and other relevant authorities. This will entail that LTI ReEnergy Cleantech Project Development & Investments Zambia Limited will have completed the project in accordance with the project objectives.

b. Demobilize all structures from the project sites and terminate contracts of all employees upon payment of their benefits accrued at the time of closure.
c. Conduct baseline study on air quality, water and soil to determine impacts of the project activities during the project life cycle.

The decommissioning exercise will take into account the implementation of the environmental management plan highlighted above. Summary of the decommissioning activities and associated costs are indicated in the table below.

Table 17: *Summary decommissioning activities & costs.*

Aspects	Impacts	Objective	Mitigation Measures	Responsible person	Indicator	Means of Verification	Frequency	Cost ZMK
Decommission and closure	Closure of the project	To ensure adherence to all regulations and requirements	A full decommissioning report will be elaborated by an independent consultant and submitted to ZEMA	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited	Number of reports submitted	Decommissioning report	-	40,000
Dismantling of infrastructure for alternative uses	infrastructure removed for alternative uses	Prevent contamination of Lake Kariba	All infrastructure that can be used for other purposes will be rehabilitated so that they can be used for other purposes	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited	Water quality parameters within standards; No visible floating materials	Year after Final Year of operation	On-going	50,000
Water quality	Possible contamination of the water resource	Maintain safe water quality	Post quality testing	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited management	Monitoring results	Year after Final Year of operation	On-going	200,000
Biodiversity	Disturbance of aquatic life	Restore natural aquatic conditions	Monitor fish activity Consultation with Ministry of Livestock to ensure restoration of natural aquatic conditions	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited management	Return of fish species and aquatic vegetation	Annual reports	On-going	20,000

Aspects	**Impacts**	**Objective**	**Mitigation Measures**	**Responsible person**	**Indicator**	**Means of Verification**	**Frequency**	**Cost ZMK**
Post-closure Monitoring	Incomplete restoration	Verify long-term restoration	Conduct periodic inspections and water sampling	LTI ReEnergy Cleantech Project Development & Investments Zambia Limited management	Monitoring reports	Monitoring reports	-	50,000

9.0 Bibliography

1. Barker, P. (2001). *A Technical Manual for Vegetation Monitoring. Resource Management and Conservation.* Horbat: Departmnet of Primary Industries, Water and Environment
2. Bension C.W, R. B. (1971). *The Birds of Zambia.* London: Collins.
3. Broadley, D. (1971). *The Reptiles and Amphbians of Zambia.*
4. Densanker, G. F. (1997). *The Miombo Network: Framework for a Terrestrial Study of Landuse in the Miombo Ecosystem of Central Africa.* Stockholm.
5. The Environmental Management Act (EMA) No. 12 of 2011
6. Environmental Council of Zambia (2000), "State of the Environment", Zambia.
7. IFC, 2007: Environmental, Health, and Safety Guidelines for Retail Petroleum Networks Laws of the Republic of Zambia (1995) Ed., Vol.13.
8. Meteorology Dept (1995). "The natural water resources master plan in the republic of Zambia" Supporting report volume 1, August.
9. National Center for scientific Research (1983), "Soil Map of Zambia", Soil Survey Unit, Mt Makulu,
10. SI No. 28 of 1997 Environmental Impact Assessment regulations.
11. Thieme, J.G and R.L. Johnson, (1975). Topography and geology; prepared by the Geological Survey Department, Zambia; P.K. Banda, senior cartographer and drawn by W. Overton, cartographer.
12. Tim Jones (1992), "Environmental Audits", Gemini house, United Kingdom.
13. ZEMA Environmental Impact Assessment format.
14. Bancroft, J.A (1961). Northern Rhodesia, Scale1: 500,000, Geology survey of Zambia. Chidumayo E.E (1987) species structure in Zambia Miombo woodland. Journal of tropical ecology Ellison G (1993): Common birds of Zambia.
15. Environmental Council of Zambia (2000), "State of the Environment", Lusaka, Zambia.
16. GRZ (2011), Environmental Management Act No. 12 of 2011.

17. IFC, 2007: Environmental, Health, and Safety Guidelines for Retail Petroleum Networks Laws of the Republic of Zambia (1995) Ed., Vol.13.
18. Local weather patterns for Zambia; Online resource. www.weatherbase.com
19. Meteorology Dept (1995). "The natural water resources master plan in the republic of Zambia" Supporting report volume 1, August.
20. National Center for scientific Research (1983), "Soil Map of Zambia", Soil Survey Unit, Mt Makulu.

10.0 DECLARATION OF AUTHENTICITY OF REPORT CONTENTS

We trust that the information described in this Environmental Impact Statement is adequate and satisfies the laws and regulations of Zambia regarding construction and operation of such facilities like the proposed solar power plant. We also trust that the information meets the Zambia Environmental Management Agency's requirements for approval.

.....

Director

LTI ReEnergy Cleantech Project Development & Investments Zambia Limited

11 APPENDICES

Annex 1 Company Documents

CF45
(Regulation 46)
Companies Registration No. **120251018502**
Serial No. **1379317**

Republic Of Zambia

The Companies Act, 2017

(Act No. 10 of 2017)

The Companies (Prescribed Forms) Regulations, 2018

(Section 14)

CERTIFICATE OF INCORPORATION
PRIVATE COMPANY LIMITED BY SHARES

This is to certify that LTI REENERGY CLEANTECH PROJECT DEVELOPMENT & INVESTMENTS ZAMBIA LIMITED is on and from the **14th day of January 2025** incorporated as a PRIVATE COMPANY LIMITED BY SHARES.

Given under my hand and seal at Lusaka, Zambia, this **14th day of January 2025**.

PATENTS & COMPANIES REGISTRATION AGENCY

PERRY C. MWABA
Deputy Registrar of Companies

For further details relating to this business visit
http://www.pacra.org.zm

Annex 2: Relevant Permits

WARMA

WATER RESOURCES MANAGEMENT AUTHORITY

TEMPORARY WATER PERMIT

for

LTI Reenergy Cleantech Project Development and Investments Zambia Limited

WARMA No.: **WP93166**

Catchment Name: **Zambezi** Catchment ID: **01**

Sub-Catchment/Water Resource: **III (Lower Zambezi)**

Validity: **17th March 2025** to **17th March, 2026**

In the presence of (Signature): ..... (Signature).....

Authority Secretary **Director Général**

ZAMBEZI RIVER AUTHORITY

Water! Today, Tomorrow
www.zambezira.org

HEAD OFFICE:
Kariba House 32 Cha
Cha Cha Road P.O
Box 30233 Lusaka
Zambia
Tel.+260 211 226950, 227970-3
e-mail : info@zambezira.org

HARARE OFFICE:
Club Chambers
Nelson Mandela Avenue
P.O Box 630 Harare
Zimbabwe
Tel. +263 24 2704031-6
e-mail: info@zambezira.org

KARIBA OFFICE:
Administration Block
21 Lake Drive
Pvt. Bag 2001 Kariba
Zimbabwe
Tel.+263 261 2146140/ 179/673/251
e-mail: info@zambezira.org

Please reply to: **LUSAKA** ..... Office

Reference: 184/4

24th April 2025

Mr. Michael Bellmer
Owner
LTI REENERGY Project Development and Trading
Creative City Free zone, Creative Tower
Fujairah
P.O BOX 4422
UNITED ARAB EMIRATES

REF: REQUEST FOR A NO-OBJECTION TO CARRY OUT FEASIBILITY STUDY FOR FLOATING SOLAR AT KARIBA NORTH (ZAMBIAN SIDE OF LAKE KARIBA WATERS)

We make reference to your letter of 22nd April 2025 on the above subject.

Zambezi River Authority has noted that LTI Reenergy Project Development and Trading of the United Arab Emirates has been granted authorisation by the Ministry of Energy of the Republic of Zambia (under the letter with reference MOE/OPPPI/ 101/10/20 issued on 8th April 2025 from the office of the Permanent Secretary) to undertake feasibility studies at own cost and risk for the development of floating solar on Lake Kariba (Zambian side of the lake waters) and on Itezhi Tezhi Dams. The Authority also noted that the feasibility studies would have to be undertaken within a period of 24 Months from 8th April 2025 when the Ministry of Energy issued this authorization.

The Authority has also noted the one-year temporal water permit number WP 93166, issued by the Water Resources Management Authority (WARMA) of Zambia, valid from 17th March 2025 to 17th March 2026.

You may wish to note that the apex governing body of Zambezi River Authority, namely, the Council of Ministers (COM), during its meeting of 15th December 2023, guided that each of the two Contracting States of the Authority (The Governments of Zambia and Zimbabwe), was free to implement measures for the implementation of floating solar systems on the waters of Lake Kariba that are within their boundaries. This was over and above the measures to be implemented by the Authority in respect of installation of floating solar systems on Lake Kariba.

The actual COM resolution was as follows:

(i) That the Authority proceeds with implementation of the Floating Solar power plant as a single, bilateral Project on the Lake.

(ii) That the two Governments remain at liberty to undertake further individual Floating Solar Developments within their respective boundaries, taking into consideration all requirements for stakeholder engagements and environmental protection.

(iii) That as a key part of pre-development activities by either Contracting State, extensive consultations be held with the other Contracting State to reach mutually agreed developmental plans.

In this regard, the authorisation from the Government of the Republic of Zambia through the said letter from the Ministry of Energy (together with and the temporal water permit from WARMA) is in line with the COM decision and a welcome development.

Accordingly, the Authority has no objection to your plans to undertake feasibility studies for the implementation of a floating solar system on the Zambian side of the Lake Kariba waters (Kariba North). We look forward to engaging with you at your earliest convenience (through either physical and/or virtual meetings) for you to furnish us with more details on your plans to undertake feasibility studies for your proposed floating solar project.

Yours faithfully

ENG, MUNYARADZI C. MUNODAWAFA
CHIEF EXECUTIVE

cc: Eng. Arnold Simwaba, Permanent Secretary (Electricity) and Chairperson of the Zambezi River Authority Board of Directors, Ministry of Energy, Lusaka, Zambia.

Dr. Gloria Magombo, Secretary for Energy and Power Development and Co-Chairperson of the Zambezi River Authority Board of Directors, Harare, Zimbabwe.

All Communications should be addressed to the Permanent Secretary
Telephone: (260-211) 230840
Facsimile 230468

In reply please quote

MOE/OPPPI/101/10/20

No:.....

REPUBLIC OF ZAMBIA

MINISTRY OF ENERGY

OFFICE OF THE PERMANENT SECRETARY
P.O. BOX 36079
LUSAKA
ZAMBIA

8th April, 2025

Micheal Bellmer
Owner
LTI ReEnergy Project Development & Trading FZ LLC
Creative City Free Zone, Creative Tower
Fujairah
P.O Box 4422
UNITED ARAB EMIRATES

APPLICATION FOR FEASIBILITY STUDY AUTHORISATION FOR THE DEVELOPMENT FLOATING SOLAR POWER PROJECTS ON KARIBA NORTH AND ITEZHI-TEZHI DAMS

Reference is made to your letter dated 31st March, 2025 in which you applied for authorisation to undertake a feasibility study for the development of floating solar power projects on Kariba North and Itezhi-Tezhi Dams.

Kindly note that the Ministry has granted you authority to undertake the feasibility study at your own cost and risk. The feasibility study shall be undertaken within a period of 24 months, during which you will be required to be submitting quarterly progress reports.

Looking forward to the results of the feasibility study.

Mwape B. Chipala
Acting Permanent Secretary
MINISTRY OF ENERGY

Cc: Hon. Makozo Chikote, MP., Minister of Energy, LUSAKA.

Annex 3: Disclosure Meeting Minutes

DISCLOSURE MEETING MINUTES

DISCLOSURE MEETING MINUTES FOR THE PROPOSED INSTALLATION & OPERATION OF A 500MW FLOATING SOLAR POWER PLANT ON KARIBA NORTH IN SIAVONGA DISTRICT BY LTI REENERGY CLEANTECH PROJECT DEVELOPMENT & INVESTMENTS ZAMBIA LIMITED HELD ON THE 20TH OF NOVEMBER, 2025.

AGENDA

1. Opening remarks by meeting chairperson and Introductions
2. Presentation of the Environmental and Social Impact Assessment for LTI ReEnergy Cleantech Project Development & Investments Zambia Limited.
3. Discussion
4. Closing remarks

ATTENDEES

Find attached in the appendices a list of the disclosure meeting attendees.

1. OPENING REMARKS BY MEETING CHAIRPERSON & INTRODUCTIONS

The meeting was officially called to order at 10:35 hours by the Chairperson, Mr. Dickson Kabwe, who welcomed all participants and introduced the two companies being Tsalach Global Limited and the project proponent, LTI ReEnergy Cleantech Project Development & Investments Zambia Limited.

All stakeholders present including representatives from government departments and affected community members were given an opportunity to introduce themselves.

The meeting was convened to discuss the proposed Floating Solar Project on Lake Kariba. The Chairperson welcomed all participants and highlighted the importance of renewable energy development in Zambia while stressing the need to safeguard both the environment and community livelihoods. The purpose of the meeting was to present the project, summarize the Environmental Impact Assessment (EIA) progress from the last scoping meeting and gather views from stakeholders.

2. PRESENTATION OF THE PROJECT

A comprehensive presentation was delivered by Mr. Dickson Kabwe, who provided an overview of the project and the project progress for the Environmental and Social Impact Assessment (ESIA) on the proposed project

involving the installation of floating solar photovoltaic (PV) panels on Lake Kariba.

The chairperson outlined some of the studies conducted in the Environmental Impact Assessment (EIA) that the project is undergoing. He further gave an overview of the proposed project the location of the site, notable landmarks and the components that it will constitute.

Mr. Kabwe further outlined the concerns raised during the scoping meeting which was held on the 21st of August, 2025 and he gave mitigation measures to the concerns raised by the various stakeholders.

Mr. Kabwe concluded the presentation with an emphasis on the necessity and importance of conducting the ESIA process on such a project of such magnitude.

3. DISCUSSION

Ms. Chitalu Chela-Siavonga Town Council Planner

Ms. Chela raised a question on whether cloud cover was considered in chosing of the project site. She further inquired on the number of local people that would be employed by the proposed project.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe responded by saying that feasibility studies were conducted and the proposed site was more suitable considering all factors including cloud cover and the close proximity to land was also one of the factors that made it suitable.

Mr. Michael Belimer-LTI Representative

Mr. Belimer added to say the project would be done in phases and in each phase, a different number of locals especially at construction/FPV system installation phase were most of the unskilled labour would be needed, will be employed.

Mr. William Bwalya- Forestry Department

Mr. Bwalya inquired on the plans to be put in place by the developer with regards to the vegetation/flora that will be lost in trying to clear the land for the assembling, substation and other facilities to be put on land.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe in response, mentioned that the assembly point will have minimal impact on vegetation as it is minimal. However, the forestry department will be engaged to ensure that vegetation clearance is done accordingly and the developer will try to come up with a forestry management plan to ensure afforestation is done in the affected areas.

Mr. Michael Belimer-LTI Representative

Mr. Belimer also mentioned that the use of land for the project would be minimal. However, vegetation would be considered.

Mr. Ladicious Hanziba- National Assembly of Zambia

Mr. Hanziba inquired on the measures to be put in place to ensure that locals are prioritized in the employment process. He further asked if the labour office will be engaged in the employment process. Additionally, Mr. Hanziba inquired on the measures to be put in place to ensure the FPV system is in place.

Mr. Michael Belimer-LTI Representative

Mr. Belimer mentioned that locals will be prioritized for unskilled labour however, for trainable skills, locals will also be trained. Additionally, the anchoring system will be firmly done into the ground and the materials as well as the design to be used will help keep the FPV system in place.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe added saying that traditional leaders in the proposed project area have been engaged other than the District Commissioner who is mostly engaged by developers. Furthermore, the labour office will also be engaged as advised in the employment of locals.

Mr. Noah Musuka- Yalelo

Mr. Noah in his comment mentioned that Yalelo is in support of the coexistence of the Fisheries and FPV plant companies. However, he urged the developer to put in plans to ensure that compensation is done in case of any damages to the facilities around the proposed project in as much as the company project shall have insurance. He further stated that Yalelo was open to further engagements and dialogues.

Mr. Michael Belimer-LTI Representative

Mr. Belimer in response, mentioned that a proactive approach will be taken in the project such as having insurance and complying to the various Zambian regulations.

Mr. Lubombo Winter-Siavonga District Health Officer

Mr. Winter inquired on when the project would be implemented and if there would be any housing facilities to be constructed on land for the workers.

Mr. Michael Belimer-LTI Representative

Mr. Belimer in response mentioned that temporal housing facilities will be put up and the project will kickstart as soon as all the approvals are obtained.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe further added saying the project would kickstart as soon as the EIA process was done and approval is given.

Ms. Chipo Mukwanka- Siavonga Town Council

Ms. Mukwanka inquired on how waste management will be done during the project implementation.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe mentioned that waste generation is expected more at the construction/installation phase and minimal waste generation at the operation phase. However, a waste management plan will be put in place to ensure that all the waste generated is stored in bins and once sufficient quantities are stored, then disposal will be done by a licenced waste collector within the district.

Mr. Chrispin Ndoji- ZESCO

Mr. Chrispin asked if LTI had considered changing to hydropower generation in the future when water levels will be stable seeing that 500MW is a huge amount of power to be generated.

Mr. Michael Belimer-LTI Representative

Mr. Belimer in response mentioned that the project was a long term one and the option of changing to hydropower could also be considered by the company.

Mr. Davy Kalala-MLSS

Mr. Kalala asked if the developer had any plans of doing any Corporate Social Responsibility (CSR) in the area.

Mr. Michael Belimer-LTI Representative

Mr. Belimer responded in affirmative that the company would conduct CSR around the area.

Mr. Dickson Kabwe- Tsalach Global Limited

Mr. Kabwe also responded in affirmative once the project kickstarts, the developer would do so. He further mentioned that the developer was currently in engagement talks with the Fishermen association who brought up innovations during the scoping meeting for the developer to look into.

4. CLOSING REMARKS

The closing remarks were given by Mr. Kabwe and Mr. Winter who thanked everyone for their participation and attendance. He mentioned that the ESIA process is an ongoing process which will involve more engagements with the community and its leadership. The meeting was closed at 12:12hrs.

…… ……

Annie Choba- Meeting Secretary **Dickson Kabwe- Meeting Chairperson**

Figure 20: Physical Disclosure Meeting Attendance List

Tsalach Global Limited

ATTENDANCE LIST

	NAME	NRC	PHONE NO.	VILLAGE/ORGANISATION	SIGNATURE
1.	Moya Mwitha	445637/61/1	09727991[illegible]	GTC	[illegible]
2.	Rabson Tembo	281006/53/1	0977404692	HEALTH	[illegible]
3.	Udo T. Mudaranhu	63-2284W66	+263782026563	LTI	[illegible]
4.	Michael Bellmer	[illegible]	+4917415060005	LTI ReEnergy	[illegible]
5.	Lubombo Winter	312622/74/1	0977247659	Siavonga DHO	[illegible]
6.	Daniel Sakala	158292/63/1	0971627209	ZRA	[illegible]
7.	Chrispin Ndodi	415766/67/1	0966462960	ZESCO-KNB	[illegible]
8.	Noah Muwea	316884/10/1	0768820421	YALELO	[illegible]
9.	Passmore Simuzingili	143852/78/1	0975708087	Banana Bay	[illegible]
10.	Robina Munakwabo	241238/71/1	0975628093	NATIONAL PARKS & WILDLIFE	[illegible]
11.	CHITALU CHELA	958833/11/1	0972901052	SIAVONGA TOWN COUNCIL	[illegible]
12.	LABICIOUS HANZIBA	152991/72/1	0977765874	NATIONAL ASSEMBLY [illegible]	[illegible]
13.	PATRICIA SIMUZINGILI	959777/11/1	0967872227	MINISTRY OF HEALTH	[illegible]
14.	MUKUNDA MOOTE	192758/83/1	0977524064	EDUCATION	[illegible]
15.	KAIKO MUTTAU	274300/82/1	0977044447	IMMIGRATION	[illegible]
16.	Rahaby Nguira Chikonte	539955/11/1	0975-845177	DEC	[illegible]
17.	WILLIAM BUALYA	197249/44/1	0977619635	FORESTRY DEPT	[illegible]
18.	MERCY GAMELA	336899/73/1	0972029573	FISHERIES DEPT	[illegible]
19.	DR CHIWAMA BORNFACE J.	128997/10/1	0972674654	VETERINARY SERVICES	[illegible]
20.	Alfred Tom Hamuenyo	139474/75/1	0977357456	Kapenta Fisher	[illegible]

Tsalach Global Limited

ATTENDANCE LIST

	NAME	NRC	PHONE NO.	VILLAGE/ORGANISATION	SIGNATURE
1.	SNIKE MZULAH	158697/10/1	0978944885	TIMES OF ZAMBIA	
2.	MACHA BRIAN	124750/10/1	0974419159	KARIBA FM RADIO	
3.	DORCAS CAROL P.	208835/45/1	0977693755	SOCIAL WELFARE	
4.	BRANDINA LAMBWE	142668/64/1	0976886403	ZANIS	
5.	BERTHA MULYALE	087770/10/1	0992609240	HEALTH	
6.	BISAEL PHIRI	264885/61/1	0977745347	HEALTH	
7.	CHIPO MUKWANKA	310467/10/1	0978006232	COUNCIL	
8.	SHARON CHILESHE	197654/44/1	0978424622	COUNCIL	
9.	GREGORY ZENDA	89-1966832	+263 776334514	LTI	
10.	Esther Banda	129645/79/1	0973337495	Tsalach Global Ltd	
11.	[illegible] C. CHOBA	386401/43/1	0963360818	[illegible]	
12.	Davy M. Kalala	248204/64/1	0977892164	MLSS	
13.	ARTHUR M. MULALE	327432/16/1	0977311116	SMALL ENTERPRISE	
14.	DICKSON KABWA	204783/71/1	0979969837	Tsalach Global Ltd	
15.					
16.					
17.					
18.					
19.					
20.					

Figure 21: Scoping Meeting Pictures

Annex 4: Letter of Approval TORs

ZAMBIA ENVIRONMENTAL MANAGEMENT AGENCY
RESPONSE LETTER

06 Oct, 2025

{serial_no}

The Project Manager,
LTI ReEnergy Cleantech Project Development & Investments Zambia Limited,
Plot No. 52, Alick Nkhata Road,
Massmedia,
LUSAKA.

Dear Sir/Madam,

RE: APPROVED TERMS OF REFERENCE AND SCOPING REPORT FOR THE PROPOSED INSTALLATION AND OPERATION OF A 500MW FLOATING PV SOLAR POWER PLANT ON KARIBA NORTH, NORTH-WEST OF BANANA ISLAND IN SIAVONGA DISTRICT BY LTI REENERGY CLEANTECH PROJECT DEVELOPMENT & INVESTMENTS ZAMBIA LIMITED.

The above matter refers.

Zambia Environmental Management Agency (ZEMA) has reviewed the Terms of Reference (ToRs) and Scoping Report for the Environmental Impact Assessment for the Proposed installation and operation of a 500MW floating PV solar power plant on Kariba North, North-West of Banana Island in Siavonga District by LTI Reenergy Cleantech Project Development & Investments Zambia Limited. We would like to inform you that the said ToRs and Scoping Report are **acceptable on condition** that you attach all necessary lease agreements and/or consent letter for the proposed project site.

The approved ToRs and EIA team members are as follows:

i. **EIA Team Members**

No	Name	Qualification	Roles	Position on the Tea
1.	Peter M. Mwanza	Masters of Science in Project Management, Bachelor of Science in Wood Science and Technology, International Diploma in Environmental Management	ESIA Coordinator and provider of environmental management information	Environmentalist/Team Leader
2.	Nephas Mapiki	Master of Science in Project Management, Bachelor of Science in Urban and Regional Planning.	GIS information and conduct a land use assessment on the project area	GIS and Land use Exp
3.	Fidelis Silungwe	B.Eng Metallurgy, Diploma in Environmental Management, Certificate in Environmental Management and Ethics. Certificate in Sustainability and Climate Change	The expert will conduct Air Quality and Noise assessment in the project area	Air and Noise Expert
4.	Esther Banda	BEng in Environmental Engineering	Will work in collaboration with the Air and Noise expert in Conducting Air Quality and Noise assessment in the project area	Assistant Air & Noise E
5.	Valerie Kalinso	Masters Fellow – Master of Mass Communication, Degree in Mass Communication	Social Experts to specialize in gathering information on the Population, distribution. Conduct a Gender assessment, social and economic gender patterns in the project area.	Social Economic Exper
6.	Dickson Kabwe	Bachelor Degree of Science (Ecology), Certificate in Environmental Management, Certificate in Compliance and Enforcement of Environmental Law	The Ecologist will focus on the assessment of the Flora, Fauna, Aqua-flora and Identify areas of high biodiversity on the site	Ecologist Expert
7.	Christopher Mutale	Bachelor of science in Wildlife Management (CBU), Certificate in Monitoring and evaluation, Certificate in fundamentals of project management and Current registered student of Masters of Engineering in Environmental Engineering (UNZA)	The Assistant Ecologist will work hand in hand with the senior ecologist as they focus on the assessment of the Flora, Fauna, Aqua- flora and Identify areas of high biodiversity on the site	Assistant Ecologist Exp

Annex 5: Approved TORs and Scoping reports

Annex 5a: Approved TORs

Annex 5b: Approved Scoping Report

Annex 6: Specialized Study reports

Annex 6a: Aquatic Assessment Report

Annex 6b: Social and Economic Baseline Report

Annex 6c: Site Suitability Mapping

Annex 6d: Ecological Report

Annex 6e: Ambient Air Quality and Noise Measurement Report

Annex 7: Maps, satellite images and Drawings

Annex 7a: Google Map

Annex 7b: Contour

Annex 7c: Elevations

Annex 7d: Location

Annex 7e: Topographic Map