



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED HYBRID POWER PLANT FOR BEC-BAIDOA, BAIDOA, SOMALIA



PROJECT

Somali Electricity Sector Recovery Project (SESRP) (P173088)
ELECTRICITY SERVICE PROVIDER



Baidoa Electric Company (BEC-BAIDOA)

JANUARY 2025

DRAFT ESIA REPORT

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Acknowledgement

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Acronyms and Abbreviations

AC	:	Alternating Current
ADR	:	Alternative Dispute Resolution
AfDB	:	African Development Bank
ALARP	:	As-low-as-reasonably-possible
BESS	:	Battery Energy Storage Systems
CO	:	Carbon Monoxide
CO ₂	:	Carbon Dioxide
CSO	:	Civil Society Organization
DC	:	Direct Current
DIN	:	German Institute for Standardization
DOD	:	Depth of Discharge
DoECC	:	Directorate of the Environment and Climate Change
DRE	:	Distributed Renewable Energy
E&S	:	Environment and Safety
EHSG	:	Environment, Health and Safety Guidelines
ELV	:	Extra-low voltage
ESF	:	Environmental and Social Framework
ESIA	:	Environmental and Social Impact Assessment
ESMF	:	Environmental and Social Management Framework
ESMP	:	Environmental and Social Management Plan
ESP	:	Electricity Services Provider
ESS	:	Environmental and Social Standards
FGS	:	Federal Government of Somalia
FMS	:	Federal Member State
FRS	:	Federal Republic of Somalia
GBV	:	Gender-based Violence
GDP	:	Gross Domestic Product
GHG	:	Greenhouse Gas
GN	:	Guidance Notes
GRM	:	Grievance Redress Mechanism
HD	:	Horizon Development
HIV/AIDS	:	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICP	:	Informed Consultation and Participation
IDO	:	Industrial Diesel Oil
IDP	:	Internally Displaced Persons
IEC	:	International Electro technical Commission
ILO	:	International Labour Organization
INDCs	:	Intended Nationally Determined Contributions
ITCZ	:	Inter-Tropical Convergence Zone
JTC	:	Joint Technical Committee
LV	:	Low Voltage
MoEWR	:	Ministry of Energy and Water Resources
MW	:	Megawatt
NAPA	:	National Adaptation Program of Action on Climate Change
NDP	:	National Development Plan
BEC-BAIDOA	:	Baidoa Electric Company
NO ₂	:	Nitrogen Oxide
NT	:	Near-threatened
OHS	:	Occupational Health and Safety
PAP	:	Project Affected Persons
PIU	:	Project Implementation Unit
PMP	:	Power Master Plan

PPE	:	Personal Protective Equipment
PV	:	Photovoltaic
PWD	:	People with Disability
RAP	:	Resettlement Action Plan
REF	:	Renewable Energy Factor
RPF	:	Resettlement Policy Framework
SCADA	:	Supervisory Control and Data Acquisition
SDG	:	Sustainable Development Goal
SEA/SH	:	Sexual Exploitation and Abuse and Sexual Harassment
SEP	:	Stakeholder Engagement Plan
SESRP	:	Somali Electricity Sector Recovery Project
SME	:	Small and Medium Enterprise
SO2	:	Sulphur Dioxide
SRP	:	Social Responsibility Programmes
TV	:	Television
UNCCD	:	UN Convention to Combat Desertification
UNFCC	:	United Nations Framework Convention on Climate Change
UNFPA	:	United Nations Fund for Population Activities
UNHSP	:	United Nations Human Settlements Programme
USAID	:	United States Agency for International Development
UV	:	Ultraviolet
VMG	:	Vulnerable and Marginalized Groups
VU	:	Vulnerable
WB-ESS	:	World Bank Environmental and Social Standards
WBG	:	World Bank Group

Executive Summary

- (i) Somalia's electricity sector is fragmented and inefficient, ranking among the world's worst for affordability. The Federal Government of Somalia has received World Bank funding to support the SESRP project, aiming to increase access to cleaner energy. Horizon Development (Consulting firm) is assisting the PIU in managing environmental and social risks, implementing mitigation measures, and overseeing the implementation of SESRP in Somalia, ensuring compliance with national and World Bank policies.
- (ii) The SESRP has the following components:
 - Component 1** : Sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa.
 - Component 2** : Hybridization and battery storage systems for mini grids.
 - Component 3** : Stand-alone solar off-grid access to public institutions (Health and Education).
 - Component 4** : Institutional Development and Capacity Building.
- (iii) Baidoa Electric Company (BEC-BAIDOA) is the only electricity utility service provider in Baidoa City in the South West State. BEC-BAIDOA is participating in the SESRP project, especially in implementing component 2 on hybridization and battery storage systems for mini-grids. BEC-BAIDOA currently has an installed capacity of 8.648MW consisting of 7.648MW (diesel genset) and 1MW (solar PV). Under the proposed arrangement, BEC-BAIDOA will establish a new and modern hybrid power plant while the MoEWR will provide overall coordination of the project and oversight during planning and implementation of the project, including overall coordination and oversight for safeguards due diligence, and implementation. The joint technical committee (BEC-BAIDOA and MoEWR) will be responsible for the implementation of the project during construction and operation phases.
- (iv) The main objective of this ESIA was to examine both positive and negative effects of the proposed hybrid power plant on the people particularly in the Project Area (Baidoa City and the surroundings), and proposed measures to mitigate the negative impacts and enhancement of positive impacts during the construction, operation and decommissioning phases of the project.
- (v) This ESIA study followed World Bank's environmental and social standards (ESS) guidelines, national legislations, and international best practices. It focused on understanding the project background, preliminary designs, and implementation plan. Data was collected through both qualitative and quantitative methods, including literature reviews and physical observations, photography, checklists, interviews, and stakeholder consultation. Primary data was collected through interviews, discussions, photography, observations, and checklists to understand the environmental, socio-economic, and cultural setting of the project area.

Project Description and Context

- (i) The proposed Hybrid power plant (3°04'50"N, 43°37'02"N) is nestled in the southwestern corner of Baidoa City covering over 20 ha, and is adjacent to the current power plant operated by BEC-BAIDOA. The proposed area is relatively flat land with sparse vegetation comprising mainly of *acacia-commifora* bushes. No waterbodies exist near the proposed site, but a settlement comprising of an IDP camp is approximately two kilometers from the proposed project site. A gravel road linking the southernwestern outskirts of Baidoa City connects the site.
- (ii) The feasibility study recommends a detailed design of a hybrid power plant consisting of 5.35MW solar PV, 4MW BESS and 4MW genset. The existing 11kV transmission line will be the main power evacuation line serving the proposed powerplant. The proposed power plant will comprise of PV

modules and lithium-ion battery storage system. The plant is expected to operate for 25 years with a battery lifetime of 6000 cycles (approximately 17.5 years), and shall be decommissioned thereafter. Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power plant is to operate for 25 years, a replacement plan will be implemented to ensure continued functionality. This shall include procuring and installing new batteries or upgraded storage technologies, safely recycling or disposing of expired batteries in line with environmental regulations, and allocating funds for the replacement. Battery replacement shall be coordinated with routine maintenance to minimize downtime. Additionally, this shall present an opportunity to adopt newer, more efficient technologies that could enhance the plant's performance for the remainder of its operational life.

Legal and Regulatory Framework

- (i) *National Laws and regulatory framework:* The assessment of Somalia's Environmental and Social Impact Assessment (ESIA) frameworks for electricity expansion indicates the country's dedication to sustainable development, environmental conservation, and social inclusion. Key federal laws, such as the Provisional Constitution of Somalia (2012), emphasize the importance of environmental protection and sustainable natural resource usage. The National Environmental Policy (2020) emphasizes the importance of ESIA's in assessing the potential environmental and social implications of development projects, including mitigation methods, public consultation, and adherence to international best practices.
- (ii) *South West State Laws and regulatory framework:* The study of South West State (SWS) legal and regulatory frameworks for Environmental and Social Impact Assessment (ESIA) adheres to federal laws and is focused on compliance with relevant environmental regulations. The regulations emphasize the importance of comprehensive impact studies, public participation, and mitigation measures to address any environmental, social, and cultural consequences. These laws also comply with international standards, guaranteeing that the proposed hybrid power plant follows best practices for environmental sustainability and social inclusion.
- (iii) *Legal framework for land ownership and expropriation:* Somalia's legal system for land ownership and expropriation combines statutory, customary, and Islamic laws. The Federal Constitution recognises private property rights and safeguards against wrongful deprivation. Expropriation is permitted for public purposes, subject to reasonable compensation, under SWS's Land Law. Customary law and Islamic principles are critical in rural communities where clan-based land tenure determines land allocation. SWS's regional government is striving to formalise property ownership structures, but obstacles remain due to weak legal infrastructure, enforcement capabilities, and land-rights conflicts.
- (iv) *Institutional framework for management of E&S in FRS and SWS:* Multiple governmental organisations in the Federal Republic of Somalia (FRS) and SWS are responsible for enforcing E&S policies. At the federal level, the Ministry of Environment and Climate Change (MoECC) is in charge of developing E&S policies, regulating them, and ensuring compliance throughout Somalia, as well as setting baseline criteria and cooperating with foreign partners. SWS work with MoEACC on monitoring and compliance.
- (v) *Energy sector standards related to environmental, health and safety:* At the federal level, the Ministry of Energy and Water Resources (MoEWR) has implemented rules that establish EHS requirements for energy projects, with an emphasis on pollution control, safe working conditions, and minimising impacts on local communities and ecosystems. SWS adheres to these federal standards while adapting them to local contexts, with the Ministry of Environment and Climate Change in charge of enforcing environmental impact assessments (EIAs) and implementing safety protocols for energy projects, particularly renewable energy and off-grid solutions. While these frameworks seek to reduce risks, limited regulatory capacity and enforcement resources make full compliance difficult, especially in remote and underdeveloped locations.
- (vi) *Regional and International / Multilateral Agreement:* The FRS is a signatory to key multilateral agreements such as the Convention on Biological Diversity (CBD), the United Nations Framework Convention on Climate Change (UNFCCC), and the United Nations Convention to Combat Desertification (UNCCD). These agreements require Somalia to integrate environmental safeguards into development projects, including

the protection of biodiversity, climate change mitigation, and the prevention of land degradation. By adhering to these agreements, FRS ensures that power projects are designed and implemented with consideration for environmental sustainability, regional cooperation, and international best practices for managing environmental impacts.

- (vii) *World Bank's ESF*: The World Bank's most recent environmental and social standards (ESS) and guidance notes were reviewed to see if a proposed project violated any of the ESS. The ESIA's goal was to give guidance for environmental and social assessments of WB-financed projects, facilitate decision-making, assure sustainable solutions, and adequately consult affected parties. The ESIA found that the planned project will have both negative and beneficial effects on the environment and society, emphasizing the significance of good and sustainable project alternatives.

Analysis of Alternatives

- (i) Two sites were under consideration – the existing power plant and the proposed new site, which is adjacent to the existing power plant. The analysis of alternatives compared the existing power plant location, which has adequate space for the new hybrid power infrastructure, with a different site further away from the current location that also offers sufficient space for expansion. Maintaining the current location would leverage existing infrastructure and minimize relocation costs, space constraints could limit future growth and operational efficiency. On the other hand, the alternative site while providing ample space, lacked the basic support infrastructure such as road connections and power evacuation infrastructure.
- (i) The No Project Option was deemed least preferred due to socio-economic and environmental factors. It would continue diesel generator-based electricity generation, causing GHG emissions, and affecting local economies due to lack of affordable, clean, and reliable electricity supply. This would also hinder employment opportunities and hinder the South West State and FRS from meeting energy requirements, thereby affecting the overall socio-economic status of target communities.

Environmental and Social Baseline

Baidoa City, located in Somalia's SWS, is characterized by a semi-arid climate with low and irregular rainfall, contributing to recurrent droughts and water scarcity. The natural vegetation primarily consists of sparse shrubs and acacia trees, with pockets of degraded rangelands due to overgrazing and deforestation for charcoal production. Soil conditions are generally poor, prone to erosion and desertification, exacerbated by unsustainable land use practices. The city's air quality is influenced by the widespread use of biomass and diesel generators, while waste management systems are limited, resulting in improper disposal of solid and liquid wastes. Water resources are heavily dependent on seasonal rivers, shallow wells, and boreholes, often affected by contamination and overuse.

Baidoa City serves as an economic and administrative hub, particularly for the agricultural and livestock trade that supports livelihoods in the SWS. The city has a growing population, including a significant number of internally displaced persons (IDPs) driven by conflict, drought, and climate change impacts. Infrastructure development is limited, with inadequate housing, poor road networks, and inconsistent electricity and water supply. Education and healthcare services are available but often overstretched and under-resourced. The local economy is informal, heavily reliant on small-scale trade, remittances, and humanitarian aid. Unemployment, particularly among youth, is high, contributing to economic vulnerability. Gender disparities persist, with limited access to economic opportunities and education for women. Despite these challenges, Baidoa plays a critical role in regional trade and cultural cohesion, underlining its potential for socioeconomic growth with targeted investments and improved governance.

Assessment of Impacts

The project aims to positively impact the SWS and FRS economy in general by providing employment opportunities and boosting economic growth. However, it will also have negative impacts on the biophysical environment, infrastructure, utilities, and social environment, including land access restrictions, worker influx, security, occupational health, and fire hazards.

Impacts and mitigation measures

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
CONSTRUCTION	Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> Dispose of waste materials promptly to avoid visual pollution. Install temporary barriers, such as walls or screens, to shield construction sites. Keep construction materials and equipment organized to avoid visual clutter. Limit the construction footprint and restrict activities to designated areas.
		Soil, ground/surface water contamination	<ul style="list-style-type: none"> Properly store, handle, and dispose of construction waste. Use bunded areas and spill kits for fuel, chemicals, and oils. Store construction materials like cement securely to avoid leakage or runoff. Design and implement temporary drainage to manage storm water. Regularly maintain equipment to avoid leaks. Conduct regular water quality tests in nearby water bodies to detect contamination early.
		Air quality (Dust)	<ul style="list-style-type: none"> Cover construction material stockpiles (sand, gravel, etc.) to minimize dust release. Limit vehicle speed on-site and ensure trucks are covered when transporting materials. Monitor dust levels regularly and adjust mitigation measures as needed. Promote vegetation growth in disturbed areas to stabilize soil and reduce dust. Regularly spray water on work areas to suppress dust. Schedule high-dust activities during times of lower wind speeds or less traffic. Where possible, pave or stabilize construction access roads to reduce dust generation.
		Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Use low-sulphur fuels to reduce harmful pollutants. Regularly maintain construction vehicles and equipment to minimize exhaust emissions. Plan transportation routes and schedules to minimize trips and avoid congested areas. Minimize vehicle idling and schedule operations to reduce fuel consumption. Inform local communities of mitigation measures to address air quality concerns proactively. Deploy vehicles and machinery with low-emission engines
		Noise & vibration	<ul style="list-style-type: none"> Conduct regular noise and vibration monitoring to ensure compliance with permissible limits. Establish a GRM for community to report noise or vibration disturbances. Inform nearby residents about construction schedules and anticipated noise levels in advance. Provide earplugs or earmuffs to construction workers operating noisy equipment. Regularly maintain construction equipment to prevent excessive noise and vibrations. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Turn off equipment when not in use to reduce unnecessary noise.
		Biodiversity (Fauna)	<ul style="list-style-type: none"> Limit vegetation removal to the essential areas and replant native species post-construction. Implement noise and vibration mitigation measures to minimize disruption to fauna. Ensure proper disposal of wastes to avoid attracting wildlife. Site clearing work/earthwork to be done during the dry season to minimize impacts on fauna. Vehicle movements shall be limited to designated paved/unpaved roads and maintained at 15-20 km/h. Ensure wildlife-friendly designs for infrastructures. An ecologist shall be hired to coordinate the fauna monitoring.
Biodiversity (Flora)	<ul style="list-style-type: none"> Limit clearing to designated areas essential for construction and infrastructure. 		

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> Rehabilitate disturbed areas with native plant species post-construction. Implement erosion control measures (e.g., silt fences, vegetation buffers) to prevent damage to surrounding flora. Prevent the introduction and spread of invasive plant species. Ensure proper demarcation and delineation of the project site to be affected by construction works.
		Soil erosion	<ul style="list-style-type: none"> Limit clearing of vegetation to areas essential for construction and retain natural ground cover where possible. Schedule construction activities to avoid heavy rainfall periods, reducing runoff risks. Plant native vegetation or grass on disturbed areas immediately after construction to stabilize the soil. Design and maintain access roads to minimize soil compaction and erosion along transportation routes. Regularly inspect and maintain erosion control measures, especially after rainfall events. Avoid groundbreaking during the seasons of high rainfall to avoid erosion.
		Wastes (Solid wastes)	<ul style="list-style-type: none"> Develop and implement a site-specific waste management plan detailing waste segregation, storage, and disposal methods. Set up clearly marked waste collection points with appropriate bins or containers. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time Train workers on proper waste disposal practices and the importance of waste reduction. Safely store hazardous waste in designated areas and ensure proper disposal through licensed contractors. Promote the recycling and reuse of materials, such as scrap metals, wood, and concrete. Optimize material use and avoid over-ordering construction supplies to reduce waste. Establish a schedule for regular waste collection and removal from the site to prevent accumulation. Construction wastes to be managed in accordance with internationally accepted construction standards. Conduct periodic audits of waste management practices to ensure compliance and address any gaps.
		Wastes (Liquid wastes)	<ul style="list-style-type: none"> Develop and implement a plan for the collection, treatment, and disposal of liquid waste. Train workers on proper handling and disposal of liquid waste and spill response protocols. Reduce water use through efficient construction practices and recycling whenever feasible. Monitor liquid waste generation and ensure compliance with local environmental regulations. All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. Develop and implement a detailed Spill Prevention Plan (SPP) Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. In case of spillage, the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. Install oil-water separators in drainage systems to capture and remove oil or fuel from storm water. Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. Provide sanitary waste facilities for both genders clearly marked Refuelling and maintenance of vehicles will not take place at the construction site.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. Develop a water management plan to monitor and optimize water usage during construction. Prioritize the use of non-potable or recycled water for activities such as dust suppression and equipment washing. Implement water-saving techniques, such as using low-flow faucets and nozzles in construction processes. Train workers on the importance of water conservation and best practices for minimizing water use. Coordinate and schedule water-intensive tasks efficiently to avoid excessive consumption. Source and utilize a sustainable and reliable water supply for both construction and operation phase. Consult with the project local committee on water use to avoid conflicts with the community. Conduct regular monitoring of water consumption to ensure adherence to planned usage levels and report deviations.
		Energy Consumption	<ul style="list-style-type: none"> Use energy-efficient machinery and tools to minimize fuel and electricity consumption. Train workers on energy conservation practices and the importance of reducing consumption. Regularly maintain construction equipment to ensure optimal energy performance and reduce inefficiencies. Plan and schedule activities to avoid energy-intensive operations during peak hours. Monitor energy use regularly to identify areas for improvement and ensure compliance with energy-saving targets. Implement energy-saving measures, such as turning off unused equipment and lights. Enforce a strict no-idling policy for construction vehicles and machinery to save fuel. Develop and implement an energy management plan to track and optimize energy usage during construction.
	Impacts on social environment	Archaeology and cultural heritage	<ul style="list-style-type: none"> Develop and implement a Chance Finds Procedure and ensure protocols are followed. Engage a qualified archaeologist to monitor all ground-disturbing activities to ensure early identification. Establish a clear protocol for halting construction activities immediately if any archaeological or cultural materials are found. If chance finds are made, ensure proper documentation, including detailed records, photography, and GPS coordinates, before any further action is taken.
		Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Collaborate with local law enforcement to address trespassing incidents and ensure community safety. Conduct routine inspections of security measures to identify and address vulnerabilities. Deploy trained security guards to patrol the site and monitor for unauthorized access. Develop a response protocol for handling incidents of trespassing or unauthorized entry. Display clear and visible warning signs around the site to discourage trespassing. Establish controlled entry and exit points with security personnel or electronic systems. Inform nearby communities about the project, emphasizing safety risks associated with unauthorized access. Install adequate lighting and CCTV cameras to deter intruders and enhance monitoring. Install perimeter fencing around the construction site to prevent unauthorized entry. Issue identification badges to workers and ensure only authorized personnel on-site.
		Worker influx – incoming workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Recruit local workforce to the extent possible especially for unskilled

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> and semi-skilled jobs. Raise awareness among local community and workers on the need to have a good /cordial working relation Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM accessible to community members. The contractor and the project/community grievance redress committee to work closely address complains raised on time. Respect for community values/culture. Prompt payment of workers as per the contractual agreements/terms.
		Gender-based violence	<ul style="list-style-type: none"> Provide comprehensive training for workers and management on recognizing, preventing, and responding to GBV. Implement and enforce a strict zero-tolerance policy for any form of GBV, including harassment, abuse, or exploitation. Set up confidential and accessible reporting channels for victims of GBV, ensuring safety and anonymity. Engage with local communities, particularly women’s groups, to raise awareness of GBV risks and prevention measures around the construction site. Work with local law enforcement, health services, and NGOs to provide support to victims of GBV. Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks related to the subproject.
		Labour disputes	<ul style="list-style-type: none"> Provide workers with clear, written contracts outlining terms, conditions, and dispute resolution procedures. Ensure fair and timely payment of wages, benefits, and allowances in line with local labor laws and industry standards. Establish a workers’ committee or labor union representatives to voice concerns and address grievances. Create transparent communication channels between workers, management, and contractors to address issues before they escalate. Implement formal mechanisms for resolving disputes, such as mediation or arbitration, to address conflicts fairly. Hold regular meetings with workers to discuss concerns, updates, and resolve issues early on. Ensure a safe and healthy working environment, as poor working conditions can contribute to labor disputes. Ensure full compliance with local labor laws, international labor standards, and regulations to prevent legal disputes. Establish an accessible, confidential grievance redress system for workers to report issues without fear of retaliation. Engage with local communities to manage expectations and foster positive relationships with the workforce. Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues.
		Child and forced labour	<ul style="list-style-type: none"> Implement and enforce a zero-tolerance policy towards child labor and forced labor, in compliance with international labor standards. Verify the age of all workers before hiring to ensure no child labor is employed, and maintain documentation of workers' ages. Ensure that all workers sign contracts freely, without coercion, and that they are fully aware of their rights and responsibilities. Engage with local communities to raise awareness about the risks and harms of child and forced labor, and encourage reporting of suspected cases. Ensure compliance with both local and international labor laws, including those prohibiting child and forced labor, and regularly review practices to ensure alignment. Establish accessible, confidential reporting mechanisms for workers and the community to report suspected child or forced labor incidents. Put visible signage on site “No Jobs for children” Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour.
		Security risks	<ul style="list-style-type: none"> Conduct a comprehensive risk assessment to identify security threats. Engage local stakeholders (government, law enforcement, and communities) to understand local security concerns. Collaborate with local law enforcement and security agencies to

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<p>provide support and enhance security measures.</p> <ul style="list-style-type: none"> • Hire licensed security personnel familiar with the area to provide 24/7 site surveillance, patrols, and monitoring. • Use surveillance systems, such as CCTV cameras and motion sensors, to monitor critical areas in real-time. • Implement strict access control protocols, including identity verification and sign-in procedures for workers. • Develop a security incident response plan that includes procedures for evacuation, medical emergencies, and reporting incidents. • Provide workers with security training, and protocols for responding to security threats. • Maintain constant communication and coordination with local authorities regarding security updates and developments in the region. • Prepare contingency plans for potential security scenarios, including kidnappings, armed attacks, and civil unrest. • Have security response teams on standby to address urgent security breaches or emergencies.
		Occupational Health and safety	<ul style="list-style-type: none"> • Develop and implement a comprehensive Occupational Health and Safety (OHS) plan outlining safety protocols, emergency procedures, and risk assessments. • Provide appropriate PPE (e.g., helmets, gloves, goggles, and boots) to all workers and enforce their use at all times on site. • Conduct regular safety training for workers on hazard identification, safe work practices, and emergency response procedures. • Perform regular risk assessments and safety audits to identify potential hazards and implement corrective actions. • Ensure first aid kits are readily available on-site and provide trained medical personnel or access to nearby medical facilities for emergencies. • Conduct daily safety inspections to identify and address hazards promptly. • Install clear and visible safety signs and warnings to alert workers of potential hazards, especially in high-risk areas. • Develop emergency response plans and conduct regular drills for fire, medical emergencies, and other potential incidents. • Establish a system for reporting, investigating, and documenting safety incidents and near misses to prevent recurrence. • Implement health surveillance programs to monitor workers' health, especially for those exposed to hazardous substances or conditions. • Use skilled personnel for activities which demand skills/technical tasks • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees
		Community health and safety risks	<ul style="list-style-type: none"> • Develop a community health and safety plan to outline measures for protecting local communities from construction-related risks. • Implement awareness campaigns to inform local communities about construction activities, potential risks, and safety protocols. • Collaborate with local health and safety authorities to ensure compliance with safety regulations and address any community concerns in a timely manner. • Develop and communicate emergency response procedures for the community, ensuring quick access to medical assistance in case of accidents. • Ensure proper management and disposal of construction waste to prevent contamination of local environments and protect community health. • Establish a grievance mechanism that allows community members to raise health and safety concerns related to construction activities. • Manage construction-related traffic to minimize accidents by establishing safe routes, signage, and speed limits, and employing traffic control personnel. • Regularly monitor environmental conditions (air, water, and soil quality) to assess any potential impacts on community health and take corrective actions as needed. • Use dust suppression techniques and noise reduction measures (e.g., sound barriers, equipment maintenance) to reduce air and noise

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			pollution affecting nearby communities.
		Fire Hazards	<ul style="list-style-type: none"> • ‘No smoking’ signs shall be posted at the construction site • A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. • Designate an assembly point • Provision of firefighting equipment on site during construction. • Implement strict fire prevention protocols, including the safe storage and handling of flammable materials, fuels, and chemicals. • Provide fire safety training to all workers, including how to use firefighting equipment and respond to fire emergencies. • Assign designated fire watch personnel to monitor high-risk areas during critical activities, such as welding or using open flames. • Develop and communicate a fire emergency response plan, including evacuation routes, safe assembly points, and contact details for local fire services. • Install clear fire hazard signs, evacuation routes, and emergency exits to ensure quick and safe evacuation in case of a fire. • Implement strict controls on hot work (e.g., welding, cutting), including proper supervision and fire watches during these activities. • Establish communication with local fire services for immediate response and support in case of fire emergencies. • Ensure that construction equipment and machinery are regularly inspected and maintained to prevent overheating or malfunction that could lead to fires. • Use fire-resistant materials for construction activities where feasible, particularly in high-risk areas.
		Traffic risks	<ul style="list-style-type: none"> • Develop and implement a comprehensive traffic management plan to minimize construction-related traffic disruptions and risks. • Install clear signage and road markings to direct both construction vehicles and public traffic safely, including speed limits, detours, and warning signs. • Where possible, establish separate routes for construction vehicles to reduce interaction with public traffic and minimize accidents. • Implement speed limits within the construction area and enforce safety zones around high-risk areas to protect workers and the public. • Conduct awareness campaigns to inform the public about ongoing construction activities, expected traffic disruptions, and safety precautions. • Limit construction vehicle movement during peak traffic hours to reduce congestion and minimize the risk of accidents. • Develop and communicate an emergency response plan for traffic accidents, including quick access to medical services and coordination with local authorities. • Ensure safe pedestrian pathways and crossings are provided around the construction site to protect local residents and workers. • Control and limit access points to the construction site to reduce unauthorized vehicle entry and minimize traffic risks. • Erect temporary road signs warning local road users of construction activities and increased traffic. • Designate safe parking and loading zones for construction vehicles away from main roads and community spaces.
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> • Update the existing SEP to make it more relevant to the subproject and the identified stakeholders. • In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. • Prepare and implement a GRM to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM.
		Inadequate grievances management	<ul style="list-style-type: none"> • Constitute a Local Grievances Committee in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. • Implement a worker’s grievances mechanism. • Awareness on the culturally appropriate and accessible GRM to all

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<p>community segments including VMGs, vulnerable individuals and households and CSOs</p> <ul style="list-style-type: none"> All reported grievances are logged, dated, processed, resolved and closed out in a timely manner. Proportionate representation of VMGs and vulnerable individuals in the local grievances committee. GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity.
OPERATION	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Fence off the power plant. Engage local communities in discussions about visual impacts and seek input on landscaping and design improvements to reduce visual intrusion.
		Soil, ground/surface water contamination	<ul style="list-style-type: none"> Implement spill prevention protocols and install containment systems (e.g., secondary containment for fuel and chemical storage) to prevent leaks and spills. Develop a stormwater management plan to prevent runoff from carrying contaminants into local water bodies, including the use of retention ponds and proper drainage systems. Store hazardous materials (e.g., chemicals, fuels) in secure, well-marked areas and ensure proper disposal according to regulations to avoid contamination of soil and water. Apply erosion control measures (e.g., vegetation cover, mulching) to prevent soil erosion, which can lead to contamination of surface water through sedimentation. Provide regular training to staff on best practices for preventing soil and water contamination, including spill response and waste management procedures. Regularly inspect and maintain equipment and infrastructure to prevent leaks, failures, or malfunctions that could lead to soil or water contamination.
		Air quality (Dust)	<ul style="list-style-type: none"> Establish vegetation and landscaping around the site to act as windbreaks and reduce the spread of dust in the surrounding area. Continuously monitor dust levels around the plant and at nearby sensitive receptors to ensure compliance with air quality standards. Inform local communities about ongoing dust control measures and maintain open channels for reporting dust concerns. Ensure planting of grass around and within the facility compound
		Air quality (Vehicle fumes emissions)	<p><i>Vehicles</i></p> <ul style="list-style-type: none"> Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. Use high quality, low-sulphur fuel to minimize harmful emissions from vehicles. Continuously monitor air quality in and around the site to track the impact of vehicle emissions and take corrective action if levels exceed standards. Keep the local community informed about measures being taken to minimize vehicle emissions and address any concerns promptly. <p><i>Generators</i></p> <ul style="list-style-type: none"> Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. Implement strategies to reduce idling time when diesel generators are not needed or can be supplemented by the hybrid system. Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. Invest in modern diesel generators with advanced combustion systems. Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. Regularly report emissions data to local regulatory authorities as part of environmental compliance. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> Use of diesel which is Sulphur-free to run the power producing generators to be encouraged Use Selective Catalytic Reduction (SCR) to significantly reduce NOx emissions by injecting ammonia or urea into the exhaust stream.
		Noise & vibration	<p><i>Genset</i></p> <ul style="list-style-type: none"> Install soundproof enclosures around the diesel generators Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations Ensure regular servicing of the diesel generator to maintain its optimal function. Install high-performance silencers on the generator's exhaust system to reduce noise emissions Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <p><i>BESS</i></p> <ul style="list-style-type: none"> Install soundproof or acoustically treated enclosures around noisy inverters and transformers. Use quieter, high-efficiency fans and cooling systems, or design them with lower noise outputs. Equip the BESS unit with vibration isolators or mounts to reduce noise generated by vibrations Install sound barriers or walls around the BESS unit to deflect or absorb noise. Use sound-absorbing materials within the BESS unit's housing to absorb sound before it escapes. Regularly service and maintain fans, inverters, and other equipment to ensure they operate smoothly
		Biodiversity (Fauna)	<ul style="list-style-type: none"> Conduct regular monitoring to assess the presence and behaviour of wildlife in and around the power plant area. Properly manage solid and liquid waste to prevent contamination of habitats that could harm local fauna. Develop a response plan for handling any incidents involving wildlife, such as rescues or injuries. Enforce strict speed limits for vehicles on-site to reduce the risk of wildlife collisions. Prohibit the use of pesticides, herbicides, or other chemicals that could harm wildlife in areas near the plant. Conduct periodic environmental audits to ensure all biodiversity protection measures are being implemented effectively. An ecologist shall be hired to coordinate the fauna monitoring. Bird deterrents to be installed to prevent collisions with solar panels.
		Biodiversity (Flora)	<ul style="list-style-type: none"> Conduct regular monitoring to assess the health and coverage of flora in and around the power plant area. Restore degraded areas with native plant species to enhance local biodiversity and prevent erosion. Implement measures to control and prevent the introduction or spread of invasive plant species within the project site. Prohibit the use of harmful herbicides, pesticides, or fertilizers that could damage native vegetation. Develop and implement a fire management plan to protect surrounding vegetation from accidental fires.
		Soil erosion	<ul style="list-style-type: none"> Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use Construct the drainage system in a way to follow natural drain of the water Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. Undertake landscaping with grass on areas without electrical installation (lower areas)
		Wastes (Solid wastes)	<p><i>General solid wastes</i></p> <ul style="list-style-type: none"> Collaborate with the local community to promote responsible waste disposal and recycling efforts.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> • Compost biodegradable waste, such as food scraps, to reduce landfill contributions and create usable compost for landscaping. • Conduct regular training for employees and contractors on proper waste management practices. • Emphasis on prudent waste generation and give priority to reduction at source • Ensure non-recyclable solid waste is disposed of at authorized landfill sites compliant with local regulations. • Maintain records of waste generation, handling, and disposal to ensure compliance with environmental regulations. • Operator to contract a licensed waste handler to collect and dispose solid waste • Perform periodic audits to monitor waste generation and management effectiveness, and identify areas for improvement. • Promote reuse of materials where feasible, such as using reusable containers and pallets for operational activities. • Properly handle and dispose of hazardous waste, including electronic and chemical waste, in accordance with international standards. • Provide adequate, well-labelled, and secure storage areas for waste to prevent littering and wildlife scavenging. • Provide waste handling facilities such as labelled waste bins • Undertake solid waste management awareness to operators • <i>Damaged solar panels and hazardous wastes</i> • Ensure segregation from other waste streams • All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through an approved waste handler
		<p>Wastes (Liquid wastes)</p>	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> • Provide sanitary waste facilities for both genders clearly marked • Use well-designed, impermeable septic tanks for areas without access to municipal sewage, ensuring regular maintenance and emptying by licensed operators. • Ensure all treated wastewater complies with national and international effluent discharge standards. • Train personnel on proper use and maintenance of sanitary facilities to avoid overloading treatment systems. • Implement water-saving fixtures and practices in sanitary facilities to reduce liquid waste generation. • Develop a plan to manage spills or leaks of sanitary liquid waste, including immediate containment and cleanup. • Conduct routine inspections of all sanitary waste infrastructure to identify and address issues promptly. • Install clear signage in restrooms and waste management areas to encourage proper use and minimize misuse. • Employ licensed service providers for the collection, transport, and disposal of liquid sanitary waste when necessary. <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> • Refuelling and maintenance of vehicles will not take place at the construction site. • Create awareness for the employees on site on procedures of dealing with spills and leaks • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Generators</i></p> <ul style="list-style-type: none"> • Proper storage of the oil is required to ensure no leakages • Frequent inspection and maintenance of the generator to minimize leakages. • No vehicles should be serviced or maintained at the project site.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> The waste oil or used oil must be disposed-off appropriately. Proper training for the handling and use of fuels for the operators of the power plant. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. Develop and implement a detailed Spill Prevention Plan (SPP) Ensure quick clean up of spills by designated response teams trained in handling hazardous materials. Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. Establish proper waste management protocols for the disposal of used oil, fuel, and filters from equipment maintenance activities. Implement a regular environmental monitoring program to check for any signs of contamination in soil, groundwater, and surface water near the plant. Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. Install spill and leak detection systems on fuel storage tanks, transformers, and pipelines. Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear.
	<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> Ensure prudent use of water. Install water-conserving automatic taps. Any water leaks through damaged pipes and faulty taps should be fixed promptly.
		Energy consumption	<p><i>Lightings</i></p> <ul style="list-style-type: none"> Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement. Install an energy-efficient lighting system Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. Replace conventional lighting with energy-efficient LED bulbs Utilize daylight sensors to adjust indoor lighting levels based on the amount of natural light, reducing the need for artificial lighting during the day. <p><i>Diesel generators</i></p> <ul style="list-style-type: none"> Conduct scheduled maintenance and servicing of diesel generators. Ensure high quality, low-sulphur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. Implement energy-efficient technologies and practices in plant operations. Implement measures to reduce unnecessary idling of diesel generators. Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel consumption and improve overall generator efficiency. Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime.
	Impacts on social environment	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Fencing off the facility to keep of community members, children and livestock from entering into the facility Maintain records of any person who comes to site Implement controlled access points with security gates, identification checks, and electronic monitoring systems.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> • Employ trained security personnel to monitor and patrol the premises continuously. • Deploy surveillance cameras at key locations to monitor the site and identify unauthorized activities in real-time. • Erect clear warning signs at strategic locations indicating restricted areas, potential hazards, and penalties for trespassing. • Conduct outreach programs to educate the local community about the risks of unauthorized access and the importance of site security. • Install adequate lighting around the perimeter and access points to enhance visibility and discourage trespassers, especially at night. • Use motion sensors and alarm systems to detect and respond promptly to unauthorized entries. • Develop and implement a response plan for security breaches, including reporting protocols and coordination with local law enforcement. • Ensure all employees and contractors carry identification badges and enforce strict entry protocols. • Conduct regular reviews of security measures to identify vulnerabilities and update protocols as needed. • Collaborate with local authorities and communities to report and discourage suspicious activities near the site.
	Gender-based violence		<p><i>GBV- SEA and SH</i></p> <ul style="list-style-type: none"> • Ensure that Code conducts are signed by all employers or incorporated in the employment contracts. • Establish Workers GRM with multiple channels including SEA/H channels. • Implement a code of conduct signed by all those with physical presence on site. • Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks related to the subproject. • The Action Plan to be proportionate to potential SEA/SH risks, and includes measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases. <p><i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i></p> <ul style="list-style-type: none"> • Develop and implement subsidized electricity pricing structures for vulnerable and marginalized groups (VMGs) to ensure affordability. • Collaborate with government and non-governmental organizations to extend electricity access to underserved communities. • Introduce a lifeline tariff for minimal electricity consumption, targeting low-income households. • Provide flexible payment options, such as prepaid meters or installment plans, to reduce financial barriers for vulnerable individuals. • Allocate part of the project's revenue for CSR projects aimed at improving access to affordable energy for VMGs. • Prioritize hiring VMGs and vulnerable individuals for operational roles to enhance their financial capacity to afford energy services. • Work with humanitarian organizations to fund electricity access for VMGs and vulnerable groups. • Establish grievance redress mechanisms and regular monitoring to ensure project benefits are equitably distributed. • Lower initial connection costs for VMGs to remove financial barriers to accessing electricity.
	Labour disputes		<ul style="list-style-type: none"> • Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes. • Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Ensure full compliance with national labour laws. • Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. • Implement fair and transparent disciplinary procedures. • Maintain open communication between management and workers.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> Promote equal opportunities and non-discriminatory practices in hiring, promotion, and compensation to avoid conflicts.
		Child and forced labour	<ul style="list-style-type: none"> Compliance with the national labor laws and labour management practices. Put visible signage on site “No Jobs for children” Do not allow children at the project site. Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. Report any form of forced labour at the site.
		Security risks	<ul style="list-style-type: none"> Deploy trained security personnel to guard the site 24/7. Continue engaging local communities to foster positive relationships and minimize hostility. Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters. Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. Implement a rigorous vetting process for all employees to minimize the risk of insider threats. Maintain a secure perimeter with robust fencing of the site Maintain and regularly update a comprehensive security incident response plan Maintain close coordination with local law enforcement and security agencies Monitor local security developments and adjust security protocols accordingly. Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response.
		Risks related to poor or inadequate stakeholder engagement (Conflict)	<p><i>Risks related to Inadequate stakeholder engagement</i></p> <ul style="list-style-type: none"> In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. Prepare a stakeholder engagement/consultation plan (SEP) that is proportionate to the subproject and the identified stakeholders. Prepare and implement a grievance redress mechanism to deal with grievances. Sensitize stakeholders on SEP and GRM. The grievance redress committee to include representatives from the community. Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget. <p><i>Inadequate grievances management</i></p> <ul style="list-style-type: none"> Employ from the community to the extent possible Engage the community members and other stakeholders in a timely manner Ensure all grievances are logged and closed Monitoring the pattern of grievances to come up will long term measures Solve all conflicts/grievances at the earliest time possible Work closely with the GRM committee members in solving the conflicts
		Occupational health and Safety	<ul style="list-style-type: none"> Implement and enforce a comprehensive OHS policy aligned with international standards. Conduct regular OHS training and refresher courses for all employees and contractors on hazard identification and safety protocols. Provide appropriate PPE, such as helmets, gloves, safety shoes, and high-visibility vests, and ensure their proper use. Develop and maintain emergency response plans, including fire drills, evacuation procedures, and first-aid training. Perform regular inspections and audits of equipment, facilities, and procedures to identify and mitigate hazards. Establish and enforce safe work practices for tasks involving electrical systems, heavy machinery, and hazardous substances. Conduct periodic medical check-ups for employees to monitor and address occupational health issues.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> • Implement a system for reporting, investigating, and addressing workplace incidents and near misses to prevent recurrence. • Install clear safety signs, hazard warnings, and emergency instructions in relevant areas of the facility. • Equip the site with accessible first-aid stations and ensure trained personnel are available to administer basic medical care. • Install fire extinguishers, fire alarms, and suppression systems, and conduct regular maintenance and drills. • Ensure routine maintenance of machinery and electrical systems to prevent malfunctions and accidents. • Provide hearing protection and monitor noise levels in areas with high decibel exposure. • Store chemicals and fuels in designated, secure areas with proper labelling and safety controls. • Require all contractors and subcontractors to adhere to the power plant's OHS standards and practices. • Establish an OHS committee to oversee safety compliance, address employee concerns, and recommend improvements. • Provide a confidential and accessible platform for workers to report safety concerns or violations without fear of retaliation.
	Community health and safety risks		<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> • Continuously monitor air emissions to ensure pollutants remain within permissible limits and do not affect public health. • Implement dust suppression techniques, such as water spraying and vegetation cover, to minimize particulate matter exposure to nearby communities. • Safely collect, segregate, and dispose of solid and liquid waste to prevent contamination of the environment and water sources. • Educate local communities on potential health risks and mitigation measures related to the power plant's operations. • Enforce strict site access controls to prevent accidental exposure to operational hazards by unauthorized individuals. • Develop and communicate an emergency response plan to nearby communities for incidents like fires, explosions, or hazardous leaks. • Establish a system for the community to report and address health-related grievances associated with the power plant. • Actively monitor and address community complaints related to health issues promptly to reduce risks. • Manage traffic from plant operations to reduce risks of accidents and associated public health impacts. <p><i>Shocks and electrocutions</i></p> <ul style="list-style-type: none"> • Inspect the wiring of the houses before connecting power • Safety awareness campaigns to the community before connection of power on safety precautions; • Require community to engage a certified technician to do wiring in the premises; • Use of quality materials while wiring; • Refraining from individual illegal extensions of power lines to other houses; • Observing safety measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths; • Keeping off all electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches; • Reporting any electric wire/conductors if found fallen on the ground; • Report any incident regarding electricity at the local office –staff in charge of operating the power plant. <p><i>Public Health Impacts –HIV/AIDs</i></p> <ul style="list-style-type: none"> • Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community • Allowing migrant workers time to be with their families
		Fire hazards	<ul style="list-style-type: none"> • 'No smoking' signs shall be posted within the power plant area • A fire Assembly point should be identified and marked

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> • A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported; • Detection/alarm systems that can detect fire should be and installed • The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including diesel generators, fuel storage areas, BESS locations, etc. • Workers especially operators of the plant must be trained on fire management
DECOMMISSIONING	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> • Develop and implement a detailed site restoration plan to return the area to its original state or an agreed-upon condition. • Safely and promptly, remove all construction materials, debris, and decommissioned equipment from the site. • Perform decommissioning activities in phases to minimize abrupt changes to the landscape. • Implement erosion control measures, such as terracing or planting cover crops, to prevent soil degradation. • Involve local communities in planning and decision-making for landscape restoration to align with their preferences. • Monitor the restored site periodically and carry out maintenance activities to ensure successful reestablishment of vegetation and landscape features. • Ensure all materials are disposed of at authorized facilities to prevent visual clutter or contamination. • Limit the use of temporary lighting to necessary areas to reduce visual disturbance during nighttime operations. • Use locally sourced materials for restoration to ensure compatibility with the surrounding environment.
		Biological environment	<ul style="list-style-type: none"> • Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning. • Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. • Monitor and manage invasive species during and after decommissioning to prevent their spread into disturbed areas. • Plan for revegetation and habitat restoration using native plant species after decommissioning to promote biodiversity and ecosystem recovery.
		Solid Waste Generation	<ul style="list-style-type: none"> • Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal • Ensure adequate collection and storage of waste on site • Ensure safe transportation to the disposal sites / designated area • Hazardous waste must be disposed by approved waste handler • Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements • Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste
		Liquid Waste Generation	<ul style="list-style-type: none"> • Develop a detailed liquid waste management plan outlining procedures for the collection, storage, treatment, and disposal of liquid wastes. • Establish temporary storage facilities for liquid wastes to prevent leaks or spills and ensure safe handling until proper disposal. • Identify opportunities for the reuse or recycling of liquid waste materials, where feasible, to minimize waste generation. • Engage with the local community to inform them about liquid waste management practices and promote awareness of environmental protection. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.
		Noise and vibration	<ul style="list-style-type: none"> • Select and use machinery and tools designed to minimize noise generation during decommissioning activities. • Schedule noisy activities, such as heavy equipment operation, during off-peak hours to minimize disturbance to local communities. • Regularly maintain decommissioning equipment to ensure it operates efficiently and with minimal noise. • Monitor noise and vibration levels continuously to ensure they remain

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<p>within acceptable thresholds and mitigate any exceedances.</p> <ul style="list-style-type: none"> • Inform nearby communities about planned decommissioning activities, including expected noise and vibration levels, to manage expectations. • Where possible, use quieter decommissioning methods, such as manual dismantling, instead of mechanical processes. • Provide hearing protection for workers involved in noisy tasks and monitor exposure times to prevent hearing damage. • Maintain open communication with local communities to address concerns related to noise and vibrations during the decommissioning process. • Ensure that all decommissioning activities comply with national and international noise and vibration standards.
		Air quality (dust)	<ul style="list-style-type: none"> • Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. • Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. • Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term. • Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. • Engage with local communities to inform them about decommissioning activities and measures being taken to control dust emissions. • Conduct regular inspections to identify potential sources of dust emissions and ensure that mitigation measures are effectively implemented.
		Air quality (vehicle & machinery fumes)	<p><i>Vehicle & machinery fumes</i></p> <ul style="list-style-type: none"> • Use high-quality fuels with lower sulphur content to minimize emissions from vehicles and generators. • Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. • Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. • Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use. • Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. • Establish an air quality-monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. • Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. • Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. • Establish a reporting system for emissions data to track progress and compliance with environmental standards. <p><i>Generators</i></p> <ul style="list-style-type: none"> • Ensure proper removal and disposal of hazardous materials, such as oil, fuel, and coolant, in accordance with environmental regulations. • Dismantle and dispose of the generators and components at authorized recycling or disposal facilities to avoid environmental contamination. • Provide personal protective equipment (PPE) for workers and implement safety measures to minimize exposure to hazardous substances during the generator decommissioning process. • Prevent soil and water contamination by ensuring that any fuel or oil leaks are immediately contained and cleaned up. • Keep the local community informed of the decommissioning schedule, potential impacts, and mitigation measures to address concerns. • Properly manage and dispose of any solid or liquid waste generated during the decommissioning process according to best environmental practices. • Ensure all decommissioning activities comply with local environmental regulations and international standards for waste management and environmental protection. • Conduct monitoring after decommissioning to ensure that the site is free of contamination and that restoration efforts are successful.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	Impacts on Infrastructure & Utilities	Water Consumption	<ul style="list-style-type: none"> Conduct a comprehensive assessment to evaluate water needs for decommissioning activities and identify opportunities for reduction. Develop a water management plan that outlines strategies for minimizing water consumption throughout the decommissioning process. Implement systems to recycle and reuse water for various tasks, such as dust suppression, equipment washing, and site clean-up. Provide training for personnel on water conservation practices and the importance of minimizing water use during decommissioning. Engage with local communities to raise awareness about water conservation efforts and the importance of sustainable water management. Use temporary storage solutions to manage water supplies efficiently and reduce waste. Implement measures to prevent leaks and spills from water storage and distribution systems. Provide periodic updates to stakeholders and the community on water management practices and progress in reducing consumption.
	Impacts on social environment	Occupational health and safety	<ul style="list-style-type: none"> Create a comprehensive occupational health and safety management plan outlining procedures, responsibilities, and protocols to mitigate identified risks. Ensure that all workers are equipped with appropriate PPE, such as helmets, gloves, goggles, and respiratory protection, to minimize exposure to hazards. Establish clear emergency response procedures for incidents such as fires, chemical spills, and medical emergencies, and ensure all workers are trained in these procedures. Develop and enforce safe work practices and standard operating procedures for decommissioning tasks, including equipment handling, dismantling, and waste disposal. Provide first aid facilities and ensure that trained personnel are available to respond to medical emergencies on-site. Implement measures to control noise and vibration levels during decommissioning activities, such as using quieter equipment and scheduling high-noise activities appropriately. Ensure that all contractors and subcontractors adhere to the same occupational health and safety standards as the main contractor.
		Gender-based violence	<ul style="list-style-type: none"> Ensure that Code conducts are signed by all employers or incorporated in the employment contracts on issues associated with GBV. Establish Workers GRM with multiple channels including SEA/H channels. Implement a code of conduct signed by all those with physical presence on site.
		Inadequate grievances management	<ul style="list-style-type: none"> Develop and communicate a transparent, accessible grievance mechanism for all stakeholders, including local communities, workers, and contractors. Ensure prompt acknowledgment and response to grievances, with clear timelines for resolution and regular updates to complainants. Raise awareness of the grievance mechanism through community meetings, posters, and local media to ensure stakeholders know how to lodge complaints. Provide an option for anonymous complaints to encourage individuals who may fear retaliation to raise concerns. Train project staff, contractors, and relevant local authorities on the grievance management process to ensure consistent and effective handling of complaints. Regularly assess the effectiveness of the grievance mechanism, adjusting procedures as needed to improve responsiveness and stakeholder satisfaction.
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			influenced decisions.
		Labour disputes	<ul style="list-style-type: none"> • Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Ensure full compliance with national labour laws. • Set up a monitoring system to track and evaluate labour relations, allowing for early detection of potential disputes and timely intervention. • Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes.
		Child and forced labour	<ul style="list-style-type: none"> • Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. • Ensure compliance with the national labor laws and labour management practices. • Put visible signage on site "No Jobs for children" • -Do not allow children at the project site.
		Security risks	<ul style="list-style-type: none"> • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Establish partnerships with local law enforcement and security agencies to enhance overall security coordination and response. • Engage with local communities to build trust and cooperation, encouraging them to report suspicious activities or security concerns. • Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. • Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning. • Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities.
		Community health and safety risks	<ul style="list-style-type: none"> • Create a health and safety management plan that outlines strategies for minimizing risks and protecting community health during decommissioning activities. • Develop and communicate an emergency response plan that includes protocols for medical emergencies, environmental incidents, and community evacuations if necessary. • Engage with local communities regularly to gather feedback, address concerns, and provide updates on decommissioning activities and safety measures. • Implement measures to minimize noise pollution during decommissioning. • Develop a traffic management plan to control vehicle movement to and from the site, reducing risks of accidents and ensuring safe access for the community. • Implement dust suppression measures, such as regular watering of the site, to minimize dust emissions that can affect community health. • Ensure proper waste management practices to prevent contamination of land and water resources, which could affect community health. • Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process.
		Fire hazards	<ul style="list-style-type: none"> • Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. • Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. • Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. • Ensure the availability of adequate firefighting equipment, such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. • Store flammable materials in designated, secure areas away from ignition sources, following appropriate storage guidelines. • Use clear signage to indicate fire exits, assembly points, and locations of firefighting equipment throughout the site. • Minimize the accumulation of combustible waste materials on-site and

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES
			<ul style="list-style-type: none"> establish a routine waste removal process. Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary.
		Traffic risks	<ul style="list-style-type: none"> Develop and implement a Traffic Management Plan (TMP). Engage with local communities to raise awareness about increased construction traffic and safety measures. Erect temporary road signs warning local road users of construction activities and increased traffic. Install speed bumps or other traffic-calming measures on roads near the construction site. Use traffic signs, barriers, and cones to guide and direct both construction and local traffic.

Estimated budget for the implementation of the ESMP

The total estimated budget for the implementation of the Environmental and Social Management Plan (ESMP) is projected at approximately USD 218,200. This budget covers a range of activities essential to ensuring compliance with environmental and social safeguards throughout the construction and operation phases. Key components include monitoring environmental impacts such as air quality, noise, and waste management, community engagement initiatives to address concerns and mitigate risks like gender-based violence (GBV) and occupational health and safety, capacity building for local stakeholders, and periodic reporting to regulatory bodies.

Stakeholder Analysis, Public Consultations and Disclosure

- (i) The Environmental and Social Impact Assessment (ESIA) study for the proposed hybrid power plant in Baidoa City involved extensive consultations with stakeholders from both public and private sector entities. The engagement aimed to ensure transparency, gather insights on potential impacts, and build consensus on the project's benefits and mitigation measures. Stakeholders included representatives from government ministries, local authorities, non-governmental organizations (NGOs), business leaders, community elders, and utility service providers. The consultations provided a platform to discuss the project's design, its anticipated impacts, and the Environmental and Social Management Plan (ESMP).
- (ii) Project site and the area in general is private land and is occasionally used by the local communities for livestock grazing. From the consultations with the local communities, it was clear that the communities understood the status of the land as private property. They further expressed no objections to any development activities proposed by the property owner as there were similar alternative sites for occasional grazing across BAIDOA District. There are no sacred sites or cultural heritage sites in the vicinity of the project area. Due to its expansive nature and existence of pockets of vegetation dominated mainly by *Acacia tortilis*, the project site on regular basis hosts a variety of common and local wildlife species, including Salt's Dik-dik (*Madoqua saltiana*), Abyssinian Hare (*Lepus habessinicus*), and a variety of resident bird species. No conflicts over land/land ownership was expressed.
- (iii) The majority of stakeholders expressed strong support for the proposed hybrid power plant, recognizing its potential to address Baidoa's critical energy shortages and enhance economic activities. Government representatives highlighted the project's alignment with national and regional energy policies, emphasizing its role in fostering sustainable development. Business leaders and private sector representatives acknowledged the project's potential to reduce reliance on costly diesel generators, lower energy costs, and attract investment. Community elders and local authorities underscored the importance of clean energy in improving living standards, particularly in underserved areas.
- (iv) While supportive, stakeholders emphasized the importance of full and transparent implementation of the Environmental and Social Management Plan (ESMP) developed for the project. Key concerns included potential environmental impacts such as water resource use, and waste management during the construction and operation phases. Social concerns included the risk of disruption to

community health and safety, disruption especially for vulnerable groups (the IDPs). Because of these challenge, the stakeholders, especially the local community emphasized the importance of engaging the community throughout the project lifecycle. There was a strong recommendation across the stakeholders' groups that the project prioritizes local employment and capacity-building initiatives, ensuring that the local workforce benefits directly from job creation and skills development opportunities.

Conclusion and recommendations

Conclusion

The ESIA study revealed that the proposed hybrid power plant has positive impacts on residents and the environment. However, it also poses potential environmental and social risks. The project proponent, implementing entity, and contractor must adhere to the social and environmental management plan, obtain permit approvals from the SWS Government and FGS, and engage qualified technical personnel throughout the project. The full implementation of the Environmental and Social Management Plan (ESMP) will ensure the sustainability of project activities from construction to decommissioning, including a general outlay, associated impacts, mitigation action plans, monitorable indicators, implementation timeframes, responsibilities, and cost estimates. From the findings of this ESIA, the following specific conclusions can be drawn:

- The project will adhere to industry norms and standards, ensuring environmental sustainability through the implementation of the ESMP. Mitigation measures will be integrated to comply with state and FGS laws and procedures. The power plant and structures will be installed to the required international standards. Sustainable environmental management will be ensured during all phases of the project, including adherence with all the relevant Word Bank's ESS.
- The proposed project will generate socio-economic benefits which would not be realized if the 'NO development option' is considered.
- The proposed project's potential adverse impacts can be successfully mitigated, with most impacts assessed as low to medium low before implementation, and risks are expected to reduce with mitigation measures. The impacts that will be adverse will be temporary during the construction phase and can be managed to acceptable levels with the implementation of the recommendation of the mitigation measures for the project.
- The relevant stakeholders have been consulted and the relevant project information shared and the views of the stakeholders is that the project is important.

Recommendation

It is strongly recommended that the MoEWR and BEC-BAIDOA make a concerted effort in particular, to implement the ESMP provided herein. Statutory EHS Audits shall be carried out in compliance with the national laws and WB requirements. The environmental performance of the site operations shall be evaluated against the recommended measures and targets laid out in this report. Based on the findings from this ESIA, the following specific recommendations can be made:

- The BEC-BAIDOA and the contractor shall adhere to relevant legal and regulatory framework to ensure compliance and success of the project
- Adherence to the mitigation measures as spelt out in the ESMP and monitoring of the same shall be mandatory to ensure environmental and social sustainability of the project.
- BEC-BAIDOA shall cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders, and ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable.
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Stakeholder engagement to be carried out throughout the construction and operation and decommissioning phases.
- Contractor to ensure grievance redress mechanism is established and operational before commencement of the operation.
- Diligence on the part of the contractor and proper supervision by the MoEWR and BEC-BAIDOA is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.

Authorization opinion

The HD believes the ESIA provides sufficient information for decision-making on the project's progress. They show the proponent's preferred alternatives are acceptable and identify essential mitigation measures. They believe the applicant's proposal should be approved on environmental and social grounds, provided essential mitigation measures are implemented. The proposed project does not pose significant environmental and social threats. Additionally, the proponent (MoEWR/BEC-BAIDOA) shall own the entire implementation process for this ESIA and ensure its full execution in all the project phases.

1.0. Introduction

1.1. PROJECT BACKGROUND

Since 2012, Somalia has been working to achieve political stability and reconstruction. However, the aftermath of the conflict has left the electricity sector fragmented and inefficient¹. The current installed capacity of 276 MW in main load centres across the country is insufficient to meet present demand. A combination of high costs and irregular supply compound the electricity generation, transmission, and distribution has made Somalia ranked among the worst in the world for electricity affordability^{2,3}. To address these difficulties, the Federal Government of Somalia obtained World Bank funding to support the efforts to increase access to cleaner and cheaper electricity supply and to re-establish the electricity supply industry through SESRP project. The SESRP Development Objective is to increase access to lower cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry in different load centres within the Federal Republic of Somalia". The Ministry of Energy and Water Resources (MoEWR) with a designated Project Implementation Unit (PIU) coordinate the SESRP. Overall, SESRP project aims to support the Federal Government of Somalia (FGS) initiative of ensuring increased electricity access to the citizens. This proposed project is in line with the commitment of the FGS as outlined in its ninth national development programmes (NDP-9: 2020-2024). Most relevant to the SESRP, the NDP-9 emphasizes increasing energy supply with special focus on renewable energy sources, and energy market regulatory reforms.

The SESRP aligns with the country's Ninth National Development Plan (NDP-9) for 2020-2024 by contributing to key objectives such as economic diversification, infrastructure development, and energy access. NDP-9 emphasizes the importance of sustainable energy solutions to support economic growth and improve living standards. By integrating renewable energy sources, such as solar, with conventional power systems, the SESRP will help to reduce reliance on expensive imported fossil fuels, increase energy security, and promote environmental sustainability. The SESRP also supports efforts to expand energy infrastructure, which is crucial for fostering industrial growth, job creation, and poverty reduction, in line with the development plan's broader goals of inclusive and resilient development. The SESRP project has the following components:

Table 1-1: Summary of SESRP project components

- | | |
|-------|--|
| SESRP | <ul style="list-style-type: none">● Component 1 – Sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa.● Component 2 – Hybridization and battery storage systems for mini grids.● Component 3 – Stand-alone solar off-grid access to public institutions (Health and Education).● Component 4- Institutional Development and Capacity Building. |
|-------|--|

1.1.1. Component 2: Hybridization and BESS for Mini-grid

The component aims to improve the capacity of electricity services providers (ESPs) to provide clean and affordable electricity to consumers in targeted load centers across the FGS. BEC-BAIDOA, a key ESP, has made progress in meeting these requirements. They have completed feasibility studies and acquired space for a hybrid power plant in Baidoa City's southwestern outskirts. The MoEWR will provide overall coordination and oversight during planning and implementation, including safeguards due diligence and implementation. BEC-BAIDOA will be responsible for the project's implementation during construction and operation phases.

An Environmental and Social Impact Assessment (ESIA) study is necessary under SESRP to ensure compliance with international and national environmental and social safeguards. The study evaluates potential impacts on the environment, communities, and local economies, identifying risks such as pollution, land use conflicts, biodiversity loss, and social concerns like labour conditions and community health and safety. Given the World

¹<https://www.trade.gov/country-commercial-guides/somalia-energy-and-electricity>

²<https://www.trtworld.com/opinion/somalia-encourages-foreign-investments-to-fix-its-energy-crisis-12788824>

³<https://sominvest.gov.so/wp-content/uploads/Energy-Sector-Study.pdf>

Bank's stringent environmental and social standards, the ESIA ensures that the project adheres to best practices for mitigating negative impacts while enhancing positive outcomes, such as improved energy access and economic development. Additionally, the ESIA facilitates stakeholder engagement, ensuring that the concerns of local communities and other stakeholders are considered throughout the project lifecycle.

1.1.2. Justification for the ESIA

Conducting an Environmental and Social Impact Assessment (ESIA) for the proposed hybrid power plant project in Somalia, funded by the World Bank, is critical to ensuring that the project adheres to the World Bank's Environmental and Social Framework (ESF) and global best practices, and the existing national legal and regulatory frameworks. The ESIA helps to identify, predict, and mitigate potential environmental and social risks, such as air and water pollution, habitat disruption, labor conditions, and community health and safety. By doing so, it promotes sustainability, safeguards the well-being of local communities, and ensures compliance with national environmental regulations. Furthermore, the ESIA fosters transparency and stakeholder engagement, building community support for the project and ensuring that development benefits, such as increased energy access and economic growth, are balanced with responsible environmental stewardship and social equity.

1.2. OBJECTIVES OF THE ESIA

The main objective of this ESIA was to examine both positive and negative effects of the proposed hybrid power plant on the people, their property, and the environment particularly in the Project Area (BAIDOA City and the surroundings), and proposed measures to mitigate the negative impacts and enhance positive impacts during the construction, operation and decommissioning phases of the project. Directly linked to the main objectives were the specific objectives that included:

- Present an outline of the project background,
- Establish the environmental baseline conditions of the project area and review all available information and data related to the project,
- Identify key areas for environmental, social, health and safety concerns as well as the anticipated impacts associated with the proposed project implementation and commissioning,
- Undertake detailed analysis of project alternatives
- Undertake public consultations with the potentially affected peoples and other interested parties
- Establish a comprehensive environmental and social management plan (ESMP) covering the construction, operation and decommissioning phases of the project,
- Preparation of a comprehensive Project Report in accordance with the World Bank ESS1 guidelines and submission to the MoEWR for further instructions and/or approval.

1.3. SCOPE OF THE ESIA STUDY

The ESIA scope largely covered the following areas:

- Baseline Conditions: Environmental setting (climate, topography, geology, hydrology, ecology, water resources, sensitive areas, baseline information, etc.); socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.), and infrastructural issues (roads, water supplies, drainage systems, power supplies, etc.).
- Legal and policy framework: Focusing on the relevant national and WBG's EHS in general, and those relevant to power generation and supply, and other national laws and policies focusing on allied activities relative to the project in question.
- Analysis of alternative: Identification, analysis, and evaluation of the various project alternatives with various indicators, including environmental, technical, economical, etc.
- Stakeholders' engagements: Interactive approach was adopted for the immediate neighbourhood in discussing relevant issues including among others: land use aspects, project acceptability, social, cultural and economic aspects.
- Environmental and social risks assessments: Identification of Environmental impacts namely physical impacts, biological impacts and Legal Compliance.

- Development of ESMP for the proposed hybrid power plant.

1.4. TERMS OF REFERENCE FOR THE ESIA

The Experts from HD were assigned the task of carrying out Environmental and Social Impact Assessment of the proposed hybrid power plant. The scope covered various activities related to; project planning activities, construction works of the proposed development, which included all activities necessary to construct, operate, and decommissioning of the project. The output of this work is a comprehensive Environmental Impact Assessment project, which will aid MoEWR in deciding on the project. The report is also in compliance to the World Bank's ESS of the proponent's development partners. The ESIA experts conducted the study guided by the following terms of reference:

- Establish the suitability of the proposed site/location to set up the hybrid power plant.
- A concise description of the legal and regulatory frameworks relevant to the project, description of the technology, procedures and processes to be used, in the implementation of the project.
- A description of the potentially affected environment/social economic and cultural setting of the project area.
- Consultation with stakeholders including the potentially project affected persons (PAPs).
- A description of positive and negative impacts of the project on the environmental, health, safety and social cultural aspects of the community
- Analysis of alternatives including project site, design and technologies
- Identification of the most appropriate mitigation measures/interventions against negative impacts during construction, operation and decommissioning.
- Development of an Environmental and Social Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment and society, including the cost, timeframe and responsibility to implement the measures.

1.5. ESIA APPROACH AND METHODOLOGY

The approach chosen in undertaking this study considered World Bank's ESS guidelines, existing national legislations and guidelines relevant to the project; and international best practices. The study largely involved the understanding of the project background, the preliminary designs and the implementation plan. The approach and methodology applied during the study enabled collection of both primary and secondary data. Qualitative and quantitative methods of data collection were employed. Secondary data was obtained through literature reviews while primary data was obtained through physical observations, photography, checklists, interviews and stakeholders' consultation.

1.5.1. Key Activities Undertaken During the ESIA

The ESIA study for the proposed hybrid power plant involved a comprehensive assessment of both environmental and social impacts. Baseline environmental and socioeconomic surveys and analysis were done to gather data/information from both primary and secondary sources. Stakeholder engagement was crucial, with consultations held with different stakeholders, including the local communities, government bodies, and other stakeholders to gather input and address concerns. Risk assessments were performed to identify potential environmental and social impacts, and mitigation measures were developed to ensure compliance with regulations and minimize adverse effects, promoting sustainable development in the region.

In summary, the following key activities undertaken during the study:

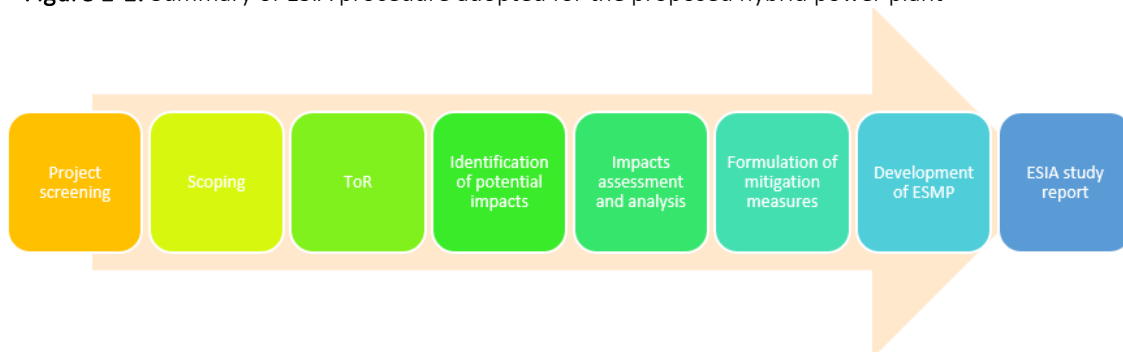
- Physical inspections of the proposed project area and site
- Literature review of relevant documents
- Stakeholder consultations with different stakeholders and project-affected persons
- Gathering environmental and socio-economic data of the area by use of checklist
- Continuous discussions with the stakeholders and accessing other sources of information on the proposed project details, the site planning and implementation plan,
- Photography, and interviews with people in the immediate neighborhood
- Evaluation of the activities around the site and the environmental setting of the wider area.

- Report writing and submission.

The initial stage of this assessment was project screening. Other considerations made during this stage included a preliminary assessment of the environmental sensitivity of the proposed project area/site. This screening indicated that the proposed hybrid power plant falls under Category B (Moderate Impacts) – a project that has potential adverse environmental and social impacts that are site-specific, reversible, and can be mitigated with standard procedures. As such, a more focused Environmental and Social Impact Assessment (ESIA), including the development of an Environmental and Social Management Plan (ESMP) with specific mitigation measures. Figure 1.1 summarizes the basic steps used in developing this ESIA. The details can be described as follows:

- **Step 1: Project concepts:** The project details regarding; scope, design, implementation, tests, commissioning were first analysed. A feasibility study report was obtained and analysed.
- **Step 3: Project Screening:** Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.
- **Step 4: Identification of Potential Environmental and Social Impacts:** The Potential Environmental impacts were identified, Classified and magnitude determined.
- **Step 5: Impact Assessment and Consultations:** The Environmental and Social Impacts were analysed, assessed and discussed in details involving consultations with the BEC-BAIDOA and other stakeholders.
- **Step 6: Formulation of Mitigation measures:** Mitigation measures to ameliorate or minimize the potential Environmental and Socio – economic impacts were formulated for the entire project life.
- **Step 7: Development of an Environmental & Social Management and Monitoring Plan:** An E&SMMP for the project life was developed indicating parameters to be monitored, persons responsible, timing and costs involved.

Figure 1-1: Summary of ESIA procedure adopted for the proposed hybrid power plant



1.5.2. Desk Study and Literature Review

The main objective was to gather and analyse existing information relevant to the environmental and social impacts of the proposed hybrid power plant through secondary data sources with a clear focus on environmental conditions, social demographics, regulatory frameworks, and previous relevant studies. The study involved gathering information and data from several sources including government reports, academic research, industry reports, non-governmental organizations' reports, local publications and other relevant reports from the World Bank. We utilized academic databases (e.g., Google Scholar, JSTOR) and government and industry repositories to find relevant documents; and online Sources - search for relevant information on organizational websites, online journals, and other credible sources. From the information and data gathered, we undertook review and analyses that focused on summarizing key findings from each source, focusing on the relevance to the proposed power plant's impacts, identifying common themes, and gaps in information. This was followed with comparative analyses that focused on comparing our findings with other similar projects to assess potential impacts and mitigation strategies. The regulatory review focused on examining the existing regulations and guidelines (national, state and World Bank) to ensure compliance and identify necessary permits and approvals. Some of the documents reviewed included the feasibility study documents, various FRS legislations, World Bank safeguard policies, project frameworks (ESMF and RPF), topographical maps, Google Earth/maps, and other relevant documents, including targeted studies commissioned by BEC-BAIDOA such as geotechnical studies and the MoEWR among other documents.

A critical literature review of secondary data focused on the followings:

- Relevant legislation and institutional framework governing the proposed project
- Licenses and permits requirements and conditions.
- Types of waste likely to be generated.

Documents relevant to the proposed development were reviewed.

1.5.3. Environmental and Social Baseline Assessments

To gain a better understanding of the environmental, socio-economic and cultural setting of the project site and its surrounding the ESIA team needed to gather primary data. This entailed collection of the data using various tools and methods. Interviews, discussions, photography, observations, and checklists are some of the methods employed in gathering the data needed from different stakeholders.

1.5.4. Public Consultations

The aim of the PC was to ensure that the opinions of all relevant stakeholders interested in a proposed project such as project affected persons, and the public in the vicinity of the proposed project are considered during project planning, design, construction, operation and decommissioning phases. The consultations also presented an opportunity for the community to raise issues and concerns pertaining to the project. Public consultations were conducted using standardized questionnaires and key informant interview guides. An interactive approach was adopted for discussing relevant information key among them being neighbourhood issues, project acceptability, social, cultural and economic aspects, and environmental impacts.

1.5.5. Assessment of Physical and Chemical Parameters

No in-situ sampling of air, noise, soil analysis and water quality analysis. The assessment of physical chemical parameters relied mainly on secondary information gathered from literature for BAIDOA as gathered during the desktop studies for soil^{4,5,6}, air^{7,8}, and water quality^{9,10}. The most recent topographic and geotechnical study commissioned by BEC-BAIDOA for the new project site was also a key reference document

1.6. TARGET GROUP FOR THE ESIA REPORT

The ESIA Report has been prepared for use by different stakeholders to be involved in the construction and operation of the proposed project. This report contains useful information on policies and procedures to be adhered to, implementation modalities, analysis of potential environmental and social impacts and suggested mitigation measures at various stages of project activities. The information will be useful in planning, implementation, management and maintenance of the project. In this regard, the report is useful to the following stakeholders:

- Engineers to be involved in preparation of designs and plans for the proposed hybrid power plant;
- Contractors to be engaged in the construction works for the project;
- MoEWR and other relevant FGS and South West State Government ministries and agencies;
- Funding agencies;
- Project affected persons and other stakeholders.

⁴United Nations Office for the Coordination of Humanitarian Affairs. (2023). Soil erosion and degradation impact assessment for sustainable agriculture in South Somalia. Retrieved from <https://www.unocha.org>

⁵Food and Agriculture Organization of the United Nations. (2023). Somalia's agriculture and soil rehabilitation: Insights into Baidoa soil management practices. FAO. Retrieved from <https://www.fao.org/>

⁶Aseey, A., Nisar, Z., & Jama, S. (2022). Soil fertility constraints and management in Southern Somalia: A case of Baidoa. *International Journal of Agriculture and Biology*, 24(3), 345-352.

⁷United Nations Environment Programme. (2022). Air quality assessment in Somalia: Regional overview and pollution sources. UNEP. Retrieved from <https://www.unep.org>

⁸World Health Organization. (2021). WHO global air quality guidelines: Particulate matter (PM2.5) concentrations and health impacts in Somalia. WHO Publications. Retrieved from <https://cdn.who.int>

⁹International Organization for Migration. (2024). Access to clean water and sanitation eased in Baidoa - SouthWest State. IOM Somalia. Retrieved from <https://somalia.iom.int>

¹⁰Food and Agriculture Organization of the United Nations (FAO). (2022). Baidoa water resources management report: Addressing the challenges of water scarcity and contamination. FAO Somalia. Retrieved from <https://www.fao.org/somalia>

1.7. KEY ASSUMPTIONS

The Experts made the following assumptions in preparing this ESIA

- All the technical data and information provided by the proponent, implementing and the specialists are accurate and up-to-date
- The design features will be put in place to minimize risks from external factors which could threaten the integrity of the facility which include: risks from other natural calamities; measures to minimize threats or damage from third parties e.g., terrorist attack
- The BEC-BAIDOA and the Contractor will implement the measures in the proposed ESMP
- The BEC-BAIDOA will undertake monitoring to track the implementation of the ESMP to ensure that management measures are effective to avoid, minimize and mitigate impacts and that corrective action will be undertaken to address shortcomings and/or non-performances.

2.0. Project Description and Context

2.1. OVERVIEW

This section provides an overview of the proposed BEC-BAIDOA Hybrid Power Plant in the southwestern outskirts of BAIDOA City as currently designed. The description borrows largely from preliminary project designs, discussions with the project engineers, field observations, feasibility study, interviews and available project documentation availed by BEC-BAIDOA and MoEWR.

2.2. LOCATION OF THE SITE

The proposed Hybrid power plant (3°04'50"N, 43°37'02"N) shall be located in the southwestern outskirts of BAIDOA City, South West State (Figure 2.1). The project site is in an open area with sparse settlements in the immediate vicinity within over 20 ha piece of land adjacent to the current BEC-BAIDOA Powerplant. The proposed hybrid power plant will have both direct and indirect impacts on the environment and communities. The project will combine solar PV, battery storage and genset, affecting air quality, water resources, noise, and livelihoods. The project may also disrupt traditional livelihoods and increase traffic and transport risks. Overall, the direct and indirect areas of influence is expected to be 2km and 5km radius respectively.

Figure 2-1(a): Location of the proposed BEC-BAIDOA hybrid power plant site in the southwestern outskirts of Baidoa City, Somalia

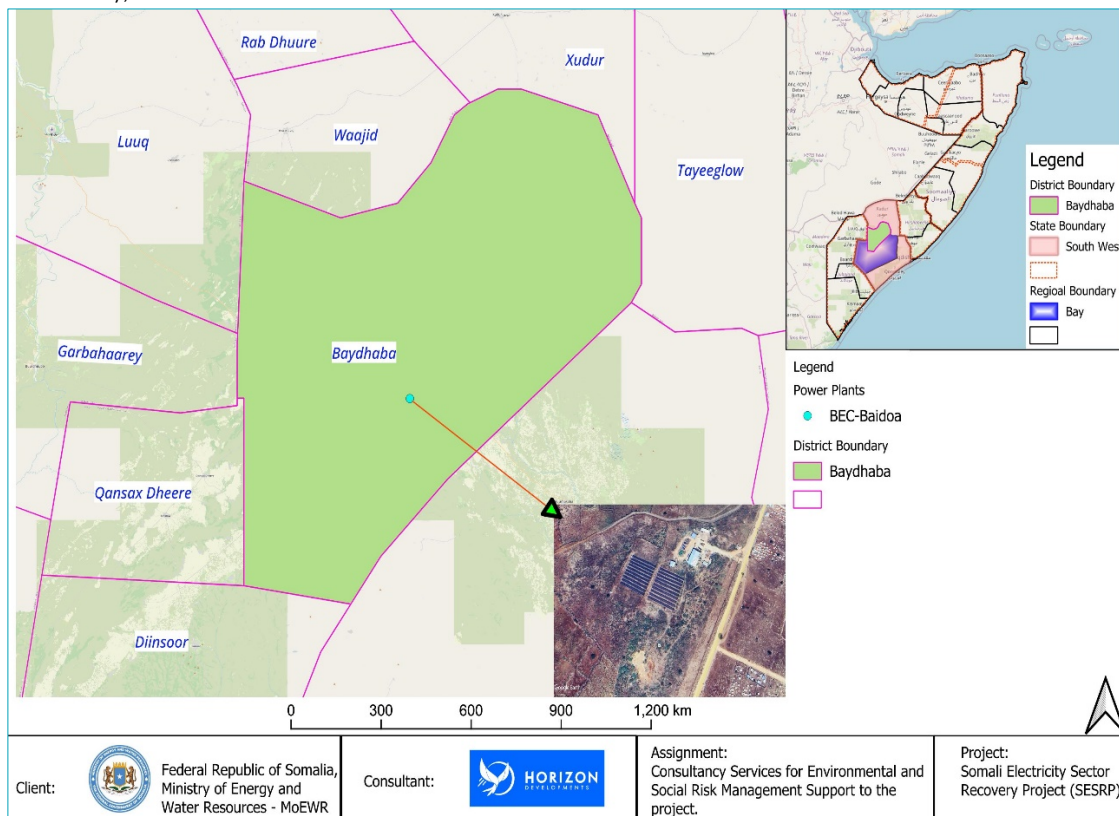


Figure 2-2(b): Boundary descriptions for the proposed hybrid power plant



Source: MoEWR (2024). Technical due diligence and proposed design report, BECO, Baidoa

2.3. PROJECT SITE AND SURROUNDINGS DESCRIPTIONS

Consultations with the local community indicated that the land is solely owned by BEC-BAIDOA and has been acquired legally through willing seller-willing buyer arrangement. No objections were raised by the community in regard to acquisition of the land by BEC-BAIDOA for the development of the power plant. There was no evidence of the community using the area for watering their livestock. Pockets of vegetation comprising mainly of *Acacia-commifora* bushes were observed with little to no grass.



Plate 2. View of pockets of *Acacia-commifora* bushes observed during field visit at the project site



Plate 3. Aerial view of the existing power plant and the surroundings

Land use in Baidoa and its surrounding areas is predominantly characterized by pastoralism, subsistence agriculture, and informal settlements, reflecting the region's reliance on natural resources for livelihoods. The rangelands are extensively used for livestock grazing, a cornerstone of the local economy, though overgrazing has led to degradation in some areas. Smallholder farming, primarily rain-fed, is practiced on arable land, producing sorghum, maize, and other staple crops, but is highly vulnerable to erratic rainfall and droughts. Urban expansion in Baidoa has resulted in increased informal settlements, driven by population growth and a significant influx of internally displaced persons (IDPs), often leading to unregulated land use. Additionally, deforestation for charcoal production and fuelwood is a major land-use activity, contributing to environmental challenges such as soil erosion and reduced vegetation cover. These dynamics underscore the need for sustainable land management to balance economic activities with environmental conservation. The major land uses near and around the proposed project site include an IDP camp (located approximately 2km away from the proposed site).

2.4. DESCRIPTION OF THE PROPOSED POWER PLANT

2.4.1. Overview

The feasibility study for the proposed project undertaken by MoEWR showed that BEC-BAIDOA is the only electricity services provider in Baidoa City is a leading electricity service provider, especially in the northern sector of Baidoa City. As at October 2024, the company had a customer base of 24,536 comprising of households (82.70%), small and medium sized businesses (3.17%), commercial and industrial (0.57%), public institutions (1.18%), social institutions (0.37%) and street lights (12.02%). There is an increasing number of large-scale consumers whose demand levels are determined after comprehensive surveys are done. Given the increasing electricity demand in Baidoa City and the surrounding areas, BEC-BAIDOA needs to increase its production capacity from the current 8.648MW from gensets and solar PV to 22MW. Currently BEC-BAIDOA uses both analogue and digital metering systems but is increasingly investing in smart metering systems.

Under the proposed new hybrid power plant, BEC-BAIDOA will require a new Supervisory Control and Data Acquisition (SCADA) system to control and monitor the operations of the plant. The new SCADA system shall be able to give preference to the generation sources to supply the load in the order of priority starting with

solar PV (first priority), batteries (second priority) and diesel generators (third priority). Our preliminary analysis indicates that ESS5, ESS6 and ESS7 will not be triggered by the proposed investment in the new site.

ESS8 may be relevant to a project, especially during construction. If a chance find triggers WB-ESS8, immediate measures should be taken to protect cultural heritage. Construction activities should be halted near the find, and a heritage specialist should be engaged to assess its significance. The project team should inform authorities and local communities about the discovery, ensuring transparency and legal compliance. A protocol for future chance finds should include training for construction personnel to recognize potential artefacts or heritage sites. Overall, it would be important that the project complies with ESS1, ESS2, ESS3, ESS4, ESS8 and ESS10 guidelines during all the project phases from construction, and operation to decommissioning. In addition, compliance with the Federal State of Somalia and state laws for SWS need to be complied with in this new venture. On the basis of the feasibility study, the proposed project is category B as per the World Bank guidelines, and as such required environmental and social impact assessments.

2.4.2. Proposed Power Generation Capacity

From the feasibility study analysis, scenario 2 of 50% REF (i.e., 13.35MW) has been recommended for detailed design. Given this scenario selection, the proposed location will be adequate to accommodate the proposed installation. Based on this analysis and from the environmental and social impacts perspectives, HD concluded and recommended that the proposed adjacent site to the existing power plant would be ideal for the planned investment to meet the required expectations of boosting production capacity.

A hybrid power plant consisting of solar PV and battery storage is proposed for the WB financing. The total proposed capacity, which the SESRP will invest, are as follows: 5.35MW (Solar Photovoltaic); and 4MW (Battery energy storage systems (BESS) - the lithium ion storage systems), and 4MW genset. However, the project financing will not be focusing on any kind of generators. The power plant is expected to operate for a period of twenty-five (25) years, after which it shall be decommissioned. The design for power evacuation and transmission from the proposed new power plant has been completed, and will be implemented as outlined in Table 2-1. Generally, the system will be modular, so that it can be upgraded easily to meet future demand needs. The proposed power plant will be configured as AC coupled due to the significant portion of daytime loads that can be fed directly from the solar PV generator without intermediate battery storage.

Table 2-1: Summary of medium and low voltage lines, service drops and metering systems for the proposed project

Medium Voltage (MV) Line		Item	Description	Unit	Values
		1	Medium voltage	Volts	11kV
		2	Length of medium voltage line	KM	30
		3	Size of the step-up transformer at the power station	KVA	2500
		4	Number of step-down transformers	No.	27
		5	Sizes of step-down transformers	VA	315KVA - 3No.; 200KVA - 24No.
		6	Total capacity of step-down transformers	KVA	5,745
		7	Types of poles		Concrete poles, locally made
		8	Height of the poles	Meters	12
		9	MV line protection		Fuse at the transformers, surge arresters and earthing
Low Voltage (LV) Line		Item	Description	Unit	Values
		1	Low voltage	Volts	400V for 3 phases; 240V for 1 phase
		2	Length of low voltage line	KM	Unknown
		3	Size of the conductor for the LV trunk lines	sq.mm	100
		4	Size of the conductors for the LV lateral lines	sq.mm	50, 35, 25 and 16
		5	Type of the conductors		Aluminium ABC cables
		6	Types of poles		Steel poles and concrete locally made
		7	Height of the poles	Meters	9
		8	LV line protection		Fuses at the transformers LV side, surge arresters and earthing
		Item	Description	Unit	Values

Service Drops	C.	Service Drops		
	1	Low voltage	Volts	400V for 3 phases; 240V for 1 phase
	2	Length of service drop cable	Metres	Less than 20 metres
	3	Size of the conductor for the service drop	sq.mm	Minimum 16
	4	Type of the conductors		Aluminium ABC cables
	6	Types of poles		Steel poles and concrete locally made
	7	Height of the poles	Metres	9
	8	LV line protection		Fuses at the transformers LV side, surge arresters and earthing
Metering	Item	Description	Unit	Values
	D.	Energy Meters		
	1	Voltage rating of the meters	Volts	400V for 3 phases; 240V for 1 phase
	2	Current rating of the meters	Amps	100A for direct meters and few CT meters for large scale businesses
	3	Type of meters		Digital meters but not smart
	4	Payment method		Post-paid meters
	6	Meter ownership		Customers buy the meters
	7	Calibration of the meters		BECO tests the meter for accuracy by connecting the meter in parallel with BECO's standard meter
	8	Meter reading		Done manually

2.4.3. Architecture and Basic Design Specifications

This hybrid power generation site is projected to generate 9.35MW from renewable energy, and a further 4MW for which BEC-BAIDOA will invest in diesel generators. BEC-BAIDOA has experienced significant growth customer growth of 4% per annum, and fifth year from 2024 (i.e., 2029) the customer base is projected to rise to 31,125 (Table 2-2). This growth is significant given that on average, BEC-BAIDOA connects 160 new customers per month, translating to 1,920 new customers per annum.

Table 2-2: Projected patterns of BEC-BAIDOA customer base growth in the next five years (2024-2029)

Customer Category	No.as at July 2024	%	Barwako	Year 1	Year 2	Year 3	Year 4	Year 5
Households	20,291.00	82.70%	3,150.00	3,150	812	812	812	812
SMEs	777	3.17%			31	31	31	31
C&Is	139	0.57%			6	6	6	6
Public Institutions	289	1.18%			12	12	12	12
Social Institutions	90	0.37%						
Street lights	2950	12.02%						
Totals	24,536.00	100%	3,150.00	3,150	859	859	859	859
			Total Customers	27,686	28,545	29,405	30,265	31,125

Source: MoEWR (2024). Technical due diligence and proposed design report for BEC-BAIDOA Hybrid Power Plant, BAIDOA, Somalia

The proposed mini-grid installations will be built to comply the International Electro technical Commission (IEC) standards. It will have an installation of solar panels and BESS. The solar panels will have a connection to the batteries through underground cables. The proposed standby generator will also be connected to the system as a backup. The goal of the hybridization of diesel systems is to reduce fuel consumption by switching off diesel generator set(s) for several hours a day, in order to reach a PV energy, share in the final mix of at least 60% or more. It is estimated that the proposed renewable energy investment will lead to a significant reduction in carbon emissions (Table 3-3). The PV plant and the battery capacity will be sized according to the daily demand and the solar resources. In addition to this Design architecture, the project site shall have a site office that shall also have a Control Room adjacent as well as a guard house.

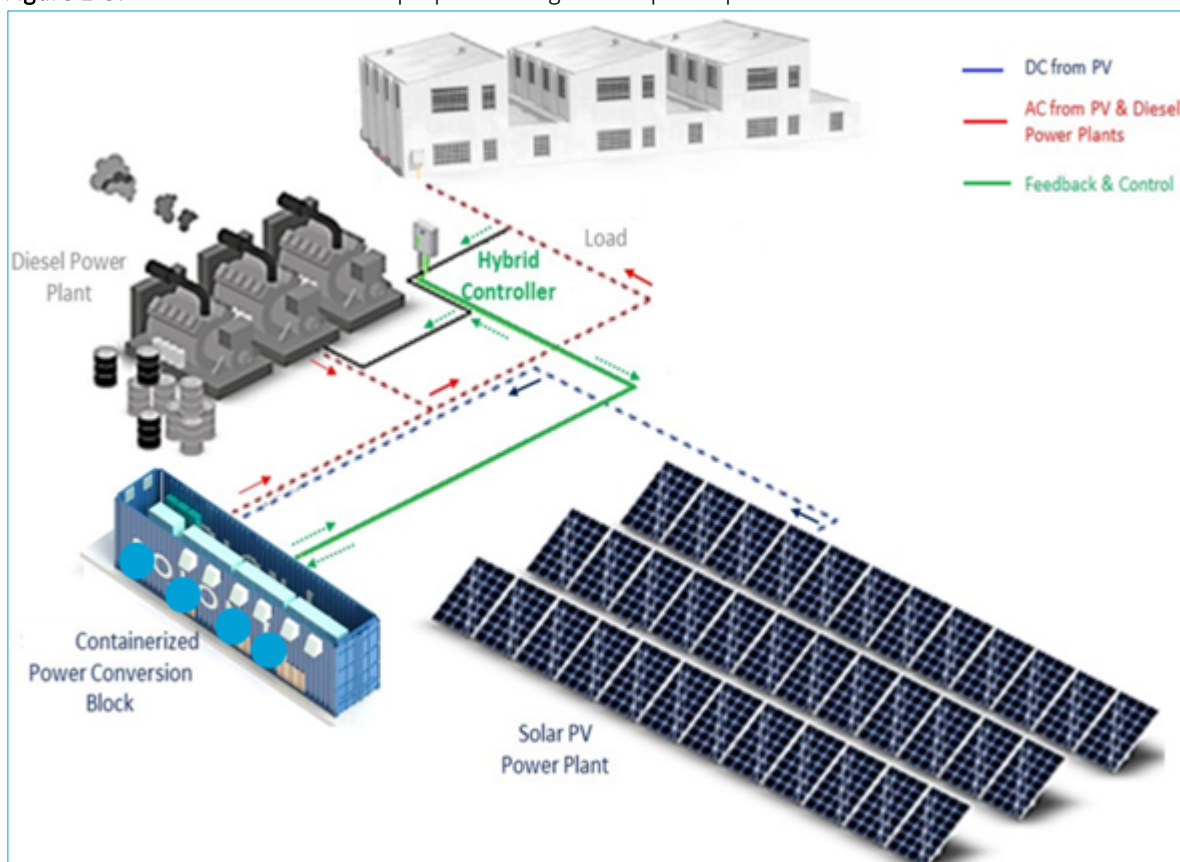
The Solar PV hybrid system will be based on a centralized photovoltaic plant connected to a 3-phase 400V AC busbar line, where the multi-mode battery inverter and the diesel generator are also connected. The plant is configured such that a significant portion of daytime loads is fed directly from the solar generator (grid-tie inverter) without intermediate battery storage usage. The Hybrid Power Plant will also be equipped with a Diesel Generator to be used as reserve power. Under this design arrangement, the diesel generator switches on automatically whenever the battery state of charge reaches a certain defined DOD (Depth of Discharge).

The diesel generator will be equipped with automatic start-up function controlled by the battery inverter charger. Figure 2.3 illustrates the preliminary design of the proposed BEC-BAIDOA Hybrid Power Plant.

Table 2-3: Projected reductions in carbon emissions gained from the proposed investment

Year	Year 0	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Total
Daily Demand (KWh)	26,728	32,995	34,064	35,133	36,202	37,271	38,340	
Daily PV contribution (KWh)		26,081	25,820.59	25,560	25,299	25,038	24,777	
Daily Diesel Contribution (KWh)		6,913	8,243.15	9,573	10,903	12,233	13,563	
Daily Litres Displaced		7,381	7,307.23	7,233.42	7,159.61	7,085.79	7,011.98	
Annual Litres Displaced		2,694,078	2,667,137	2,640,196	2,613,256	2,586,315	2,559,374	15,760,357
Daily Tonnes of CO2 Avoided		70	69	68	67	67	66	
Annual Tonnes of CO2 Avoided		25,418	25,163	24,909	24,655	24,401	24,147	148,693

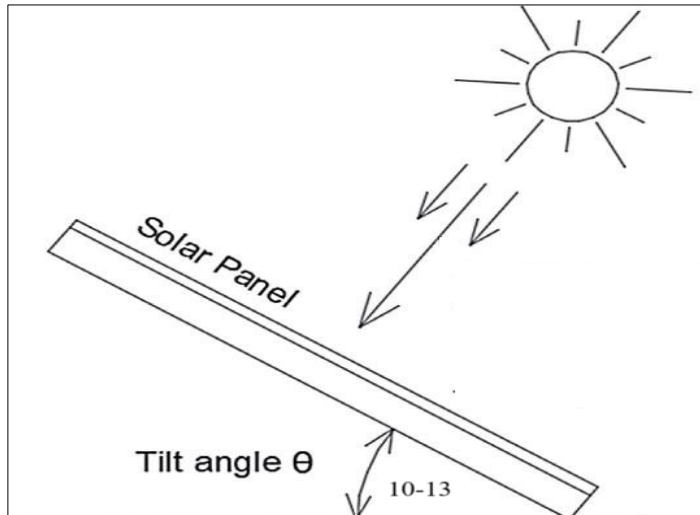
Figure 2-3: Illustration sketch of the proposed design of the power plant



2.4.4. Placement of the Solar PV Arrays

The PV array module support structure shall be ground-mounted on arid soil with a base made of concrete. The support shall have a tilt angle between 10°-13° from the horizontal (Figure 2.4). The support frame shall be of either lightweight aluminium or galvanized steel and it shall be easy for installation, maintenance and disassembly at the end-of-life cycle. Cables used within the PV generator shall have a voltage rating; have a temperature rating higher than 40°C above ambient temperature; they will be UV-resistant; water resistant and it is recommended that they be flexible (multithreaded) to allow for thermal/wind movement of modules. The PV inverter shall be of type current source grid-tied to convert DC to an AC Sinusoidal current. String inverters shall be installed indoors or outdoors with a cover and suitable for desert conditions with high ambient temperatures and dust.

Figure 2-4: Illustration sketch of the proposed tilt angle of the solar panels placement at the power plant



2.4.5. Powerhouse

The battery, multi-mode inverter, and all monitoring equipment will be put indoors with appropriate air ventilation per the manufacturer's specifications. Thus, a powerhouse or a containerized solution must be installed in accordance with the equipment manufacturer's requirements. All electrical boards and LV protection systems will be installed indoors.

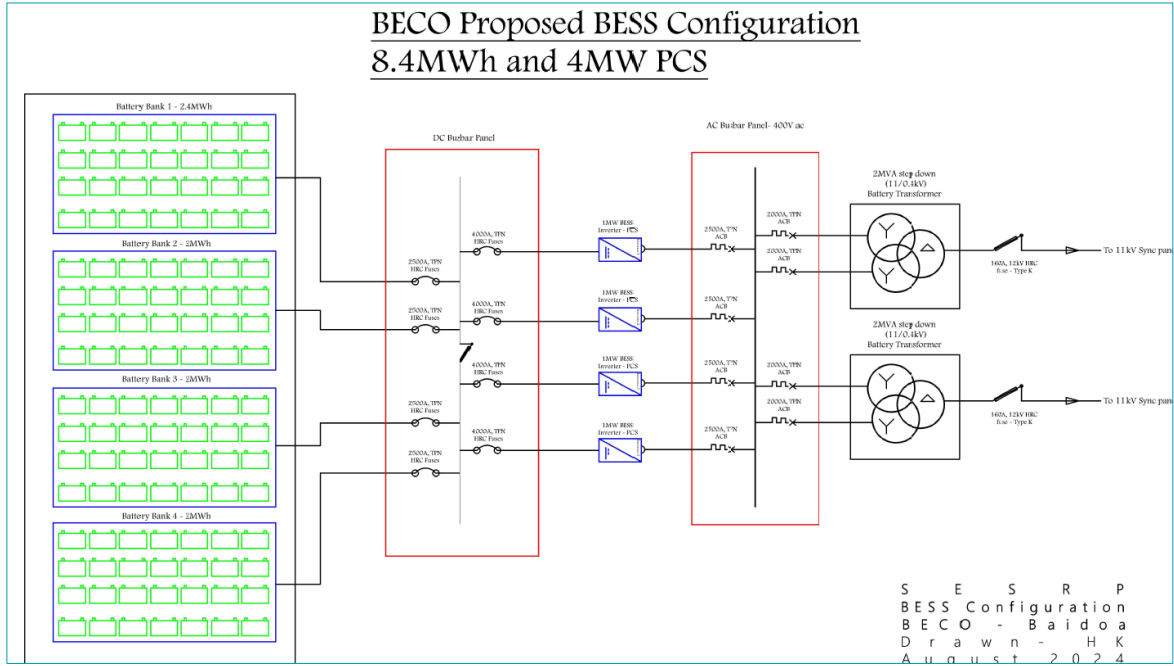
2.4.6. Multi-mode Inverter

The priority function of the Multi-Mode Inverter shall be to adjust the instantaneous power consumed from the source according to the battery voltage. The operation of the solar priority function shall be done with an automatic adjustment algorithm of the input limit current. The input limit current is decreased, if there is enough energy available at the DC side, from the initial value.

2.4.7. Battery

The battery considered is lithium ion battery technology and will be configured as shown in Figure 2-5. Lithium-ion batteries, have longer lifetime, are lighter and smaller. The battery nominal voltage does not need to be established at this stage as different technology providers may offer different solutions on this issue. Nevertheless, it must be noted that the voltage class, either ELV or LV, will determine the electrical isolation and accessibility requirements of the battery room. The battery shall have at least a rated capacity of 2.16V at the C10 discharge rate according to DIN 43539-9. The battery shall have a self-discharge when new of less than 5% per month (at 25°C and fully charged) of its rated capacity and shall have a Coulombic efficiency of at least 85% and energy conversion efficiency of at least 85% when new and charged to more than 50% of capacity. The battery cycle life for discharge/charge regular cycles down to 80% DOD shall be more than 1500 cycles (According to IEC 896-1).

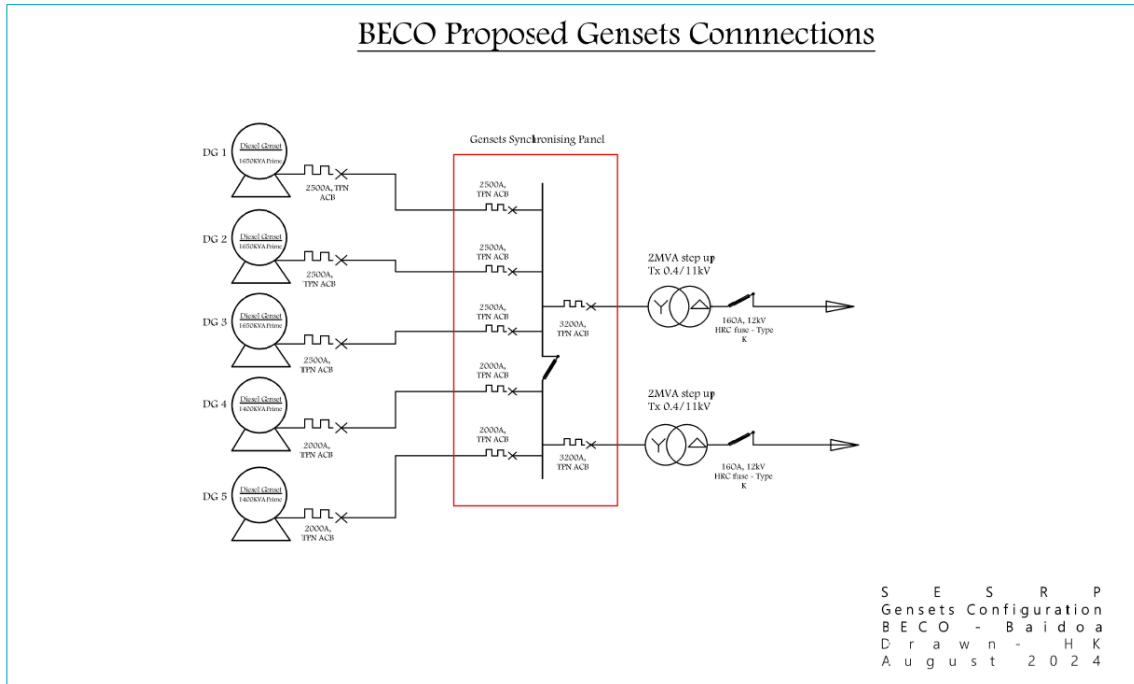
Figure 2-5: Illustration of proposed battery configuration at the proposed power plant



2.4.8. Diesel Genset

The Diesel Generator Set shall have a capacity of 4MW. The proposed Diesel Genset shall be suitable for indoor or outdoor installation and shall perform accordingly with Multi-mode Inverter, and will be configured as shown in Figure 2-5. The Diesel Genset shall work in a fully automatic manner. There will also be an external reserve fuel tank with a capacity of approximately 2000 litres. The selected diesel generator shall have a noise rating of not more than 75dBA @ 1 meter at 75% load under free field conditions. The generator sets will have a high-quality noise absorbent and fire-retardant grade acoustic insulation material.

Figure 2-6: Illustration of proposed genset configuration at the proposed power plant



2.4.9. Power Evacuation and Distribution

The electricity distribution from the generation plant to the end consumers will be done by means of a medium (33kV) and low (11kV) transmission line (TL) that will be linked to the current BEC-BAIDOA Hybrid Power Plant located in BAIDOA City before eventually being distributed to the consumers. All lines shall be over-head mounted on concrete poles or eco poles. BEC-BAIDOA will seek way leaves for the TL lines, which will run along road reserves and boundaries from the new power plant to the existing BEC-BAIDOA sub-station. A right of way (RoW) of between 3 and 5m would be appropriate for low and medium voltage transmission lines. Recommended safety measures for 33kV power transmission lines include maintaining appropriate clearance distances to ensure public safety and reduce the risk of electrical hazards. Way leave standards typically mandate a minimum horizontal clearance of upto 10m from the center of the transmission line to the nearest structure or vegetation. Every possible measures will be taken to ensure that the the existing and new TL do not trigger ESS5. For safety, lines should be well-marked, protected by grounding systems, and equipped with appropriate warning signs. Regular inspections and maintenance are essential to identify potential hazards like encroaching vegetation or structural damage, while public education on staying clear of power lines enhances overall safety.

2.5. THE PROJECT SITE

2.5.1. Site Ownership

The proposed works will be carried out on over 20 ha piece of land located adjacent to the existing BEC-BAIDOA powerplant in the southwestern outskirts of Baidoa City. The proposed project site is under the legal ownership of BEC-BAIDOA. No compulsory land acquisition, displacement or resettlement shall be conducted.

2.5.2. Access to the Project Site

It is proposed that the power plant shall have one access road. BEC-BAIDOA is linked to the central business district of Baidoa City through an all-weather road towards the southwestern outskirts. It is recommended that BEC-BAIDO undertake to maintain the road during the entire project period.

2.6. PROJECT ACTIVITIES

A contractor chosen through a bidding process will complete the final design and construction of the power plant. BEC-BAIDOA and MoEWR will supervise construction to verify that all work is completed according to specifications. This is to ensure that excellent work is completed. It is anticipated that the proposed site will be modified during construction to accommodate the power plant and associated structures. This project's tasks include site clearance and levelling, civil works and construction of utilities and structures for the facilities, as well as the installation and connection of the power plant.

2.6.1. Construction Phase Activities

All construction activities, including ground preparation, earth moving, material delivery, building, walling, roofing, and the installation of amenities (power, water, communication equipment, etc.) and fittings (doors, windows, safety provisions, etc.), will be carried out by competent personnel obtained through contractors to ensure a consistent high standard of finish and excellent value for money.

2.6.1.1. Outline of the construction activities

Construction activities will involve the following:

- The contractor shall perform site investigations in good time to ensure appropriate designs and construction is done on a sound engineering basis.
- Site preparation (ground-breaking, clearance of vegetation, preparation of a site office and stores, fencing to avoid intrusion)
- Disposal of any soil that could is not required, excavations/earth moving, filling and foundation laying
- Procurement of construction materials and delivery of the same to the site
- Storage and utilization of materials
- Civil, mechanical, and electrical works
- Building works, trampling and removal of construction wastes

- Construction of fuel storage tank
- Installing of containerized generators
- Piping of fuel lines
- Cabling
- Installation of the solar panels
- Completion of the plant
- Post construction clean-up, restoration and landscaping of site
- Load testing
- Remedying of defects after functional tests
- Solid waste collection and commissioning of the plant.

During construction, the contractor shall observe safety and shall erect warning signs to warn on any potential hazards, ensure proper and efficient use of Personal Protective equipment (PPE) for all on site and observe safe work procedures.

2.6.1.2. Construction materials, equipment and services

All materials that will be used in construction of this project shall be of high quality in line with the international standards. Sufficient materials and equipment shall be purchased and stored on site to avoid wastage.

2.6.1.3. Input materials and equipment & machinery

Works and construction activities are expected to use quality construction materials and procedures to ensure quality work, occupational and public safety and environmental protection. The following inputs and equipment will be required for construction:

- Welding machines, wheelbarrows
- Water
- Timber (e.g., doors and frames, fixed furniture, etc.),
- Solar panels
- Sand
- Raw construction materials (sand, cement, natural building stone blocks, hard core, gravel, concrete among others).
- Poles
- Plumbing equipment
- Paints, solvents, whitewash, etc.,
- Meters
- Lorries
- lightning arrestors and steel structure members
- Labour force (of both skilled and unskilled workers).
- Hardcore
- Glass
- Generator sets,
- Fuels (diesel)
- Excavators
- Electrical equipment
- Conductors
- Concrete mixers
- Bus bars, switch gears, circuit breakers
- Building stones

2.6.1.4. Use of services and resources

- *Water:* Water is key in the construction of this project. Water will be required for potable use and in the construction of the foundations for the control room, guard house and any other works. The contractor

will source water from elsewhere rather than the community water resources. One key option would be for contractor to sink a borehole to supply water during all phases of the project – construction, operation and decommissioning phases. The water demand during construction activities is not expected to be significant, and will mainly be used for sanitary support services (especially for workers), cleaning, palliating soil piles to suppress dust, drinking, amongst others. On average, cleaning solar panels typically requires about 2-4 litres of water per panel. For the proposed 5.35 MW solar farm, the number of panels can vary based on the panel specifications, but a rough estimate can be made. For example, the capacity of the panels proposed of 570w mono facial solar panels would will translate to about 9,386 panels (5,350,000 watts / 570 watts per panel) translating to approximately 32,850 litres per cleaning session. The water demand for a 4MW generator set (genset) will depend on several factors, including the type of generator, cooling system design, and operational conditions. However, for a diesel genset, the water demand for cooling typically ranges from 1.5 to 2.5 litres per kWh produced. Using an average water consumption of 2 litres per kWh, the estimated water demand for a 4MW genset operating continuously could be around 13,000 litres per hour or approximately 312,000 litres per day.

- *Labor:* The size and the composition of the workforce will be at the discretion of the contractor(s). The contractors will adhere to all the relevant employment legislations in the SWS and FGS, and ensure compliance with the World Bank’s ESS2. It is recommended that the contractor seeks unskilled labour from the surrounding areas.
- *Sewerage:* A negligible sewerage flow is anticipated for the duration of the construction period. On site, use will be made of toilets that will be serviced periodically.
- *Electricity:* Electricity will be essential for the proposed project during both construction and operation. The contractor will have to have a portable generator during construction for fabrication and welding where necessary with BEC-BAIDOA will provide electricity for operations.

2.6.1.5. Construction supervision and safety

Throughout the construction phase, supervision shall be carried out by the BEC-BAIDOA preferably through appointed supervising consultant to ensure:

- Workers use personal protective equipment (such as hand gloves, helmets, safety shoes, earmuffs, overalls and dust coats) at all times as is appropriate.
- Motorized equipment is checked to ensure that they are in good working condition, safe to use and produce minimal noise levels and reduced smoke emission.
- Provision of first aid kit and firefighting equipment (portable cylinders) and placement at strategic positions for access.
- Proper disposal of waste material and toilet facilities are provided for construction workers.
- Emergency response procedures are in place and all workers are aware of them like in case of fire.
- Any work involving deep excavations, elevated heights and lifting heavy loads, poses a number of risks to personnel. The contractor shall develop a worksite plan before commencement of each of the construction. This will ensure that personnel are equipped with the correct protective clothing and equipment and are ready to work safely while also safeguarding the environment.
- Workers shall be provided ablutions facilities and changing rooms.

2.6.2. Operation Phase Activities

The power plant shall be operated and maintained by BEC-BAIDOA. During operation phase of the project, no unauthorized person shall access the power plant. This is in line with BEC-BAIDOA policy to ensure safety of staff and the public. Routine maintenance will be done under supervision by authorized staff from BEC-BAIDOA. Throughout the project life, the BEC-BAIDOA shall adhere to all requirements of EHSG guidelines and any other applicable legislation in the FRS.

2.6.3. Decommissioning Phase Activities

BEC-BAIDOA shall submit a decommissioning plan to relevant authorities in the SWS and FRS in good time prior to decommissioning. The decommissioning plan should include a restoration plan. At the decommissioning/demolition phase, the following activities will take place;

- Removal of Solar panels and Diesel Generator and their associated switching equipment’s;

- Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power plant is to operate for 25 years, a replacement plan will be implemented to ensure continued functionality. This shall include procuring and installing new batteries or upgraded storage technologies, safely recycling or disposing of expired batteries in line with environmental regulations, and allocating funds for the replacement. Battery replacement shall be coordinated with routine maintenance to minimize downtime. Additionally, this shall present an opportunity to adopt newer, more efficient technologies that could enhance the plant's performance for the remainder of its operational life;
- Removal of electrical fittings, bus bars and steel poles/structures;
- Demolish and carefully handle components that contain oil and fuels like the Diesel generators;
- Ensure proper handling of the demolished materials and have an authorized and guided transportation and disposal away from human settlement, water bodies and wildlife conservation areas;
- Demolish and remove all the concrete works.

3.0. Policy, Legal and Regulatory Framework

3.1. OVERVIEW

This section gives the legal and regulatory framework relevant to the proposed project. Owing to FRS's protracted political instability over the last few decades, there has been the general lack of well-developed environmental laws and administrative frameworks. As such, environmental and natural resources management matters have over the years been managed in accordance with the existing statutes in place. However, FRS is moving towards strengthening its environmental management systems. For instance, a draft environmental and social impact assessment and audit regulations has been finalized¹¹. Despite the recent constitutional reforms that define natural resources, common environmental goods, and ecosystem services as protectable public assets and declare the right to a clean and healthy environment, there are still significant gaps in the implementation of environmental legislation in the FRS. On the basis of our evaluation, the following laws and regulations will apply in the implementation of the environmental and social risk management for the project:

3.1. NATIONAL LAWS AND REGULATORY FRAMEWORK

3.1.1. Provisional Constitution of Somalia

The Provisional Constitution of Somalia, which was ratified in 2012, emphasizes the value of safeguarding the environment and managing the country's natural resources, particularly in Articles 25, 44, and 45 (which deal with the environment, natural resources, and land, respectively). Relevant provisions include:

- Article 25 guarantees Somali citizens' rights such as a share of the nation's natural resources, protection from excessive exploitation, a healthy environment, and protection from pollution and harmful materials.
- Article 44 mandates the federal government to prioritize environmental protection, conservation, and preservation, preventing harm to natural biodiversity and the ecosystem.
- Article 45 encourages the Somali people to actively participate in the development, execution, management, conservation, and protection of natural resources and the environment.

The Constitution provides for the protection of workers' rights, non-discrimination, human rights promotion, and defence against gender discrimination and GBV in the workplace. Articles 11 ("Equality"), 14 ("Slavery, Servitude, and Forced Labour"), 15 ("Liberty and Security of the Person"), 24 ("Labour Relations"), and 27 ("Economic and Social Rights") contain important clauses.

- According to Article 11, "all citizens shall have equal rights and duties before the law, regardless of sex, religion, social or economic status, political opinion, clan, disability, occupation, birth, or dialect." In addition, it says that "even if the actor did not intend this effect, discrimination is deemed to occur if the effect of an action impairs or restricts a person's rights." It further states that no one shall be subjected to discrimination by the official on the grounds of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, handicap, religion, political opinion, occupation, or wealth and that this prohibition applies to all official programs.
- "A person may not be subjected to slavery, servitude, trafficking, or forced labour for any purpose," according to Article 14.
- Every person has the right to physical integrity, security, and personal liberty, according to Article 15. "The prohibition of all forms of violence, including any form of violence against women, torture, or inhumane treatment" is one of the provisions that falls under this category.
- Article 24 states that "all workers, particularly women, have a special right of protection from sexual abuse, segregation, and discrimination in the workplace." It also enshrines everyone's right to fair labour relations. All labour laws and practices must adhere to the principle of gender equality in the workplace. It also guarantees every worker the freedom to organize and become a member of a trade union, to go

¹¹Ministry of Environment and Climate Change (2024). Final draft environmental and social impact assessment and audit regulations. Ministry of Environment and Climate Change, Mogadishu, Federal Republic of Somalia.

on strike, and to negotiate collectively with employers, trade unions, and employees on labour-related matters.

- Every person's access to clean, drinkable water, healthcare, social security, and the realization of their constitutional rights is upheld by Article 27. Additionally, it says, "It shall be ensured that minorities who have long faced discrimination, women, the elderly, and people with disabilities get the necessary support to realize their socio-economic rights."

Relevance

The proposed project complies with the Provisional Constitution of Somalia by proposing mitigation measures on how to deal with the social, health, safety and environmental issues for sustainable development. Additionally, the proposed project aims to produce clean and reliable electricity that will enhance the FRS objectives of reducing global warming through a reduction in greenhouse gas emissions in electricity generation.

3.1.2. Federal and State Regulations on Environmental, Health, and Safety

Somalia is currently developing its environmental laws and policies. A National Environmental Policy created by the FGS was accepted by the Cabinet on February 13, 2020. On November 26, 2020, the Cabinet adopted the National Environmental Act after it had been drafted. To be effective, both documents must be authorized by the Parliament. Their adoption has no set schedule in place. Environmental Quality Standards, Sectoral Environmental Assessments, Environmental Impact Assessments, and Environmental Audits are among the national environmental policies, regulations, and laws that must be drafted at the federal level by the MoECC that has formed an ESIA council to help with the coordination of ESIA activities and operations in the FRS. Overall, there is concurrence at the national and state levels that the international standards and best practices in compliance with the WB-ESS should serve as a foundation for conducting the ESIA.

Relevance

The MoEWR (the proponent) including the contractors will be required to fully comply with the environmental and quality standards as per the draft national environment act. The proponent and the contractors engaged in the project will:

- *Develop and implement a formal construction health and safety plan.*
- *Constitute health and safety committee to oversee safety and health during the construction and operation phases of the project.*
- *Ensure that the workers exposed to hazards and or accidents undergo requisite medical examinations.*
- *Ensure that equipment is serviced properly and/or use of the equipment complies with the threshold noise values provided in the EHS guidelines*
- *Carry out, and record, a fire risk assessment identifying any possible dangers and risks, and where possible remove, the risk of fire and take precautions to deal with the remaining risks.*
- *Develop and implement an emergency preparedness and response plan (EPRP) to be applied during the construction and operation phases of the project.*
- *Implement mitigation during construction to ensure neighbouring properties are not impacted by nuisance dust.*
- *Observe any existing provisions in the FRS on management of traffic of construction vehicles as guided by the ESMP.*

3.1.3. Somalia's Ninth National Development Plan

Somalia's ninth National Development Plan (NDP-9)¹², covering the period 2020-2024, identifies recurrent drought, climate change and environmental degradation as major causes of poverty and food insecurity in Somalia. The NDP-9 prioritizes environmental management, gender and social equity. It focuses on increasing energy supply, particularly from renewable sources, and energy market regulatory reform. Unregulated power production poses a major economic and environmental challenge, leading to high electricity prices and forest destruction. Access to energy is crucial for economic growth and poverty reduction, and the NDP-9 prioritizes investment in the energy sector and energy market regulation. Somalia intends to implement the Power Master Plan (PMP) with support from the World Bank, increasing the supply of renewable energy and establishing regulatory bodies to enhance market efficiency. The PMP highlights

¹²The NDP-9 is available here: <http://mop.gov.so/wp-content/uploads/2019/12/NDP-9-2020-2024.pdf>

the need to diversify energy portfolios and lessen reliance on fossil fuels while identifying supply-side issues such as inadequate capacity for the production of power. Particularly for women and young people, renewable energy can speed inclusive growth and create jobs.

Relevance

The proposed project supports the NDP-9 aims of increasing electricity generation capacity from renewable resources and reducing tariffs, thereby contributing to human and economic development.

3.1.4. Environmental Protection and Land Use Policy and Regulation

Somalia's environmental protection and natural resources are under limited federal oversight, with the National Environmental Policy and Act. A Climate Change Policy has also been developed. However, federal and state standards and regulations for environmental pollution prevention, waste management, water quality, air quality, and noise have not been formulated or approved. Land use policy and regulation oversight mechanisms are also lacking, with instruments like zoning and land use planning largely absent at federal and state levels.

Relevance

The proposed project will contribute to protection of the environment and climate change mitigation by increasing electricity generation capacity, especially by working towards focusing more on solar electricity production systems thereby reducing GHG emissions.

3.1.5. Labour and Employment Law

The Labour Code of Somalia (Law No. 65, adopted in 1972), governs labour and working conditions, including employment contracts, terms and conditions, remuneration, occupational health and safety, trade unions, labour authorities, and maternity leave. The code is currently being reviewed to align with the Provisional Constitution and International Labour Organization (ILO) conventions. The Federal Ministry of Labour and Social Affairs is reviewing the revised draft, which was finalized in February 2019 and awaits Parliamentary approval. The current Labour Code remains in effect until the revised code becomes law. The State laws on labour and employment are also under review to align them to the Provisional Constitution and ILO standards.

Relevance

- *The proposed project has an obligation to adhere to all the principles and tenets of the Labour Code (1972) pending any ongoing changes and amendments. The proposed project will adhere to the principles of the ILO conventions ratified by the Federal Government of Somalia (FGS), and the relevant provisions of the Provisional Constitution, when dealing with work and labour aspects during construction and operation phases of the project.*
- *The proponent and the contractors will be by the existing labour laws, including any amendments thereof, including abiding with all stipulations on employee management and relations in all the phases of the project.*
- *The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize for pre-employment and regular medical examinations for staff during construction and operation phases of the project.*
- *The proponent and the contractor will sensitize workers against abuse and exploitation of children, and shall not engage in any child labour during all phases of the project.*

3.1.6. Policy and Law on Gender Equality and GBV

Gender Based Violence (GBV) remains one of the most serious threats to the health and safety of women and girls globally. The situation is dire in Somalia where women and girls are at more risk of rape, Intimate Partner Violence (IPV), early and forced marriage and FGM. The Somalia context is fraught with GBV and protection concerns, especially for women and girls¹³. For example, a recent study on GBV in Somalia¹⁴ found out that 18.5% of the women and girls in the IDP camps had experienced gender-based violence in the last 12 months.

¹³ file:///C:/Users/pc/Downloads/GBV%20Bulletin%20Apr%20-%20Jun%202018%20Final-1.pdf

¹⁴ Hassan, A.D., Mohamed M.D. & Bashir, S.H. (2023). Prevalence, patterns, and determinants of gender-based violence among women and girls in IDP camps, Mogadishu-Somalia. Journal of Migration and Health, Volume 8. <https://doi.org/10.1016/j.jmh.2023.100193>.

Further investigation into the nature of the violence revealed that 44.0% of the violence against women and girls were physical assaults, followed by psychological abuse (24.8%), forced marriage (18.8%), attempted rape (7.2%), rape (4.0%) and denial of resources (1.6%). The study showed that about half (57.7%) of that violence were committed by intimate partners or relatives, mostly (60.6%) during the daytime. Moreover, a little over half (57.7%) of the victims were over 20 years old, and 43.7% of them experienced assault more than once.

While there are no specific data on GBV in South West State, considerable progress has been made by the South West State in addressing the GBV. For example, legal and community-based measures aim to mitigate gender-based violence (GBV), especially for vulnerable women and girls affected by displacement and drought are under implementation. Legal efforts include the establishment of GBV response services, such as safe spaces for women and girls, which provide counseling and skill-building activities. Community mobilization campaigns also focus on GBV prevention and awareness, aiming to engage local communities in promoting protection practices. Furthermore, cash and voucher assistance (CVA) programs help provide essential resources to at-risk women, facilitating safer access to support through mobile money, which allows discreet aid distribution in remote areas¹⁵. These initiatives, supported by collaboration with the GBV sub-cluster and local humanitarian organizations, enhance GBV prevention while addressing socio-economic vulnerabilities that often exacerbate GBV risks in crisis-affected regions¹⁶.

Somalia's National Gender Policy (2016) has been approved by the Federal Council of Ministers. The Policy aims to promote gender equality and sustainable human development by valuing women and men's contributions in economic empowerment, education, health, and political transformation. The policy outlines gender priorities in health, education, economic empowerment, and political participation. Prioritizing rural areas, the policy focuses on creating economic opportunities for both genders, including vocational, entrepreneurs, and skills enhancement programs and training for women and men, including those with disabilities. The FGS has drafted the Sexual Offenses Bill (2017) with support from the UN, which has been tabled with the Parliament and is still under review. The pre-existing Penal Code (1962) includes some provisions relevant to addressing GBV, including criminalizing rape, but it does not provide an adequate legal framework for dealing with GBV cases¹⁷. In practice, most GBV cases are dealt with by the customary system.

Relevance

In the absence of appropriate measures, the project can exacerbate gender inequalities and sexual and gender-based violence. In adherence to this policy, measures will be put in place to ensure gender inclusivity in decision-making, employment opportunity and access to the energy generated by the project, and mitigate social risks including sexual and gender-based violence, and any form of discriminations.

3.1.7. Somalia's Power Master Plan, 2018

Developed by government of Somalia in coordination with the World Bank, the PMP seeks to create an enabling environment for independent power producers and the policy, legal and regulatory framework for the sector.

Relevance

The proposed project will be a forerunner for independent renewable power producers and will serve as a model for similar renewable energy plants in other locations in Somalia.

3.1.8. Energy Policy and Regulations

At the moment, Somalia lacks both an energy sector regulatory framework and an energy policy. However, the FGS has made the creation of an energy policy, strategy, and regulatory framework a top priority, in accordance with the NPD-9 and PMP, and a number of laws and rules are presently being developed. At the moment, the responsibility for managing the energy industry rests with the Federal Ministry of Energy and Water Resources (MoEWR). A draft Energy Policy was created by the MoEWR in 2018, and in order to give the industry a complete framework, they are currently working on an Energy Act and Regulations. Currently,

¹⁵ https://gbvguidelines.org/wp/wp-content/uploads/2021/08/Case-study_somalia_gbv_cva.pdf

¹⁶ https://somalia.unfpa.org/sites/default/files/pub-pdf/gbvie_brief_jan-march_2022.pdf

¹⁷ See UNDP, UN Women, and UNFPA, 2018. Somalia Gender Justice and the Law. Available at https://www.undp.org/content/dam/somalia/docs/Project_Documents/Womens_Empowerment/Gender%20in%20Somalia%20Brief%202022.pdf for a review of the Penal Code (1962) provisions relevant to GBV.

the World Bank, African Development Bank (AfDB), and United States Agency for International Development (USAID) are some of the main partners supporting the implementation of the PMP and providing technical assistance to the FGS in the energy sector. In the absence of regulations, standards and codes of practice, there is no mechanism to vet and enforce ESP services quality, health and safety standards. This is compounded by the limited capacity of federal and state institutions to develop, enforce and monitor the sector. Currently, the Federal and State MoEWR are mandated to issue operating licenses to power plant. However, there are no licensing guidelines and there is not yet any legal basis to regulate their operations once licenses are granted.

Relevance

- *The proposed project shall align its operations to the Somalia's Power Masterplan¹⁸ and ensure that they operate within the principles of the existing energy policy and regulations. The proposed project is relevant in the sense that it will provide sustainable and reliable energy supply, including applying measures to protect and conserve the environment during its construction and operation phases. MoEWR will work closely with BEC-BAIDOA to ensure the project complies with the current energy policy and regulations, and any amendments thereof.*
- *The proposed project is in line with the energy policy and regulations in the following ways: (i) the proponent (BEC-BAIDOA) has identified and designated a site for the proposed project, and the proposed project is aligned with the Somalia Power Masterplan. Additionally, and in collaboration with the MoEWR, there is technical capacity to undertake the project under SESRP.*

3.1.9. Somalia's Intended Nationally Determined Contributions (INDCs), 2015

The report notes that Somalia has vast untapped renewable energy resources, stating that average solar potential stands at 5-7 kWh/m²/day.

Relevance

The project will reduce GHG emissions, helping Somalia meet its Paris Agreement commitments.

3.1.10. Customary Legal System and Sharia law

Somalia's legal system comprises of civil law, sharia law, and customary law. The Provisional Constitution (2012) defines the country's federal structure and hierarchy of laws. The customary legal system in Somalia, known as the *xeer* system, is crucial for land rights and resource management due to weak formal regulation. This system governs property, enforces contracts, and resolves disputes. Despite variations across regions and clans, it is applicable in most of the country. The *xeer* system is compensatory, majoritarian, and uses clan insurance to protect against violations. Elders act as judges or mediators, considering precedent and custom.

The customary *xeer* system also handles most cases of sexual violence and GBV. The FGS and some Federal Member States are making efforts to reintroduce law courts, but the capacity of and trust in the formal justice system remains weak, and the customary system functions in parallel to state law. A number of customary practices go against basic human rights standards and serve to re-victimize GBV survivors, for example, crimes of rape are commonly resolved through the marriage of the victim to the perpetrator, and revenge and honour killings are tolerated¹⁹. Numerous cultural and institutional barriers limit women's access to justice, including fear of punishment, reprisals and harassment for reporting GBV incidents, and social stigma²⁰.

Relevance

- *The power plant is required to operate under the existing customary laws within the states where their projects are located. They are further expected to respect the existing customary laws in handling their relationships with all the stakeholders they engage in their areas of operation.*
- *The land proposed for the project has been legally acquired by BEC-BAIDOA under willing buyer-willing seller. Additionally, the land's tenure falls under customary land rights. BEC-BAIDOA will observe all the relevant provisions of the customary legal systems and sharia laws related to land management (as appropriate) in all phases of the project.*

¹⁸ https://moewr.gov.so/wp-content/uploads/2020/07/Master_plan1.pdf

¹⁹ See UNDP, UN Women, and UNFPA, 2018 for further discussion of how the customary system handles GBV cases as well as other barriers to access to justice for GBV survivors.

²⁰ UNDP, UN Women, and UNFPA, 2018.

3.2. South West State Laws and Regulatory Framework

3.2.1. Overview

South West State has several key environmental policies and frameworks in place. The Environmental Policy, produced in 2014 and approved by both the Cabinet and Parliament, serves as a foundational document. Additionally, the Environmental and Social Impact Assessment (ESIA) guidelines and regulations are supported by the South West Environmental Impact Assessment Act, which operationalizes the "Environmental Impact Assessment Unit" within the Ministry. This unit is headed by a Director of ESIA and includes a team of qualified professionals with specialized training in Environmental Impact Assessment. Their functions include: receiving, processing, and safeguarding all ESIA-related documents submitted to the Ministry, Reviewing and making recommendations to the Director General, and advising the Ministry on whether a proposed major project should be objected to or halted due to unacceptable environmental impacts.

The following are the relevant policies, laws, and regulations in South West State shall be applicable to the proposed project:

3.2.2. South West State ESIA Act and Regulation (2016)

The South West Environmental and Social Impact Assessment (ESIA) Act and Regulation (2016), approved by the Cabinet and Parliament, establishes a legal framework for assessing the environmental and social impacts of development projects in SWS. At the State level, the SWS Ministry of Environment and Tourism (MoE&T) manages environmental related issues and is the principal institution to be consulted on matters relating to possible environmental and social risks and impacts of development projects. The SWS MoE&T has confirmed that there are no State ESIA standards, policies and regulations currently in place. A draft SWS Environmental Code has been developed, but not yet approved by the SWS Parliament. The SWS MoE&T agrees with the approach of carrying out the ESIA based upon the IFC Performance Standards on Environmental and Social Sustainability (Performance Standards).

Relevance

The Act mandates that all significant projects, such as the power plant, undergo an ESIA to identify, evaluate, and mitigate potential environmental and social impacts before project approval. By following these regulations, the project ensures compliance with legal requirements, addresses potential environmental and social risks proactively, and promotes transparency and stakeholder engagement. This adherence helps to safeguard environmental quality and community well-being while supporting sustainable development goals in South West.

3.2.3. South West State Urban Land Management Law (2022)

The South West State Law No. 5 of 2nd February 2022 "Urban Land Management Law" (ULML), developed with the support of UN-Habitat is aimed at ensuring a systematic approach to urban land management and integrate urban land planning, sustainable land use, and land rights. The law harmonizes duties and powers of government institutions, private owners, communities, citizens, and other stakeholder with respect to land management and urban planning and sets up government mechanism and customary method to resolve land disputes. Additionally, it provides mechanism to protect displaced communities and urban poor from unruly evictions, and allocate suitable land for voluntary relocation. The law divides land governance functions between the FMS and the local authorities. The Ministry of Public Works of Southwest is responsible for harmonizing the town plans of all local authorities through the auspices of the Land and Urban Planning Office. The law also establishes the State Land Registry (Article 17), which compiles the "registration of all planned land transactions in towns and districts provided by local governments". Local authorities are responsible for land governance under this law. As Article 25 states, "the authority to grant land to a private person rests with the local government, no other government institution can claim the authority to grant land to a person or group." Local governments are also responsible for the creation of a system to "store information related to land and real estate" (Article 25, subsection c). Similarly, urban planning is the responsibility of the local government (Article 33)

Relevance

This law is highly relevant to the proposed hybrid power plant on the outskirts of Baidoa City as it provides a legal framework for sustainable land use, allocation, and urban development. The law ensures that land for the project is allocated transparently and equitably, reducing the risk of disputes and enhancing tenure security. It emphasizes

environmental sustainability and structured urban growth, which align with the clean energy objectives of the hybrid power plant. Furthermore, the law mandates stakeholder engagement and inclusive planning, which supports community acceptance and minimizes potential conflicts over land use. Compliance with this law ensures that the power plant project is legally grounded and contributes to Baidoa's orderly urban expansion while addressing critical energy needs.

3.2.4. Baidoa Integrated Community Action Plan

The Integrated Baidoa District Community Action Plan (CAP) is envisaged to help translate the NDP and SWS Strategic Plan priorities into actionable interventions. This CAP complements the traditional humanitarian focus on the affected individuals with a broader lens that considers the whole population of an existing urban system and tries to meet both short-term humanitarian and longer-term development needs of urban populations and their environments. To CAP consolidates the different action plans, which were developed for the cities over the course of the last years under the initiative of several durable solutions stakeholders. The Baidoa Consolidated CAP synthesizes the various projects aimed at advancing the achievement of durable solutions according to the eight criteria for durable solutions to displacement set out in the Inter Agency Standing Committee (IASC) Framework on Durable Solutions for Internally Displaced Persons.

Relevance

The CAP is highly relevant to the proposed hybrid power plant as it aligns with the plan's objectives of fostering sustainable development and improving living conditions for the community. The CAP emphasizes key priorities such as enhancing access to reliable energy, promoting environmental sustainability, and creating economic opportunities, all of which are directly supported by the hybrid power plant. By providing clean and affordable electricity, the project contributes to reducing reliance on expensive and polluting diesel generators, which aligns with the plan's goals for environmental health. Additionally, the project supports local job creation and capacity building, helping to address unemployment and economic vulnerability highlighted in the action plan. Integrating the power plant into the framework of the action plan ensures that it meets community needs and contributes to Baidoa's broader development objectives.

3.2.5: South West State Environmental Management Act (2016)

South West's Environmental Management Act (2016), approved by the Cabinet, provides a legal framework for the protection, conservation, and sustainable management of the environment in South West, Somalia. The Act establishes regulations for preventing environmental degradation and promoting responsible resource use across various sectors, including land, water, and forestry. It mandates environmental assessments for development projects, reinforces institutional responsibilities for environmental monitoring, and ensures compliance with environmental standards. The Act also fosters public participation, transparency, and accountability in environmental governance, aiming to balance economic development with the preservation of natural ecosystems and biodiversity in the region.

Relevance

This act mandates comprehensive environmental assessments and enforces regulations on waste management, pollution control, and the conservation of natural resources. For the hybrid power plant, it ensures that environmental impacts such as emissions, waste generation, and land use are thoroughly evaluated and mitigated. Compliance with this act is essential for obtaining the necessary permits and ensuring that the project adheres to South West's environmental standards.

3.3. THE WORLD BANK ESS AND GUIDELINES

3.3.1. World Bank ESS and Relevance to the Project

The World Bank currently emphasises system guidelines focusing Environmental Social Frameworks (ESF). The ESF supports green, resilient, and inclusive development by strengthening environmental and human rights protections, with an emphasis on labour, inclusion, gender, climate change, biodiversity, community health, and stakeholder involvement. It takes a risk-based approach, which allows for more monitoring and resources for complicated projects while encouraging adaptive risk management and stakeholder engagement. The ESF also focuses on developing national environmental and social management systems, enhancing borrower capacity, and encouraging openness and stakeholder participation through timely information disclosure, continuous consultations, and effective grievance processes.

The consultant also referred to all the latest environmental and social standards (ESS) with all the relevant guidance notes (GN) utilized by the World Bank for new projects. The aim of the evaluation was to examine if the proposed project triggered any other the ESS. Table 3.1 summarizes the ESS from the perspectives of triggers and relevance considering the outcomes from the present ESIA.

Table 3-1: The ESS triggers and relevance to the proposed Hybrid Power Plant

ESS	Triggered?	Relevance
ESS1: Assessment and Management of Environmental and Social Risks and Impacts	Yes	Compliance with ESS1 requirements will help the proposed project to minimize adverse environmental and social effects, and promote sustainable development outcomes. By commissioning this ESIA, the proponent is cognisant of the need to comply with the ESS1 requirements
ESS2: Labor and Working Conditions	Yes	Compliance with ESS2 requirements will help project ensure the well-being of workers, protect the health and safety of local communities, and minimize risks associated with project implementation.
ESS3: Resource Efficiency and Pollution Prevention and Management	Yes	The operation of the power plant may result in increased air emissions and waste generation throughout the project, as well as their potential impacts. Additionally, during construction and operation phases, different sets of materials will be used, and this would require prudent resource efficiency and waste management.
ESS4: Community Health and Safety	Yes	Predicated on the assumption that the proposed project and its associated activities such as power transmission, construction and the associated equipment and exposure to local community are expected to have potential hazards with impacts of different strengths on community health and safety. The proponent will be required to comply with all the provisions of ESS4
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	ESS5 ensures that any land acquisition or restrictions on land use for the solar plant are conducted in a manner that minimizes displacement and provides fair compensation and resettlement assistance to affected communities. By adhering to ESS5, the project proponents can mitigate social risks, ensure the equitable treatment of displaced persons, and align the project with international best practices for social sustainability. This helps in fostering community acceptance and reducing potential conflicts, thereby contributing to the overall success and long-term viability of the proposed solar PV project. However, this would only be possible once the transmission and access roads associated with the project are demarcated.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	No	Despite the proposed project being planned in a less modified area, it is still possible that the project could have impacts of different strengths on biodiversity. The proposed location is not known for any species listed in the IUCN Redlist. Additionally, there are no critical habitats within 5-km radius of the project site.
ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities	No	Predicated on the assumption that the project area has no indigenous people who may be affected by the project
ESS8: Cultural Heritage	Yes	Predicated on the assumption that there may be cultural artefacts or resources in the project area. It is acknowledged that these may be affected, particularly during the execution of civil works for new lines and hybridization activities. By adhering to ESS8, the project proponent will be required to engage with any affected communities, implement measures to avoid or mitigate impacts on cultural heritage, and ensure that any necessary alterations are conducted respectfully and in accordance with local and international guidelines. This not only preserves cultural heritage but also fosters positive relationships with local communities, enhancing the project's social license to operate.
ESS9: Financial Intermediaries	No	This standard will not apply because SESRP is fully funded directly by WB without involving financial intermediaries.
ESS10: Stakeholder Engagement and Information Disclosure	Yes	The proposed project, much like any other development initiative, encompasses stakeholders—individuals or groups with an interest in or potential impact from the project. It is crucial to furnish them with comprehensive information about the project, establish relationships, and provide an opportunity for them to offer feedback. Considering their interests and concerns during the planning and preparation stages is integral to fostering a collaborative and inclusive project environment.

3.3.3. Resettlement Policy Framework (RPF) for SESRP Projects

A resettlement policy framework report was prepared following World Bank ESS5 policy on involuntary resettlement. The RPF states that SESRP component 2 (SESRP, hybridization and battery storage systems for mini-grids) may require land acquisition. The Framework further seeks to avoid, manage, and/or mitigate potential risks arising out of damage to assets, disruption to work, temporary negative impacts on livelihoods and/or in the unlikely case of displacement. The RPF proposes guidelines to develop a Resettlement Action Plan (RAP) and propose an implementation framework for RAP to mitigate such effects. The RPF states that involuntary resettlement and land acquisition will be avoided where feasible, or minimized or compensated where it cannot be eliminated. Where involuntary resettlement and land acquisition are unavoidable, resettlement and compensation activities will be conceived and executed as sustainable development programs, providing resources to give people affected by the project (PAPs) the opportunity to share project benefits.

Relevance

While the project will not trigger ESS5, the Resettlement Policy (RPF) is still an important document as manages resettlement social impacts by consulting and compensating displaced persons, establishing guidelines for assessing impacts, designing mitigation strategies, and facilitating stakeholder engagement, promoting sustainable development and social equity. These will be critically important in the expected TL and the access road.

3.3.5. Comparison Between the World Bank and FGS Legislations Relevant to the Project

A comparison between the WB policies and the FRS law is presented in this section. The objective is to find out any gaps and propose a recommendation.

Table 3-2: Comparison between the key WB Environmental and Social Framework relevant to the project and the FGS legislations

World Bank ESFs	FRS laws	Comparison	Recommendation
ESS1 requires screening to determine level of environmental and social assessment to be done. An ESIA is prepared before project implementation ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts	<ul style="list-style-type: none"> The environmental law requires screening of project to determine level of environmental and social assessment to be done An ESIA is required once determination is done ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts 	<ul style="list-style-type: none"> Similar both require screening Similar-both require ESIA depending on the project impacts 	Screening has been done and the project is established as medium risk which requires and ESIA ESIA is prepared in line with ESIA regulations and refers to WB safeguard policies
ESS5 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives	<ul style="list-style-type: none"> Somalia's transitional constitution emphasizes that Land shall be held, used and managed in an equitable, efficient, productive and sustainable manner. The Federal Government shall develop a national land policy, which shall be subject to constant review. That policy shall ensure: (a) Equity in land allocation and the use of its resources; (b) The guarantee of land ownership and registration; (c) That land is utilised without causing harm to the land; (d) That any land and property dispute is resolved promptly and satisfactorily for all; (e) That the amount of land that a person or a company can own is specified; (f) That the land and property market is regulated in a manner that prevents violations of the rights of small land owners; and (g) That the Federal 	<ul style="list-style-type: none"> Similar- displacement in projects should be avoided to the extent possible by exploring alternatives. 	WB policy is more elaborate than the FRS Law.

World Bank ESFs	FRS laws	Comparison	Recommendation
	<p>Member States may formulate land policies at their level. No permit may be granted regarding the permanent use of any portion of the land, sea or air of the territory of the Federal Republic of Somalia. The Federal Parliament shall enact a law regulating the size, timeline and conditions of permits of land use.</p> <p>(5) The Federal Government, in consultation with the Federal Member States and other stakeholders, shall regulate land policy, and land control and use measures (Art. 43).</p>		
<p>ESS7 on indigenous people seeks to promote the inclusion of these group in development project and especially through consultation to ensure they also share in the project benefits and ensure negative impacts do not disproportionately fall on them</p> <p>The policy requires these groups to be consulted separately to enhance their participation</p>	<ul style="list-style-type: none"> Article 11 of the Constitution regarding nondiscrimination and equality sets forth that 'All citizens, regardless of sex, religion, social or economic status, political opinion, clan, disability, occupation, birth or dialect shall have equal rights and duties before the law. Discrimination is deemed to occur if the effect of an action impairs or restricts a person's rights, even if the actor did not intend this effect. The State must not discriminate against any person on the basis of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, disability, religion, political opinion, occupation, or wealth. All State programs, such as laws, or political and administrative actions that are designed to achieve full equality for individuals or groups who are disadvantaged, or who have suffered from discrimination in the past, shall be deemed to be not discriminatory'(Art. 11). It is also stated in Article 27 regarding economic and social rights that 'it shall be ensured that women, the aged, the disabled and minorities who have long suffered discrimination get the necessary support to realize their socio-economic rights'. No provisions regarding indigenous rights. 	<ul style="list-style-type: none"> Similar-both seek to promote inclusion of these group so that they do can share the projects benefits and ensure that negative impacts of the project do not fall on them disproportionately WB needs a social assessment to be conducted 	<p>WB policy more elaborate and the two are being used to compliment</p>
<p>Project affected persons should be meaningfully consulted and be given opportunities to participate in planning and implementing of projects and especially where there is resettlement</p>	<ul style="list-style-type: none"> Article 26 regarding the right to property states that every person has the right to own, use, enjoy, sell, and transfer property. The state may compulsorily acquire property only if doing so is in the public interest. Any person whose property has been acquired in the name of the public interest has the right to just compensation from the State as agreed by the parties or decided by a court. 	<ul style="list-style-type: none"> Both are similar 	<p>Consultation has been done and will be progressed in line with the two WB policy and FRS legislations.</p>

3.4. INTERNATIONAL CONVENTIONS/AGREEMENTS RATIFIED BY THE FEDERAL REPUBLIC OF SOMALIA (FRS)

The FRS is a signatory to a number of international treaties, conventions and agreements that include legally binding commitments to protect the environment and to ensure the sustainable management of natural resources. These include:

3.4.1. The United Nations Convention on biological diversity (CBD), 1992

Article 8 – In-situ conservation (d) Promoting protection of ecosystems, natural habitats and maintenance of viable populations of species in natural surroundings (j) Respecting, preserving and maintaining knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application.

Relevance

While hybrid power plants contribute to renewable energy production and reduced greenhouse gas emissions, their construction and operation may pose risks to local biodiversity, such as habitat disruption, soil degradation, and impacts on flora and fauna. In compliance with the CBD, it is crucial to assess and mitigate these potential impacts, incorporating biodiversity considerations into the planning and implementation processes. This includes conducting environmental assessments, designing habitat protection measures, and ensuring that energy development aligns with sustainable use of biological resources to prevent significant biodiversity loss. The relevance of the CBD underscores the need for sustainable energy solutions that balance technological advancement with ecosystem conservation.

3.4.2. The UN Framework Convention on Climate Change (UNFCCC) (ratified in 2009).

The primary objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." Somalia submitted its new climate action plan (Intended Nationally Determined Contribution) to the UNFCCC in 2015. Somalia has also developed the National Adaptation Program of Action on Climate Change (NAPA), which includes a climate risk assessment²¹.

Relevance

The project will provide over 50% electricity generation from solar array replacing existing diesel power generation and thereby cutting GHG emissions.

3.4.3. The UN Convention to Combat Desertification (UNCCD) (ratified in 2002).

The Convention combats desertification in those countries that experience serious droughts and/or desertification. Somalia has developed a National Action Programme for the UNCCD²².

Relevance

To comply with the UNCCD, it is essential that the project integrates sustainable land management practices, minimizes soil erosion, and rehabilitates affected areas post-construction. The hybrid power plant could also positively contribute to combating desertification by reducing reliance on unsustainable energy sources, which can lead to deforestation and land degradation. By aligning with the UNCCD's goals, the plant can promote energy development while protecting and restoring ecosystems, ensuring that the project contributes to land conservation and sustainable use of natural resources.

3.4.4. Convention on the Conservation of Migratory Species of Wild Animals (ratified 1985).

This Convention aims to protect those species of wild animals that migrate across or outside national boundaries from becoming endangered.

Relevance

Hybrid power plants, especially large-scale installations, can pose risks to migratory birds and other wildlife through habitat disruption, collisions with infrastructure, and changes to the local environment. To adhere to the principles of the CMS, the proposed hybrid power plant will adopt a design layout of the solar panels by implementing bird-friendly infrastructure designs, and monitoring wildlife movements. Aligning the project with the CMS support global biodiversity conservation efforts, ensuring that the solar power development is environmentally responsible and sustainable.

²¹The Somalia National Adaptation Programme of Action: <https://www.wiomsa.org/download/national-adaptation-programme-of-action-somalianapa/>

²²The Somalia National Action Programme on UNCCD: <https://knowledge.unccd.int/sites/default/files/naps/2018-06/NAP%20Full%20Report%20-%20Final%2023%20May%20digital.pdf>

3.4.5. Protocol Concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (ratified 1988).

Combats pollution by oil and other harmful substances by enhancing measures for responding to pollution emergencies on a national and regional basis.

Relevance

Although the proposed hybrid power plant will primarily generate clean energy, its construction and operation can still involve activities that carry pollution risks, such as the use of machinery, transportation of hazardous substances, and the potential for spills during maintenance or installation processes. This protocol emphasizes regional cooperation and preparedness to address pollution emergencies, ensuring that any accidental releases of harmful substances are swiftly and effectively managed. The proponent will align with the protocol by developing contingency plans and EPRP for effective emergency responses, and implement best practices to minimize environmental risks. This not only helps protect against pollution but will also strengthen the project's commitment to environmental stewardship and regional cooperation.

3.4.6. Sustainable Development Goals (SDGs) and Agenda 2063 in Africa

Key targets of the SDG 7 – Ensure access to affordable, reliable, sustainable and modern energy for all – are by 2030, ensure universal access to affordable, reliable and modern energy services

Relevance

Implementation of the project will contribute increased Renewable energy generation capacity in Somalia. This is one barrier to increasing affordable access to electricity. However, the project, in itself, will not automatically increase access to electricity for households as this also depends on the tariffs, distribution networks, and regulatory frameworks that are beyond the scope of the project itself. It is hoped that the project will generate interest in and incentivize complementary investment and intervention in the energy sector by the government, development partners, and private sector in South West State to expand access to electricity in the city. It is also hoped that it will provide a model for hybrid power plants in other locations within Somalia.

3.4.7. International Labour Organization Agreements

Somalia is also a signatory to the International Labour Organization (ILO) Conventions that include legally binding commitments relevant to labour and employment conditions and the social aspects of the project. These include commitments to equal opportunities for women in employment, ending violence and harassment in the workplace, workplace health and safety, and ending child and forced labour, among other areas. Some of the relevant provisions of the ILO that the Country has ratified include:

- Discrimination (Employment and Occupation) Convention (No. 111) (ratified in 1961).
- Forced Labour Convention (No.29) (ratified in 1960).
- Freedom of Association and Protection of the Right of Organize Convention (No. 87) and Right to Organize and Collective Bargaining Convention (No.98) (ratified in 2014).
- Abolition of Forced Labour Conventions (No. 105) (ratified in 2014).
- Worst Forms of Child Labour Convention (No. 182) (ratified in 2014).
- Violence and Harassment Convention (No 190) (ratified in 2021).
- The Tripartite Consultation (International Labour Standards) Convention (No. 144) (ratified in 2021).
- The Occupational Safety and Health Convention (No. 155) and Promotional Framework for Occupational Safety and Health Convention (No. 187) (ratified in 2021).
- Private Employment Agencies Convention (No. 181) (ratified in 2021).
- The Migration for Employment Convention (Revised) (No. 97) and Migrant Workers (Supplementary Provisions) Convention (No. 143) (ratified in 2021).

Relevance

Project implementation will adhere to the principles of the ILO conventions ratified by Somalia. These include that:

- *Contractors will be obliged to have policies and procedures in place to ensure equal opportunities for and treatment of employees regardless race, color, gender/sex, religion, political opinion, or social opinion.*
- *Employment practices are non-discriminatory, and to take active measures to prevent and violence, harassment and discrimination in the workplace;*
- *They will be obliged to adhere to workplace health and safety standards.*

- *Contractors and suppliers will be contractually obligated to comply with the required local and international practices, to have a human rights policy, and to have employment processes that provide the standard terms of employment for casual and temporary workers.*

4.0. Analysis of Alternatives

4.1. OVERVIEW

In this chapter, various alternatives available to the project are discussed. The alternatives are as follows; “no-go/do nothing” alternative, alternative construction materials and technology, the alternative sites and alternative sources of energy identified during the ESIA process. The identification and examination of alternatives is fundamental to environmental assessment. It provides decision-makers with information that enables them to properly consider optimal solutions to development proposals. Alternatives illustrate and contrast the environmental implications and consequences of different options available to achieve the same end.

4.2. RELOCATION OPTION

The site for the proposed project was selected based on several factors, including:

- Geophysical Factors – An open and expansive area with maximal solar irradiance, a location not prone to soil erosion and flooding, and an area with good drainage, etc.
- Land identified is free from any dispute on ownership or any other encumbrances
- No squatters, encroachers or other claims to the land.

Relocating the proposed power plant was not considered a better option because the current location provides sufficient space for the establishment of a modern hybrid power plant and supports optimal project implementation. The existing site is strategically advantageous, as it allows the project to leverage existing power evacuation infrastructure, minimizing additional costs and construction time associated with developing new transmission facilities. Furthermore, the current location's proximity to existing infrastructure facilitates efficient integration into the grid, reducing technical and logistical challenges. Relocation would not only increase project complexity and expenses but also delay the delivery of reliable energy to the community, making the current site the most practical and efficient choice for the power plant.

4.3. ZERO OR NO PROJECT ALTERNATIVE

The No Project option in respect to the proposed project implies that the status quo is maintained. This option is the most suitable alternative from an extreme environmental perspective as it ensures non-interference with the existing conditions. This option will, however, involve several losses to both BEC-BAIDOA and the increasing customers in BAIDOA City and the surrounding areas. The target majority of the consumers will lack a clean and reliable electricity supply, and the FGS objectives of bringing a reliable, clean and affordable electricity in order to spur economic growth, opportunities for investment and better public services may not be realized. The No Project Option is the least preferred from the socio-economic and environmental perspective due to the following factors:

- Electricity generation relying on diesel generators with the accompanying GHG emissions will continue;
- The socio-economic status of target communities the local economy would remain unchanged due to lack of affordable, clean and reliable electricity supply;
- Generation of employment opportunities through expansion of business activities that would have been spurred by availability of affordable and reliable electric power will not occur
- Opening up the area for investors will not occur as anticipated;
- Community health benefits that come with electricity will not be realized;
- The targeted consumers will forgo the desired electricity supply in the area;
- The South West State and FRS will be impeded in achieving the objectives of the PMP in meeting the energy requirements.
- The objectives of the FGS's efforts towards achieving NDP-9 will not be realized.

From the analysis above, it becomes apparent that the no project alternative means no project to the local people and the FGS, and the benefits outlined above and other indirect benefits that would accrue from construction of the proposed project.

Conclusion

It is thereby concluded that the 'do-nothing' option is not a good option economically and should therefore be discouraged and rejected. It is therefore imperative for BEC-BAIDOA to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to BAIDOA City and surrounding area.

4.4. ALTERNATIVE SOURCES OF ENERGY

4.4.1. Thermal Power Generation

Improving and expanding the current thermal power through installation of more diesel gensets is an option which can be considered to provide power to BAIDOA City and surrounding areas. However, this would imply more diesel would be needed, approximately over 250-300litres of Industrial Diesel Oil (IDO) is burnt daily to generate targeted 50kWp of electricity at the current BEC-BAIDOA electricity generation sites. Thermal generation can also be fueled using alternative fuels such as natural gas, bio diesel, industrial kerosene, heavy vehicle fuel, coal and unleaded petrol. Thermal power generation has serious negative environmental impacts including an increase greenhouse gas emission. This approach will go against the FRS goals towards meeting the Paris Agreement targets.

4.4.2. Wind Power Generation

Wind power generation, while a valuable renewable energy source, has several limitations compared to the proposed hybrid power plant. Wind power is highly dependent on geographic location, and suitable sites for wind farms are limited (areas with consistent and strong winds) in the South West State. Wind energy is more variable and unpredictable because wind speeds tend to fluctuate significantly within short time frames, leading to inconsistent power generation^{23,24,25,26}. Wind turbines can have a greater visual and noise impact on the landscape, leading to community resistance, particularly in populated areas. They can also pose risks to wildlife, especially birds and bats. Wind turbines generally have higher initial capital costs due to the complexity of the technology and the need for substantial infrastructure, such as tall towers and foundations, and require regular maintenance, particularly in harsh environments, to ensure reliable operation^{27,28,29}. Wind power generation often requires more sophisticated grid management due to its variability and the potential need for energy storage or backup systems to ensure a stable power supply. Finally, wind farms require large tracts of land, which can lead to land use conflicts.

4.5. SOLID WASTE MANAGEMENT ALTERNATIVES

Solid waste in various proportions will be generated throughout the project. A comprehensive solid waste management system is recommended. First, the proponent (BEC-BAIDOA) will prioritize reduction at the source of materials. This solution will necessitate a solid waste management awareness program among management and personnel. Recycling and reuse of garbage will be the second most important alternative. This requires the implementation of a source separation program. The third priority in the hierarchy of alternatives is the combustion of non-recyclable garbage. Finally, the BEC-BAIDOA will need to form a cooperation with waste handlers in Baidoa City to ensure regular waste removal and disposal in an environmentally responsible manner.

²³Archer, C. L., & Jacobson, M. Z. (2005). Evaluation of global wind power. *Journal of Geophysical Research: Atmospheres*, 110(D12). <https://doi.org/10.1029/2004JD005462>

²⁴Rawn, B., Østergaard, J., & Rosas, P. A. C. (2007). Variability of large-scale wind power from a Danish perspective. *Wind Energy*, 10(1), 21-28. <https://doi.org/10.1002/we.208>

²⁵Holttinen, H. (2005). Hourly wind power variations in the Nordic countries. *Wind Energy*, 8(2), 173-195. <https://doi.org/10.1002/we.144>

²⁶Sorensen, P., & Cutululis, N. A. (2004). Variability and predictability of large-scale wind energy production. *Risø National Laboratory*.

²⁷Kaldellis, J. K., & Kapsali, M. (2022). Operational and maintenance aspects of wind turbines in harsh environments. *Renewable Energy*, 190, 1234-1251. <https://doi.org/10.1016/j.renene.2022.01.013>

²⁸Hansen, M. H., & Sørensen, P. (2021). Advancements in wind turbine maintenance: Focus on harsh climate conditions. *Wind Energy Science*, 6(1), 345-360. <https://doi.org/10.5194/wes-6-345-2021>

²⁹López, J., & Martínez, F. (2023). Predictive maintenance strategies for wind turbines in extreme weather conditions. *Journal of Wind Engineering and Industrial Aerodynamics*, 222, 104944. <https://doi.org/10.1016/j.jweia.2021.104944>

4.6. SELECTED ALTERNATIVES

The selected alternative for the proposed hybrid power plant combines the optimal location and technological configuration to meet energy needs efficiently and sustainably. The current site was identified as the best location due to its adequate space for development and its ability to leverage existing power evacuation infrastructure, minimizing costs and operational challenges. Technologically, the preferred option is a hybrid system comprising solar photovoltaic (PV) panels, Battery Energy Storage Systems (BESS), and backup diesel generators (gensets). This combination ensures reliable, clean, and efficient energy supply by maximizing renewable energy utilization while providing backup power during periods of low solar generation. This alternative balances sustainability, cost-effectiveness, and energy reliability, making it the most viable choice for the project.

Conclusion

A hybrid power plant was located approximately 9km from the existing BEC-BAIDOA Hybrid Power Plant was selected for consideration. It is therefore imperative for BEC-BAIDOA to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to BAIDOA City and surrounding areas.

5.0. Environmental and Social Baseline

This section outlines the existing biophysical and socioeconomic background of the proposed project region, which serves as the foundation for identifying and evaluating the project's possible environmental and social implications. It includes both project-specific information regarding the project's area of influence and regional baseline data to help put the project in context.

5.1. LOCATION

The proposed Hybrid power plant (3°04'50"N, 43°37'02"N) shall be located in the outskirts of BAIDOA City, South West State within the north-eastern Somalia. The project site is in an open area with sparse settlements in the immediate vicinity with 2km² piece of land acquired by BEC-BAIDOA for the project. Only a few temporary settlements are found near the proposed project site.



Plate 2. View of the surroundings of the proposed project site

5.2. ENVIRONMENTAL SETTING

5.2.1. Climatic Information

5.2.1.1. Rainfall

The climate in the South West State is tropical arid to dry and sub-humid, and is influenced by the north-easterly and south-easterly air flows of the Intertropical Convergence Zone (ITCZ) over the Ethiopian highlands³⁰. North-easterly and south-easterly air masses meet in the Intertropical Front (ITF) and raise air upwards to produce rain. The annual movements of the ITCZ from north to south across Africa and back

³⁰ Oduori, S., Vargas, R. & Alim, M. 2007. Land Use Characterisation of a Selected Study Area in Somaliland. FAO-SWALIM. Project Report No. L-04. Nairobi, Kenya

again, give rise to four different seasons in the State like rest of Somalia, comprising two distinguishable rainy seasons alternating with two marked dry seasons³¹, as follows:

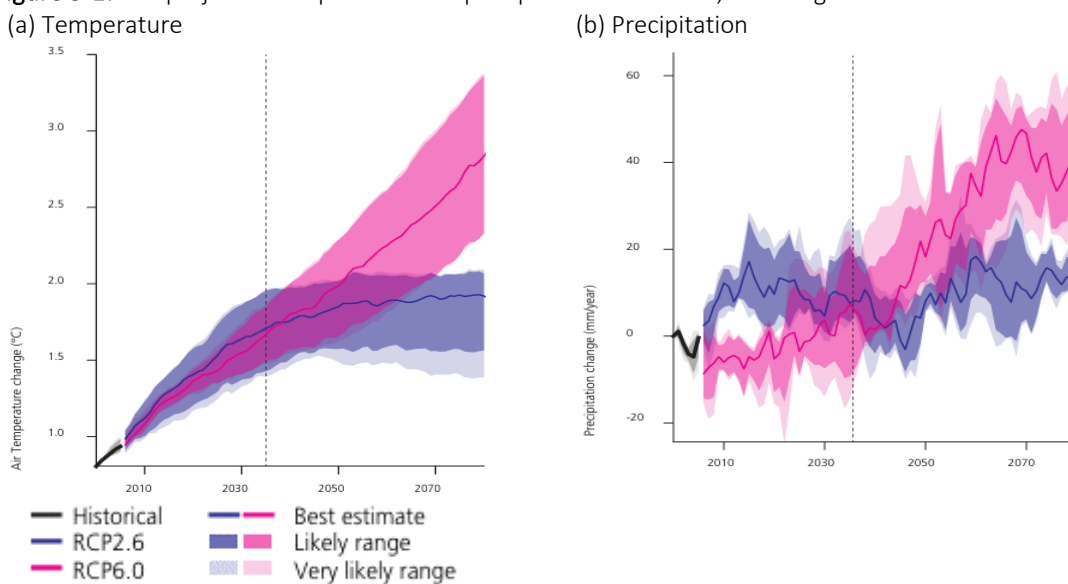
- Gu: March to June (MAMJ), the main rainy season, like for all over Somalia
- Xagaa: July to September, littoral showers, but dry and cool in the hinterland
- Deyr: September to December (SOND), second rainy season, like for all over Somalia
- Jilaal: January to March, longer dry season, like for all over Somalia

Rainfall in the region is erratic, with a bimodal pattern except in the northern riverine areas close to the coast where some showers may occur even during the Xagaa. Peak rainfall months are centred around Gu season, March to June (MAMJ) and Deyr Season, September to December (SOND). Rainfall amounts and intensity in South West is generally 200mm – 300mm annually. However, some parts of Ceel D Heer receive between 300mm - 400mm of rainfall annually. Rainfall is characterized by intense, short rainstorms. The region has a high inter-annual rainfall variation and is subject to recurrent drought of different severity every 4-5 years. Like much of Somalia, precipitation in the South West State will likely increase in the long run (until 2070), with a stronger and more continuous increase under RCP6.0 than under RCP2.6 (Figure 5-1b).

5.2.1.2. Temperature

The climatic conditions of Baidoa, South West State in Somalia are influenced by its geographic location and topography, resulting in a semi-arid to arid climate. Baidoa experiences high temperatures throughout much of the year. The hottest months are typically from May to September, with temperatures often exceeding 35°C during the day³². Cooler temperatures are observed from December to February, but even then, daytime temperatures can still be warm. As a result of increasing greenhouse gas (GHG) concentrations, air temperature over much of Somalia, including South West State is very likely to rise by 1.4 to 3.4°C by 2070 relative to the year 1876, depending on the future GHG emissions scenario³³ (Figure 5-1a).

Figure 5-1: The projected temperature and precipitation in Somalia, including the South West State



Source: https://weatheringrisk.org/sites/default/files/document/220214_SomaliaClimateRiskProfile-05.pdf

³¹ FAO-SWALIM (2010). Somalia Water and Land Information Management (2010). Atlas of the Juba and Shabelle Rivers in Somalia. Nairobi: FAO-SWALIM. Available from http://www.faoswalim.org/subsites/River_Atlas_Files/River_Atlas_Documents/index.html

³² International Institute of Tropical Agriculture, "Agroecological Zones," 2024. [Online]. Available: <https://csi.maps.arcgis.com/apps/MapSeries/index.html?appid=7539d22ab46147ce9888589aea4b1a11>. [Accessed May, 30 2024].

³³ Chen, D., M. Rojas, B. H. Samset, K. Cobb, A. Diongue Niang, P. Edwards, S. Emori, S. H. Faria, E. Hawkins, P. Hope, P. Huybrechts, M. Meinshausen, S. K. Mustafa, G. K. Plattner, A. M. Tréguier, "Framing, Context, and Methods. In: Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change.," IPCC, 2021

5.2.1.3. Air Quality

There are no published ambient air quality data for the municipality of BAIDOA.

5.2.1.4. Topography and Features

The Baidoa area is located at an altitude is approximately 440 meters above sea level on the edge of the Shebelle River Basin to the east and the Juba River Basin to the west³⁴. The Isha spring is the main source of surface water in Baidoa, located in the center of town but the water output has dramatically reduced in recent years and it has also been heavily polluted due to dumping of household waste water, solid and liquid waste, often leading to high incidences of waterborne diseases³⁵.

According to the Baidoa Water Supply Master Plan (2019)³⁶ developed with support from UNICEF, Baidoa has a high potential availability of underground water sources due to the ground formation being mostly limestone, although salinity is a problem. The boreholes that are the main source of water for the city are primarily on the outskirts. According to FAO data, the soils in the agro-ecological zone encompassing Baidoa are classified as nitisols, vertisols, and planosols that are deep, clayey soils, some of which have poor drainage and high salt content³⁷.

5.2.1.5. Geology and Soils

Baidoa City is underlain by sedimentary rock formations typical of Somalia's arid and semi-arid regions, with soils predominantly classified as sandy and loamy. These soils are generally shallow, low in organic matter, and prone to erosion, particularly in areas of heavy grazing and deforestation. The region's geology features calcareous materials, contributing to the soil's moderate alkalinity and limited water retention capacity. While the soils support small-scale agriculture and grazing, their fertility is highly dependent on seasonal rainfall and requires sustainable management to prevent degradation. Soil erosion, driven by wind and water, is a significant concern, exacerbated by unsustainable land use practices such as overgrazing and charcoal production. These conditions underscore the need for soil conservation measures in development planning for the city and its surrounding areas.

³⁴Kube Energy Somalia (2022). Environmental and Social Impact Assessment of Kube Energy Somalia, Baidoa Solar PV Plant. Wilson Peak AS & EMC Consultants.

³⁵Sharif, A.A., Mohamed, S.A., Mohamed, I.M., Abdirizak, A.A., Ubah, A.A. Adam, A.N.S., Abdullahi, H.H.S., Mohamud, A., Adan, Y.H., Munira, A.M.J. & Saffa, S. (2023). A retrospective study on cholera: problematizing the plight of the IDPs in Baidoa, southwest state of Somalia. *International Journal of Medical Science and Clinical Research Studies* 3: 2494-2501. <https://ijmscr.org/index.php/ijmscrs/article/view/1202>

³⁶Barun, J. (2019). Public Private Partnership (PPP) in Urban Water Supply System A Review Study of Somalia. https://www.researchgate.net/figure/Scope-Costs-and-Timeline-of-Baidoa-Water-Supply-Master-Plan_tbl4_348231366

³⁷ Vargas, R. R., Omuto, C., and Alim, M. S. 2007. Soil survey of the Juba and Shabelle riverine areas in Southern Somalia. FAO-SWALIM. Project Report L-08. Nairobi, Kenya.

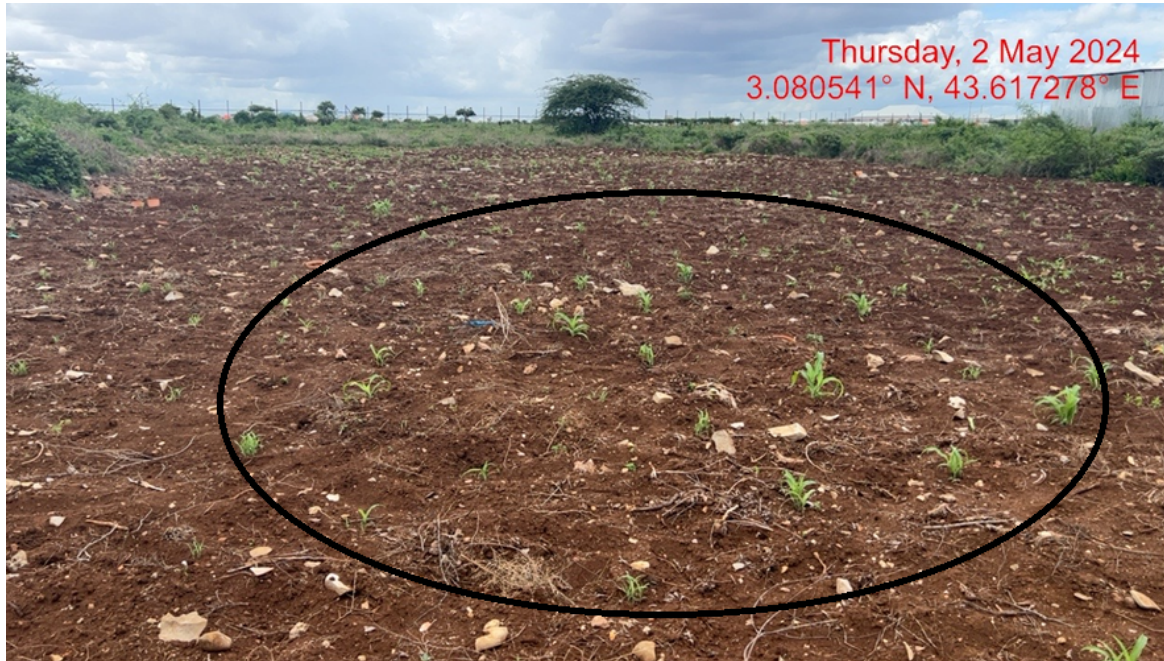


Plate 3. View of the characteristic soil types at the proposed site

5.2.1.6. Water Resources

Baidoa relies heavily on groundwater sources due to limited surface water availability. Water resources increased variability in yearly rainfall and increased and more intense heavy rains might translate into less water availability, even in the case of a higher overall rainfall, as water from precipitation will not infiltrate the soil but rather run off, increasing soil erosion and augmenting floods. Water sources are reported steadily decreasing as a combination of the several failed rains and the constantly growing population and therefore demand. At the same time, the population increase, not matched by proper measures such as improved hygiene, sanitation and waste collection will increase the pollution of the shrinking water resources. Future water availability is highly uncertain under both scenarios, and require a prudent planning as a matter of survival for the whole city.

5.2.2. Biophysical Environment

5.2.2.1. Flora and fauna

Baidoa area features a semi-arid climate typical of the South West State. The biological environment is influenced by this climate, characterized by hot temperatures and limited rainfall with the vegetation consisting primarily of drought-resistant plants adapted to the semi-arid conditions³⁸. Acacia trees and thorny shrubs are common, along with grasses that appear during the rainy season. Wildlife in Baidoa includes species adapted to dry environments. These include various types of antelope, such as dik-diks and gazelles, along with smaller mammals like rodents and mongoose. Bird species also inhabit the area, often attracted to the limited water sources. The semi-arid climate influences both flora and fauna significantly. Generally, the flora in the Baidoa area have adapted to conserve water and withstand periods of drought, while animals have developed behaviours and physiological adaptations to survive in these conditions. Human activity, including agriculture and urbanization, affects the biological environment. Deforestation for fuel and land clearance, as well as overgrazing, can impact local plant and animal populations. There are no protected areas or areas with potential as future protected areas nearby or within the ESP's area of influence.

5.2.2.2. Vulnerability to Climate Change

Baidoa City and the surrounding areas is highly susceptible to climate change due to its semi-arid climate, fragile ecosystems, and socio-economic challenges. Extreme weather events like droughts, erratic rainfall, and

³⁸Oroda, A.S. (2018). Environmental and social management plan for Baidoa and Baidoa water and sanitation project. African Development Bank, Regional Directorate General for Eastern Africa, Nairobi, Kenya.

floods pose significant threats to water availability, agriculture, and livestock, crucial for pastoralist communities. Droughts are increasing, leading to water scarcity, crop failure, and depletion of grazing land, causing food insecurity and population displacement. The region's limited infrastructure and weak governance exacerbate its vulnerability, with poor access to climate-resilient resources and increasing desertification. Climate change also increases conflict risks over dwindling resources, contributing to social instability. The CORDEX Africa multi-model median projections indicate that the number of extreme heat days in which maximum daytime temperatures exceed 40°C is likely to increase in South Central Somalia including South West State. Each year, by the 2030s, the region could experience between 4 and 30 days of temperatures exceeding this threshold, predominantly during February-April^{39,40}.

5.2.2.3 Solid Waste Management

The city lacks a systematic system for solid waste management, leading to widespread litter and rubbish disposal, causing drainage issues and a lack of sanitary landfills. Private households and commercial enterprises often practice open dumping, while some institutions burn waste. Community groups collect and dispose of waste outside town, and garbage pits exist in public facilities. The unmanaged disposal of solid waste negatively impacts urban residents' quality of life, creating health hazards and deteriorating the environment. The Baidoa administration is exploring solutions to collect household waste and dump it outside the town. The solution involves a chain of steps: collection, transfer, transport, and disposal. Private sector operators can participate in public-private partnerships with a Solid Waste Management Agency (SWM) agency, managing bulk transport, sanitary landfill site operation, and entire SWM with a designated zone. A sensibilization and awareness raising campaign could also help trigger behavioral changes in Baidoa's citizens.

5.2.2.4. Agricultural Land Soil Contamination

Baidoa's Gross Domestic Product (GDP) is driven mainly by agriculture, with 62% of GDP contributed by agriculture and fisheries, 35% services, and 3% industry. This represents the highest contribution of agriculture to GDP. Agricultural trade is a significant source of livelihoods, with brokers playing a central role in livestock trading. The sector also employs trekkers, feedlot operators, loaders, lorry drivers, and workers in market sale yards. Studies show that just over 40% of IDPs have a small business or are self-employed, with 7% working as teachers, 3% as drivers, or for the government, and the remainder unemployed. Most IDPs depend on humanitarian assistance cash vouchers, conditional cash, and unconditional cash support.

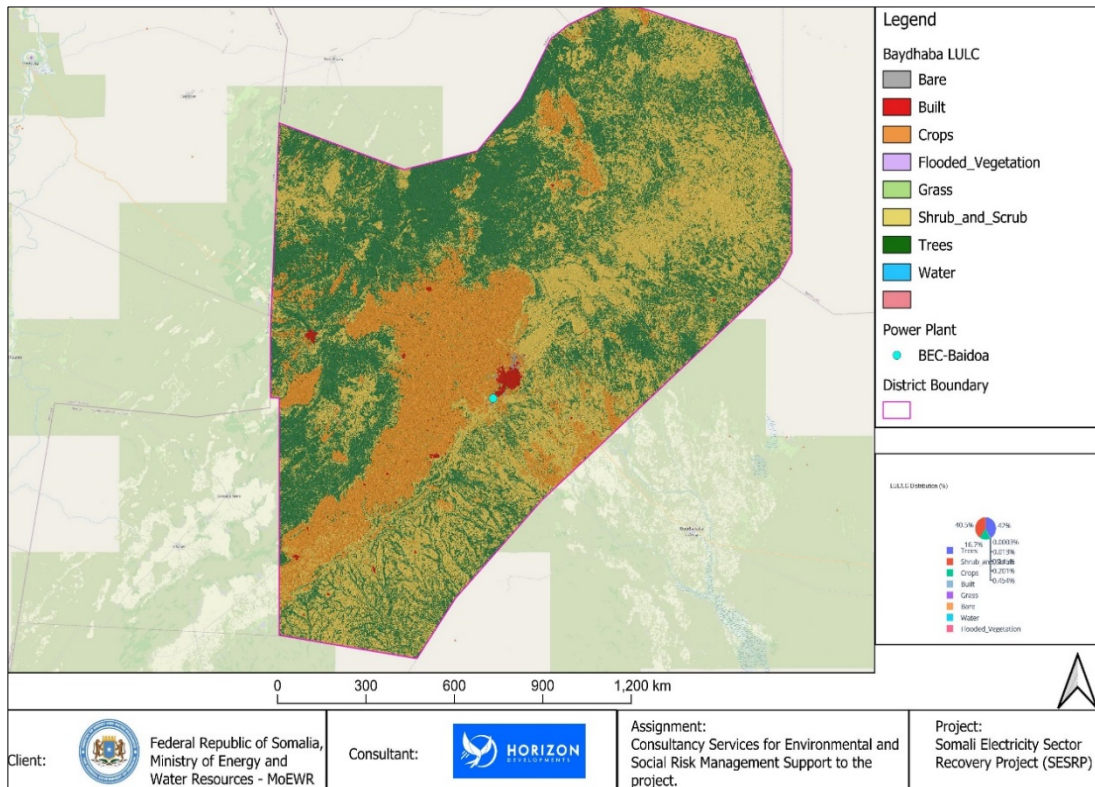
5.2.2.5. Land Use and Land Cover Characterization

Baidoa City, a major urban center in Somalia, has diverse land use and land cover patterns influenced by its geographical location and socio-economic activities (Figure 5-3). It serves as a major urban center with residential, commercial, and industrial zones. The region is home to extensive agricultural areas, including maize, sorghum, vegetables, cattle, and goats. Rural areas consist of small villages and agricultural communities, primarily engaged in subsistence farming and pastoralism. The region's natural vegetation includes sparse woodland, savannah grasslands, and shrublands. Deforestation and land degradation are ongoing concerns due to agricultural expansion. Baidoa's proximity to rivers and seasonal streams is crucial for irrigation and local water supply. Climate change and unsustainable land use practices exacerbate these issues. Efforts are underway to promote sustainable land management, afforestation programs, and community-based conservation initiatives to preserve natural resources and support local livelihoods.

Figure 5-2: Land cover types in Baidoa area of South West State, Somalia

³⁹Gutiérrez, J.M., Jones, R.G., Narisma, G.T., Alves, L.M., Amjad, M., Gorodetskaya, I.V., Grose, M., Klutse, N.A.B., Krakovska, S., Li, J., Martínez-Castro, D., Mearns, L.O., Mernild, S.H., Ngo-Duc, T., van den Hurk, B., & Yoon, J.H. (2021). 'Interactive Atlas', in *Climate Change 2021: The Physical Science Basis. Contribution of Working Group I to the Sixth Assessment Report of the Intergovernmental Panel on Climate Change*, eds. V. Masson-Delmotte, P. Zhai, A. Pirani, S.L. Connors, C. Péan, S. Berger, et al. (Cambridge University Press). <http://interactive-atlas.ipcc.ch/>.

⁴⁰World Bank. (2024). Health and Climate Change. <https://www.worldbank.org/en/topic/health/brief/health-and-climate-change>



5.2.2.6. Protected Areas and Sensitive Habitats

While no formal conservation areas exist in the immediate vicinity, the region includes semi-arid ecosystems that are critical for biodiversity, providing habitats for native plant and animal species. Degradation of these habitats, primarily due to deforestation, overgrazing, and construction activities, has led to a loss of vegetation cover and threatens the ecological balance.

5.2.2.7. Environmental Management Challenges

Like all other regions in Somalia, the Baidoa area of South West State experiences environmental management challenges. Soil erosion is a significant issue in Baidoa, exacerbated by deforestation, unsustainable land use practices, and periodic droughts. Overgrazing and poor land management contribute to land degradation, reducing soil fertility and agricultural productivity. There are no functional solid and liquid waste management systems in the Baidoa, and waste dumping, especially along the roads and on the outskirts of settlements, is a common feature. However, there are greater prospects going into the future as the FGS and South West State governments are working towards better environmental governance through the enactment of environmental legislation and regulations and enforcement mechanisms.

5.3. SOCIO-ECONOMIC SETTING

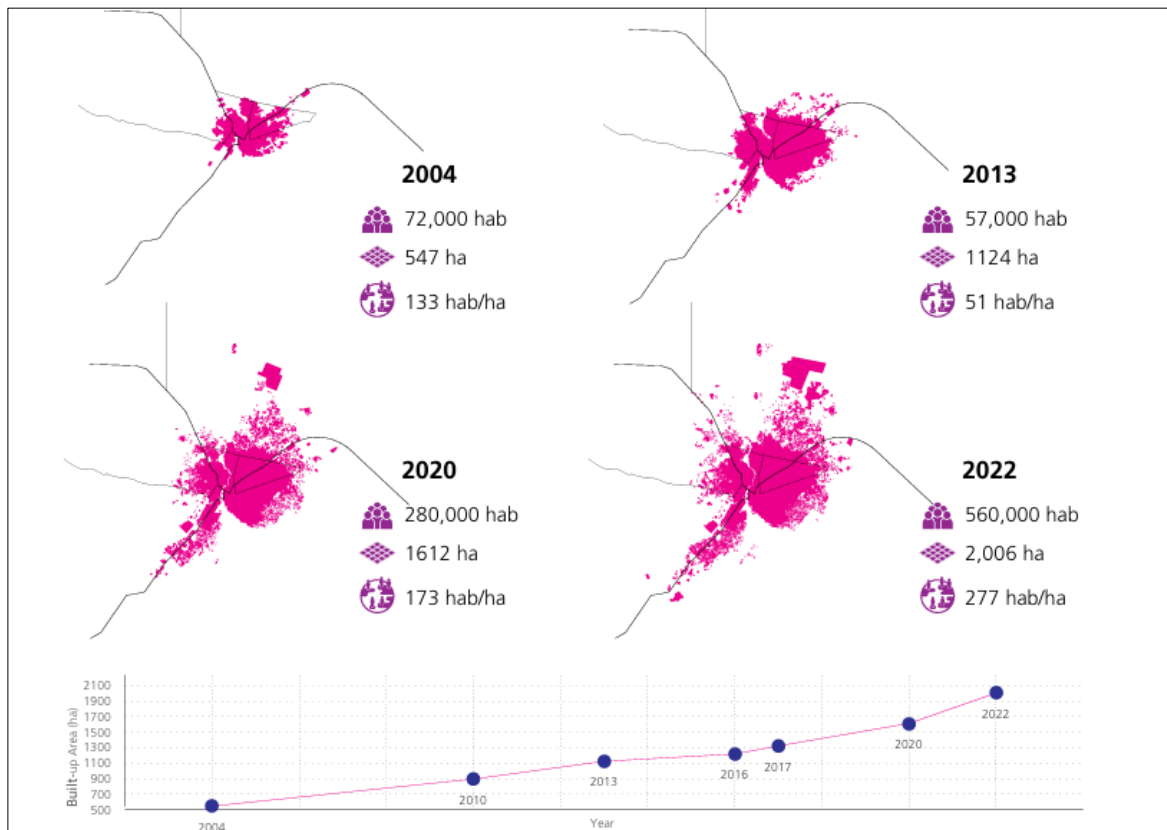
5.3.1. Overview

South West State like all other regions in Somalia that face socioeconomic challenges. South West State has a pastoral economy, with livestock and agriculture being key sources of income. However, infrastructure development is limited, and political instability and security concerns hinder growth. Despite these challenges, efforts are underway to rebuild and develop these areas.

5.3.2. Population

Baidoa, unlike other Somali cities, is expanding at a slower rate than its populations. Between 2016 and 2020, the ratio of land consumption rate to population growth was 0.21:1, indicating a slower growth rate. This results in increased density, primarily due to overcrowding and poor living conditions in IDP settlements. Better urban growth management is crucial for sustainable urbanization. The urban population in Baidoa has increased five to six times in the last five years, causing high pressure on resources and livelihood options. The Municipality of Baidoa and the South West State Government have launched programs to improve services and involve displaced communities. However, the city leadership and international community need to develop long-term strategies and concrete solutions to address the unprecedented urbanisation challenges.

Figure 5-3: Trends in population density in Baidoa City of South West State, Somalia (2004-2022)



Source: UNHSP (2023). Baidoa City Strategy. United Nations Human Settlements Programme. www.unhabitat.org

5.3.3. Administration

Baidoa (also known as Baydahba) District is classified as an A-level district and it is supposed to have an elected council of 27 members. However, while some districts in SWS have an elected district council, Baidoa's one is still in formation. The District Commissioner and Mayor, currently Abdullahi Ali Watiin, is nominated by the president of SWS. The DC's responsibilities include both the implementation of the National Constitution, national and local government policies, and programs and projects to improve quality of citizen life. Local governments resolve issues within their competence directly or through their representatives.

As per Law No. 10 of 3rd July 2017 "Local Government Law of Southwest State of Somalia" responsibilities of the District Administration are: provision, maintenance and operation of basic urban services (water, electricity, transport, etc); provision, maintenance and operation of road network and public spaces including public illumination; provision and administration.

The Municipality of Baidoa generally suffers from several structural weaknesses: lack of technical personnel, limited planning capacity, limited managerial and oversight capacity. As a result of these capacity constraints, several key services are not fully provided. At the same time, some functions are still covered by line ministries and

not the local governments. This adds to the unclarity in the devolution of functions and act as a disincentive for the recruitment of skilled personnel, triggering a negative feedback.

Administratively, Baidoa Town is divided into ten urban villages: Isha; Darusalam; Horseed; Berdale; Howl; Wadaag; Wadajir; Weberi; Salamey; Towfiq and Adaado. Law No. 10 of 3rd July 2017 does not define roles and responsibilities of the village committees. However, they do maintain a central function in the lower level of administration and politics of Baidoa.

5.3.4. Economy and Poverty

5.3.4.1. Local Economy

The local economy of the northern sector of Baidoa City, Somalia, is diverse and primarily driven by agriculture, trade, and livestock. Many residents engage in subsistence farming and pastoralism, relying on the cultivation of crops like sorghum and maize, as well as the rearing of livestock, which are vital for both food security and income. The area also serves as a commercial hub, with markets bustling with goods ranging from local produce to imported items, fostering trade among communities. However, economic activities are often hampered by challenges such as inadequate infrastructure, limited access to financial services, and the impacts of conflict and climate change. Despite these hurdles, the resilience of the local population is evident as they adapt to changing conditions and seek opportunities for growth and development.

5.3.4.2. Poverty and Social Services

Poverty is a pervasive challenge in the northern sector of BAIDOA City, Somalia, where many residents live below the poverty line and struggle to access essential services. High unemployment rates and reliance on informal economic activities exacerbate the situation, leaving families vulnerable to food insecurity and economic shocks. Social services in the area are limited, with healthcare facilities often understaffed and lacking necessary medical supplies, resulting in inadequate health care for the community. Educational institutions face similar challenges, with overcrowded classrooms and a shortage of qualified teachers hindering the quality of education. Although local and international organizations work to aid and improve conditions, the overall effectiveness of social services remains hampered by ongoing instability and insufficient investment, highlighting the urgent need for comprehensive development efforts to uplift the community.

5.3.4.3. Productive Sector (Agriculture, Livestock, Commerce and Trade)

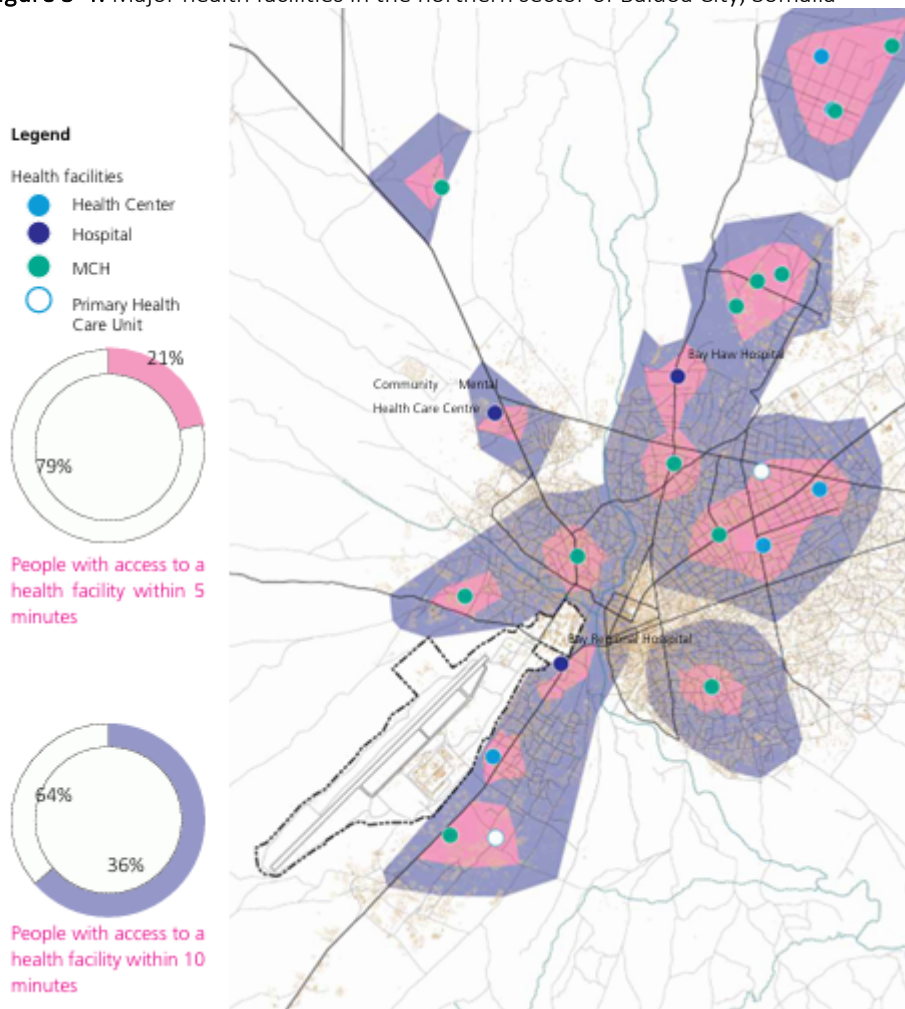
South West State faces challenges in its productive sectors, including agriculture, livestock, and extractive industries. Livestock marketing is primarily driven by private enterprises, and public-private partnerships are crucial for effective development. The government should prioritize private sector development, leverage private sector finance, and explore Islamic financing opportunities for economic expansion. The agricultural sector faces significant challenges, particularly due to its heavy reliance on imports for essential food commodities like sorghum and maize. This vulnerability makes the rural population vulnerable to market disruptions and conflicts. To address this, investments in infrastructure, modern farming practices, and access to quality inputs are needed. Strengthening resilience, promoting inter-state cooperation, and addressing conflict causes are essential components for food security and stability in South West State.

5.3.4.4. Health Sector

Several hospitals and health facilities exist in Baidoa City (Figure 5-3). Baidoa has two main health facilities, Bay Regional Hospital and Bay Haw Hospital, providing general and emergency services. Other facilities include health centers, MCH, and a Community Mental Health Care Centre. IDP settlements have 7 primary health care units and 3 pharmacies, but none have electricity, water, or specialized personnel.

Baidoa has a Community Mental Health Care Centre, the only in the region, renovated and equipped by UNHABITAT under the Midnimo Project. Despite 64% of the population having access to health facilities within 10 minutes, large parts of the city outskirts are undercovered. Primary health care units are mainly for pediatric and nutrition services in IDP settlements. A thorough city-wide assessment should survey new facilities, assess conditions and operations, and evaluate the state of the building, equipment, and specialized personnel.

Figure 5-4: Major health facilities in the northern sector of Baidoa City, Somalia

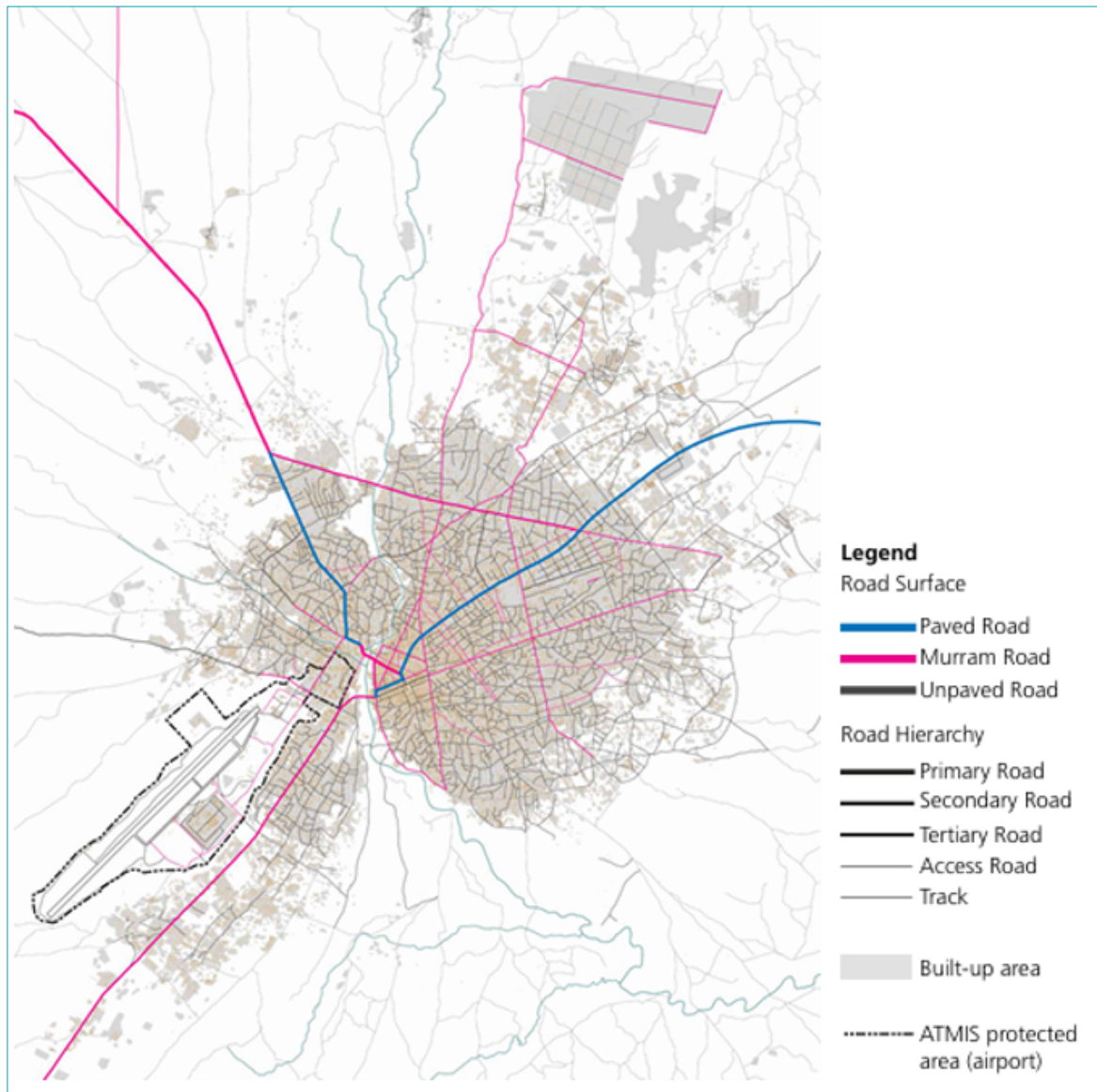


Source: UNHSP (2023). Baidoa City Strategy. United Nations Human Settlements Programme. www.unhabitat.org

5.3.4.5. Transport Sector

Baidoa's road infrastructure is generally insufficient, with most roads in poor condition (Figure 5-4). Despite being located along an international transport corridor, the current traffic volume is low due to poor road conditions and poor security levels. Road blockades hamper traffic and increase costs for goods and services. The volume of transit travel in Baidoa is likely to grow with increased security levels, government control over rural areas, and economic recovery. The city's road network consists of two primary roads: the Mogadishu road, which cuts through the city center and is wide in the outskirts but shrinks in the city center due to pedestrians, unregulated parking, and commercial activities. The secondary roads are constructed from gravel or earth and lack effective drainage, with road corridors about 9m wide. There is limited street lighting, no formal junction controls, and no enforceable traffic management measures. The tertiary road network consists of un-surfaced tracks and paths that provide access to individual residential and commercial areas. The city's road surface quality is poor, with no clear separation between vehicles and pedestrians, and few road-side surface water drains.

Figure 5-5: Road network and public transport infrastructure of Baidoa City, Somalia



Source: UNHSP (2023). Baidoa City Strategy. United Nations Human Settlements Programme. www.unhabitat.org

5.3.4.6. Housing Sector

Baidoa's land allocation for residential use and construction lacks standards at local, state, and national levels. For over thirty years, construction has been spontaneous, with no plan or safety attention. Residential units avoid areas exposed to natural hazards, but privatization processes are increasing construction in natural areas and near flooding planes. Access to adequate housing is a growing challenge in Baidoa City, and in the entire South West State, where many urban dwellers, including IDPs, women-headed households, refugee returnees, persons with disabilities, and youth, live in precarious conditions.

Baidoa City and SWS in general lack a building code regulating materials, typologies, and construction techniques. Residents or construction companies, using materials like corrugated iron sheet (CGI) or stones, typically do House construction and roofs are typically CGI, with false ceilings in higher-income houses. Currently, there is lack of data on the housing market in Baidoa. However, some general characteristics of Somalia apply also there. As the financial system in Somalia is not particularly developed, it is difficult to have access to credit, and most private housing is self-help. Rental housing is widespread across Somalia's urban areas, including Baidoa; around 25% of the housing stock is estimated to be rented in urban areas.¹ One third of those households in urban areas have two or more families living in the same house, with more than half of them sharing a single roomed house. The predominant existing housing typologies are detached, single-unit, single-storey. IDPs resides mostly in Buuls (traditional tents made from sticks, cartons, plastic, or cloth), or tents and Corrugated iron sheet (CGI) shelters provided by humanitarian organisations.

5.3.4.7. Information, Communication and Technology

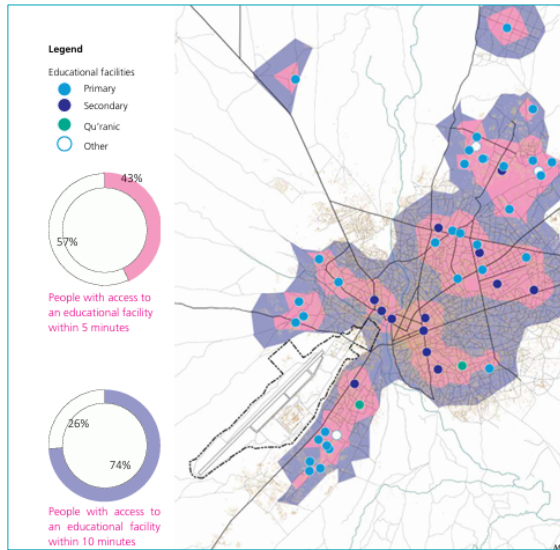
The ICT sector in the South West State is primarily driven by private sector investment from Somali entrepreneurs and international expertise. Hormuud Telecom and SOMTEL Telecom are the two main telecommunications companies in Somalia and operate throughout the country. Satellite internet has also experienced steady growth, particularly in remote areas where other online services are not available. Overall, the ICT sector in Baidoa City, Somalia, is gradually emerging as a key driver of economic growth and social connectivity. With increasing investments in telecommunications infrastructure, including mobile networks and internet services, the city is witnessing improved digital accessibility, particularly in urban areas. Local ICT companies and service providers are playing a vital role in enhancing communication, e-commerce, and access to information, fostering entrepreneurial opportunities and youth employment. Despite these advancements, challenges such as limited access in rural areas, high service costs, and inadequate regulatory frameworks persist. Strengthening ICT infrastructure and capacity-building initiatives are crucial to fully realizing the sector's potential in Baidoa.

5.3.4.8. Education

Considering the demographic composition of Baidoa, education is one of the biggest challenges to be faced, in order to access free, quality education in a safe and supportive environment. 62 educational facilities are reported within Baidoa, including primary, secondary and Quranic schools, both public and private (Figure 5-6). From a preliminary assessment, 74% of the city population resides in close proximity from an educational facility - if attention is given to any type of facility without distinguishing between levels⁴¹. However, large part of the city are uncovered, especially in the periphery and in IDP settlement. There is a particular lack of early childhood development centres, primary and Quranic schools. While the dataset on which the analysis was based is probably outdated and more schools may be present especially for IDPs, coverage is not a sufficient indicator to assess the level of educational facilities within the city.

Figure 5-6: Road network and public transport infrastructure of Baidoa City, Somalia

⁴¹ Source: UNHSP (2023). Baidoa City Strategy. United Nations Human Settlements Programme. www.unhabitat.org



Source: UNHSP (2023). Baidoa City Strategy. United Nations Human Settlements Programme. www.unhabitat.org

5.3.4.9. Water, Sanitation and Hygiene

South West State in Somalia faces significant challenges in the WASH (Water, Sanitation, and Hygiene) sector. The state has low average rainfall and is highly affected by climate change, leading to recurring droughts, short rainfall seasons, floods, and water scarcity crises. Water and pasture conditions are deteriorating, resulting in increased community and livestock migration. Water scarcity triggers conflict among communities, particularly in rural areas. Water prices are escalating, and access to water sources is limited, with some areas located far away from households. Over 70,000 people⁴² currently face an acute water crisis in South West, and the delayed onset of rains has worsened drought conditions. The government has made efforts in financing water schemes, but a significant percentage of households still rely on untreated water, leading to water-related diseases. Collaboration between governments, organizations, and stakeholders is crucial to addressing these challenges and achieving SDG targets in the state.

5.3.5. Energy Sector and Electricity Generation Status

The energy sector in South West State faces challenges due to unsustainable biomass utilization, particularly local charcoal and firewood. This overuse depletes Somalia's forests and causes health issues. Illicit charcoal exports exacerbate the issue. Lack of public oversight leads to private generators becoming primary energy sources.

Baidoa faces challenges in electricity supply, including limited access, small-scale diesel generation, substandard grid networks, and technical and non-technical losses between generation and customer. Over the last two decades, neglect have led to a significant deterioration in Baidoa's electricity supply, largely due to political and economic instability, lack of public resources, and lack of oversight. The fragmented power supply and distribution infrastructure, lack of a centralized network, and struggling institutional structures have resulted in a lack of affordable power for the population.

The current power suppliers are private independent companies which manage, operate and maintain the power generation and distribution facilities. The reach is however limited. The primary fuel source of power generation at these facilities is imported light diesel, which is expensive and results in high tariffs for the end consumer. Individual households not served by the private independent electricity services providers depend on their own stand-alone supply systems, typically either solar photovoltaics (PV) or diesel generators.

Despite the challenges in the electricity generation sector, potentials for improvement due to increased focus on renewable energy sources like solar power is quite possible. The BEC-BAIDOA Hybrid Power Plant is a hybrid power plant generating electricity from both thermal and solar power.

⁴²[file:///C:/Users/pc/Downloads/Puntland%20State%20Development%20Plan%20\(GSDP-3\)%20-%202023-2025.pdf](file:///C:/Users/pc/Downloads/Puntland%20State%20Development%20Plan%20(GSDP-3)%20-%202023-2025.pdf)

5.3.6. Proposed Project Impact on the Local Economy

The proposed hybrid power plant in Baidoa City is expected to significantly boost the local economy and contribute to broader economic growth in South West State, Somalia. By integrating solar, Battery Energy Storage System (BESS), and diesel technologies, the plant will enhance energy reliability, reduce electricity costs, and provide a more sustainable power supply. This development will lower operational costs for businesses, especially in agriculture and manufacturing, enabling them to expand and increase productivity. It will also create direct and indirect employment opportunities during construction and operation, stimulating income generation and demand for local services. Improved energy access will enhance public service delivery, benefiting schools, healthcare facilities, and water systems, thus improving overall living standards. Reliable electricity is also likely to attract domestic and foreign investment, fostering economic diversification and regional trade integration. Small businesses and informal sector enterprises will benefit from reduced energy costs, promoting entrepreneurship and inclusive growth. While temporary disruptions may occur during construction, these can be mitigated through implementation of the ESMP as proposed in the report. Overall, the hybrid power plant has the potential to catalyze sustainable economic development in Baidoa City and across South West State.

5.3.7. Security and Conflict Environment

Baidoa City, the administrative capital of South West State, Somalia, faces a complex security and conflict environment influenced by its historical challenges, socio-political dynamics, and ongoing instability in the region. The city has experienced periodic violence stemming from insurgent activities, particularly by Al-Shabaab, which remains a persistent threat through sporadic attacks, targeted assassinations, and intimidation of local communities. Despite efforts by Somali security forces and African Union Transition Mission in Somalia (ATMIS) troops to secure the area, insurgent groups exploit weak governance structures, porous borders, and limited law enforcement capabilities to maintain influence in rural and peripheral areas surrounding Baidoa.

In addition to insurgency threats, Baidoa grapples with inter-clan tensions exacerbated by competition over land, resources, and political representation. Disputes over governance, marginalization, and access to economic opportunities have contributed to localized conflicts, which, if unresolved, risk escalating into broader instability. However, the city has made progress through mediation and reconciliation initiatives, with community leaders and international partners playing key roles in fostering dialogue and reducing tensions. While Baidoa's security environment remains fragile, strengthening security institutions, addressing root causes of conflict, and promoting inclusive governance are essential steps toward achieving sustainable peace and stability.

6.0. Assessment of Impacts

6.1. OVERVIEW

This section evaluates how the proposed hybrid power plant will interact with elements of the physical, biological, and social surroundings, as well as infrastructure and utilities, to have an impact on resources and receptors. It has been organised into phases of the project life cycle in order to better comprehend the risks and repercussions associated with each. The following definitions are applied:

- The solar PV, BESS will be developed on the project site, which will be gated. As part of the investment, BEC-BAIDOA will also install a 4MW genset at the facility.
- The project area encompasses the project site and its immediate surroundings, which may have indirect and cumulative effects on nearby populations.
- The Study Area encompasses the BAIDOA City and adjacent areas, as well as the South West State.

The criteria for assessing the significance of impacts stemmed from the following key elements:

- The magnitude (including nature, scale and duration) of the change to the natural or socioeconomic environment (e.g. an increase in erosion, or an increase in employment opportunities), expressed, wherever practicable, in quantitative terms. The magnitude of all impacts is viewed from the perspective of those affected by considering the likely perceived importance as understood through stakeholder engagement;
- The nature and sensitivity of the impact receptor (physical, biological, or human). Where the receptor is physical, the assessment considered the quality, sensitivity to change and importance of the receptor. For a human receptor, the sensitivity of the household, community or wider societal group was considered along with their ability to adapt to and manage the effects of the impact; and
- The likelihood (probability) that the identified impact will occur. This is estimated based upon experience or evidence that such an outcome has previously occurred.

For this assessment, significance has been defined in Table 6.1 based on five levels.

Table 6-1: Categories of significance

Category	Significance
Negligible impacts (or Insignificant impacts)	Negligible impacts (or Insignificant impacts) are where a resource or receptor (including people) will not be affected in any way by a particular activity or the predicted effect is deemed to be 'negligible' or 'imperceptible' or is indistinguishable from natural background variations.
Minor	An impact of minor significance ('Minor impact') is one where an effect will be experienced, but the impact magnitude is sufficiently small (with or without mitigation) and well within accepted standards, and/or the receptor is of low sensitivity/value.
Moderate	An impact of moderate significance ('Moderate impact') is one within accepted limits and standards. Moderate impacts may cover a broad range, from a threshold below which the impact is minor, up to a level that might be just short of breaching a legal limit. Clearly to design an activity so that its effects only just avoid breaking a law and/or cause a major impact is not best practice. The emphasis for moderate impacts is therefore on demonstrating that the impact has been reduced to a level that is ALARP (as-low-as-reasonably-possible). This does not necessarily mean that 'Moderate' impacts have to be reduced to 'Minor' impacts, but that moderate impacts are being managed effectively and efficiently.
Major	An impact of major significance ('Major impact') is one where an accepted limit or standard may be exceeded, or large magnitude impacts occur to highly valued/sensitive resource/receptors. An aim of ESIA is to get to a position where the Project does not have any major residual impacts, certainly not ones that would endure into the long-term or extend over a large area. However, for some aspects there may be major residual impacts after all practicable mitigation options have been exhausted.

For environmental impacts the significance criteria used in this ESIA is shown in Table 2.2.

Table 6-2: Overall significance criteria for environmental impacts

Receptor sensitivity	Impact Magnitude		
	Low	Medium	High
Low	Minor	Minor	Moderate

Medium	Minor	Moderate	Major
High	Moderate	Major	Major

The social impact assessment considers stakeholder perceptions as crucial as actual impacts. This concept is explicitly included in the evaluation of significance. Impacts of significant stakeholder concern may raise the significance rating, prompting more rigorous mitigation measures. Addressing stakeholder perceptions is crucial to avoid reputational damage and loss of a 'social license to operate'. Therefore, addressing stakeholder perceptions is essential for effective social impact assessment.

6.2. THE ENVIRONMENT AND SOCIAL COMPONENTS AFFECTED BY THE PROJECT

The Project implementation may affect the different environmental components as listed in Table 6.3

Table 6-3: Environmental and social components likely to be affected by the proposed project

Components Affected		
Physical	Biological	Human
Surface and ground water	Aquatic ecosystem	Public health and safety
Air quality and climate	Terrestrial fauna and flora	Occupational health and safety
Geology and soils	Agriculture and livestock	Labor related issues
Noise and vibration		Land use and land ownership
Energy		Household Income
Landscape and aesthetics		Vulnerable groups
		Community stability
		Cultural and historical sites

IMPACTS DURING CONSTRUCTION PHASE

This section identifies and assesses the anticipated positive and negative impacts within the solar plant and surrounding areas during the construction phase. For each positive impact, enhancement measure is proposed, for negative impacts, a set of mitigation and monitoring measures are identified to avoid and minimize adverse impacts as outlined in Section 6 of this ESIA report.

6.2.1. Positive Impacts

6.2.1.1. National, Local and Regional Economy

The proposed hybrid power plant in Baidoa is poised to have transformative positive impacts on the local economy and the broader economy of Somalia. By providing a reliable, affordable, and sustainable energy supply, the plant will lower electricity costs for businesses and households, enhancing productivity and living standards. It will stimulate local economic growth through job creation during construction and operation, fostering income generation and skills development. Improved energy access will attract investments, particularly in sectors like agriculture, manufacturing, and ICT, contributing to economic diversification. Additionally, enhanced power reliability will bolster public service delivery, including health and education, supporting human capital development. On a national scale, the hybrid model, which incorporates renewable energy, aligns with Somalia's vision for sustainable development, reducing reliance on costly diesel imports, decreasing greenhouse gas emissions, and promoting energy security, all of which strengthen the federal economy.

Impact	National, local & regional economy
Type of impact	Positive
Type of effect	Direct & Indirect
Duration	Short-term as it is expected during the construction
Reversibility	Reversible
Receptor Sensitivity	Medium as the businesses involved will benefit directly from the increased revenue.
Magnitude	Medium as a number of local and regional businesses may be involved in the supply chain.
Significance of the impact without mitigation	Minor

5.2.1.2. Employment and Other Economic Opportunities

The proposed hybrid power plant in Baidoa is expected to significantly boost employment and economic opportunities while strengthening Somalia's national economy. During construction and operation, the project will create direct and indirect job opportunities, providing income and skill development for local communities. Enhanced energy reliability and affordability will enable businesses to expand operations, fostering entrepreneurship and encouraging investment in sectors like agriculture, manufacturing, and services. Small and medium enterprises (SMEs) and the informal sector will particularly benefit from reduced energy costs, promoting inclusive growth. On a national level, the plant's integration of renewable energy reduces reliance on imported diesel, cutting costs and improving trade balances while aligning with Somalia's sustainable development goals. This progress will enhance economic stability and resilience, driving long-term growth for the federal economy.

Impact	National, local & regional economy
Type of impact	Positive
Type of effect	Direct & Indirect
Duration	Short and long-term as it is expected during the construction and operation phases.
Reversibility	Reversible as it will be only limited to the construction and operation phases.
Receptor Sensitivity	Medium as the businesses involved will benefit directly from the increased revenue.
Magnitude	Medium as a number of local and regional businesses may be involved in the supply chain.
Significance of the impact without mitigation	Minor

6.2.2. Negative Impacts

6.2.2.1. Impacts on Biophysical Environment

6.2.2.1.1. Landscape and Visual

Clearing vegetation, excavating land, and erecting large structures such as solar panels, diesel generators, and transmission infrastructure can significantly alter the natural terrain and visual harmony of the site. The presence of heavy machinery, construction materials, and temporary worker camps may further contribute to visual clutter, disrupting the scenic value of the surroundings. These changes could affect the perception of the area, particularly for communities that value the land for its cultural or natural significance. While these impacts are temporary and confined to the construction phase, careful planning and mitigation measures, such as landscaping, vegetation restoration, and proper site management, will be essential to minimize their severity.

Impact	Landscape and visual
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term: The effects will commence from the start of construction and thereafter-permanent changes in visual character will occur, including into operations.
Reversibility	Irreversible until the entire Project infrastructure is decommissioned.
Receptor Sensitivity	Low on the basis that there is no international or national tourism receptors in the area, and the land has little, if any aesthetic value.
Magnitude	Medium – the changes to the visual condition of the land will occur within the Project Site and will be noticeable across the surrounding area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.1.2. Soil, Groundwater and Surface Water Contamination

The construction phase of the proposed hybrid power plant in Baidoa may pose risks of soil, groundwater, and surface water contamination. Activities such as excavation, improper disposal of construction waste, and accidental spills of fuel, oil, or chemicals from heavy machinery could degrade soil quality and introduce pollutants into water sources. These contaminants may infiltrate groundwater or runoff into surface water systems, potentially affecting local water supplies and ecosystems. Additionally, poor management of wastewater from worker camps or construction processes could exacerbate the risk of water pollution. Such

impacts can have long-term environmental and health consequences for nearby communities if not properly mitigated.

Impact	Soil, ground water and surface water contamination
Type of impact	Negative
Type of effect	Direct as it will affect soil only
Duration	Short-term changes in soil character and chemical composition may occur, but long-term consequences are unlikely unless major contamination is cleaned up.
Reversibility	Reversible as localized spills and soil compacted areas can be cleaned and restored.
Receptor Sensitivity	Low – the quality of the soil is not unique in the area and does not have significant agricultural value.
Magnitude	Low as site construction activities will be restricted to occur only in the Project Site
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.3. Flood Risks

The construction phase of the proposed hybrid power plant in Baidoa could increase flood risks due to land disturbance and alterations to natural drainage patterns. Activities such as vegetation clearance, soil excavation, and the compaction of land for infrastructure development may reduce the soil's natural permeability, leading to increased surface runoff during heavy rains. The potential accumulation of construction debris in drainage channels could obstruct water flow, further exacerbating the risk of localized flooding. These changes could impact nearby communities and pastoral/agricultural areas, resulting in potential economic and social disruptions.

Impact	Flood risk
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term if changes to natural drainage patterns are introduced, although this will be avoided to the extent possible.
Reversibility	Reversible: Changes to natural drainage flows are likely to be reversible as they could be restored once the site is decommissioned and restored.
Receptor Sensitivity	Medium – nearby land users that could be impacted from changes in drainage flows.
Magnitude	Low-to medium as the generation of floodwater is seasonal although could impact receptors outside of the Project Site located within the Project Area.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor.

6.2.2.1.4. Air Quality

Dust

The construction phase of the proposed hybrid power plant in Baidoa is likely to negatively impact air quality due to increased dust emissions. Activities such as land clearing, excavation, material transportation, and the operation of heavy machinery can generate significant amounts of dust, particularly in dry and windy conditions. This can reduce air quality, posing respiratory health risks to construction workers and nearby communities, especially vulnerable groups like children and the elderly. Dust accumulation may also affect nearby vegetation and agricultural productivity.

Impact	Air quality (Dust)
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions after construction works is completed
Receptor sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Moderate

Significance of the impact with mitigation	Minor
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Vehicle exhaust and other machinery emissions

During the construction phase of the proposed hybrid power plant in Baidoa, air quality may be negatively impacted by emissions from vehicles and construction machinery. The operation of heavy equipment, trucks, and generators powered by diesel fuel will release pollutants such as carbon dioxide (CO₂), nitrogen oxides (NO_x), sulfur dioxide (SO₂), and particulate matter into the atmosphere. These emissions can contribute to local air pollution, potentially harming the health of workers and nearby residents by aggravating respiratory conditions and increasing the risk of cardiovascular issues. Prolonged exposure to these pollutants may also affect surrounding vegetation and overall environmental quality.

Impact	Air quality (Vehicle exhaust and genset emissions)
Type of impact	Negative
Type of Effect	Direct
Duration	Short term/long-term as it is limited to construction and operation phases.
Reversibility	Irreversible given that air quality will be impacted over a long period of time.
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.5. Noise and Vibrations

Activities such as vehicles and heavy machinery operations, drilling, excavation, and the transportation of materials will produce noise of different levels, potentially disturbing local residents, and nearby businesses. Continuous exposure to high noise levels could lead to health issues such as hearing impairment, sleep disturbances, and stress for workers and local populations.

Impact	Noise
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that noise levels will rapidly revert to baseline conditions after construction works is completed
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.1.6. Biodiversity

Fauna

The construction phase of the proposed hybrid power plant in Baidoa may negatively impact local fauna and biodiversity. Land clearing, habitat destruction, and the disturbance caused by construction activities could displace wildlife, particularly species that rely on the area's vegetation and natural resources. The increased noise, vibration, and human activity associated with construction could disrupt animal behaviors, including breeding, feeding, and migration patterns, leading to reduced species diversity and population sizes. Additionally, the fragmentation of habitats could isolate animal populations, making it harder for them to access food, water, and mating sites.

Impact	Fauna
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: some species could be displaced from the project site during construction, including the NT and VU species.
Receptor Sensitivity	Low – No presence of NT and VU fauna species in and around the project area.

Magnitude	Medium as site construction activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Flora

The construction process of the proposed solar PV and other associated facilities and structures will involve clearing of the existing vegetation cover (mainly grass) and trees. Although the project will be located in an area with sparse vegetation, various pockets of vegetation was evident during the site visit, with characteristic vegetation dominated mainly by *Acacia tortilis*. both magnitude and significance of the impact will be direct, permanent and minor.

Impact	Flora
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: Vegetation restoration activities can be undertaken during the operation phase.
Receptor sensitivity	Low – no documented presence of endangered flora species
Magnitude	Low-to-medium: Vegetation clearance will be restricted only for the targeted sections of the Project site earmarked for installation of solar panels, and the accompanying infrastructure, including ancillary facilities.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.7. Soil Erosion

During construction, excavation activities will expose soil, resulting in wind erosion and surface runoff during rainfall. This is unavoidable given the loose soil conditions at the project site. Furthermore, the property is mostly level, with slight slopes in some areas. It is thus susceptible to soil erosion, particularly during rainy seasons. The impact will be small because construction activities will be limited to certain sites on the project site.

Impact	Soil erosion
Type of impact	Negative
Type of effect	Direct and indirect as the project site is located in an area prone to soil erosion
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: The agents of erosion tend to be seasonal and spatial.
Receptor sensitivity	Low – the project site is located in an area with low agricultural activities so eroded soil will not cause eutrophication/alter water quality of any nearby surface water resources in the Project Area.
Magnitude	Low – soil disturbance and loosening will be restricted only for the targeted sections of the Project site earmarked for installation of solar panels, and the accompanying infrastructure, including ancillary facilities.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.8. Wastes

Solid waste generation

The construction phase of the proposed hybrid power plant in Baidoa is likely to lead to an increase in solid waste generation, which could pose environmental and health risks if not properly managed. Construction activities will produce various types of waste, including packaging materials, scrap metal, concrete debris, plastic, and organic waste from worker camps. Improper disposal or accumulation of these materials could contaminate the surrounding environment, polluting soil and water sources, and posing risks to local wildlife and human health. Additionally, waste from machinery maintenance, such as oil filters and batteries, could further exacerbate environmental pollution.

Impact	Solid wastes generation
Type of impact	Negative
Type of effect	Direct and indirect as the project will involve the use of different sets

	of materials during construction.
Duration	Short term
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low – the project site is located in an area with no adjacent settlements.
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Liquid waste generation

The construction phase of the proposed hybrid power plant in Baidoa may lead to increased liquid waste generation, which poses potential environmental risks if not properly managed. Sources of liquid waste include wastewater from worker camps, excess water used in construction activities, and possible spills from machinery and fuel handling. Improper disposal of such waste could result in contamination of local water sources, affecting both the environment and public health. Leaking oils, chemicals, and detergents from machinery maintenance or construction processes could pollute surrounding soils and groundwater, further exacerbating the issue. Wastewater, including black and grey water from toilets and sanitation facilities, is expected to be generated because of workers' sanitation facilities. Seepage from spilled fuels and oils and leaking machinery can also negatively impact groundwater water which could lead to potential contamination. Generally, due to the localized area of impact, the overall significance of the related impacts, especially on water quality is considered to be minor, provided the necessary mitigation/ management measures are implemented.

Impact	Liquid wastes
Type of impact	Negative
Type of Effect	Direct
Duration	Short Term during construction phase.
Reversibility	Water abstraction is expected to be reversible.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.2. Impacts on Infrastructure and Utilities

6.2.2.2.1. Water Consumption

The construction phase of the proposed hybrid power plant in Baidoa is likely to increase water consumption, which could place additional strain on local water resources, especially in an area where water scarcity is a concern. The demand for water will rise for activities such as dust suppression, concrete mixing, machinery operation, and worker camp needs. Excessive water extraction from local sources could deplete available water supplies for nearby communities and agricultural activities, leading to potential conflicts over resource use. Furthermore, if water management practices are not carefully implemented, the inefficient use or contamination of water could further exacerbate the issue.

Impact	Water consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as the water will be required during both construction and operation phases
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor sensitivity	Medium due to importance of water supply conditions within the project area. Additionally, BEC-BAIDOA will invest in its own borehole for the project activities
Magnitude	Low as water requirements are considered relatively low during the construction phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.2. Energy Consumption

The operation of heavy machinery, generators, and equipment for construction activities will require substantial amounts of energy, placing additional strain on the region's already limited energy infrastructure. This increased energy demand could lead to power shortages, affecting local communities and businesses. Furthermore, if the energy supply relies on non-renewable sources, the environmental impact could be exacerbated, contributing to air pollution and climate change.

Impact	Energy consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as energy will be required during both construction and operation phases
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but BEC-BAIDOA will be required to implement energy saving measures at the project site during construction and operation phases.
Magnitude	Low as energy requirements are considered relatively low during the construction phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3. Impacts on Social Environment

6.2.2.3.1. Impact to Livelihoods from Grazing Land Access Restrictions

The establishment of the power plant and associated infrastructure, such as roads and transmission lines, will require significant land clearance, potentially displacing livestock grazing areas. This loss of potential grazing land can lead to decreased pasture availability for livestock, which are a primary source of income and sustenance for many local families. Furthermore, the disruption of traditional grazing patterns could result in increased competition for remaining land and water resources, exacerbating tensions among local communities.

Impact	Impact to livelihoods from grazing land access restrictions
Type of impact	Negative
Type of effect	Direct
Duration	Long term as such impact will occur during construction and continue into the operation phase as the boundary fence will still be present.
Reversibility	Irreversible as land area will be changed into a solar PV project development which no longer can be used for grazing
Receptor Sensitivity	Low as the area to be occupied by the site is not unique pastureland and there are adjacent areas of similar quality available locally and throughout the region.
Magnitude	Low as the number of pastoralists active is relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3.2. Archaeology and Cultural Heritage

The proposed project site did not have archeological and cultural heritage elements. This observation was confirmed during field assessments and consultations with stakeholders and local people surrounding the project site revealed that there are no remnants or signs of historical and/or prehistoric occupation. However, site preparation and earthwork activities for the construction of PV arrays and other Project components, such as central inverters, underground transmission cables, internal road network, buildings, and so on, may result in unforeseen finds of prehistoric or historical artefacts.

Impact	Archaeology and cultural heritage
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to the construction phase only
Reversibility	Could be irreversible as if sites are damaged or disturbed
Receptor Sensitivity	Low as the likelihood of such discoveries is low
Magnitude	Medium given that if sites are discovered they could be of value and importance
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3.3. Trespassing of Unauthorized Personnel

The influx of workers, contractors, and suppliers, combined with the construction site's large scale, may make it difficult to secure the area effectively. Trespassers may gain access to restricted zones, leading to potential safety hazards, theft, or vandalism. Unauthorized individuals may also cause disruptions to the construction process or interfere with machinery and materials, leading to delays or increased costs.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential permanent health and safety impacts
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3.4. Worker Influx – Incoming Workforce and Workforce Accommodation

The anticipated impacts that could be generated by the influx of workers and the construction of the living camp are similar in nature. In particular, the influx of workers may create a strain on existing infrastructure, mainly water and sanitation systems. In addition, the presence of a large number of workers, mainly men, may lead to an increased spread of communicable diseases, and gender based violence. Women, especially young girls, are threatened by the presence of the incoming workforce seeking sexual services. Interactions between incoming workers and women are likely to increase the incidence of communicable diseases, raise tensions and increase gender-based violence.

Impact	Worker influx
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	High as over 100 workers are expected to be engaged directly or indirectly during the construction phase.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.5. Gender-based Violence

The construction of a hybrid power plant in Baidoa may increase the risk of gender-based violence (GBV) due to increased interaction between workers and local populations, especially with inadequate safeguards. GBV can lead to physical, emotional, and sexual abuse, disproportionately affecting women and girls, causing long-term social and psychological harm. If not addressed, GBV incidents could strain community relations, disrupt social structures, and undermine the project's social sustainability.

Impact	Gender-based violence
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety of the victims
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.6. Labour Disputes

Labor disputes during construction can significantly impact the project and local community, leading to work stoppages, delays, increased costs, and damaged relationships. These disputes can stem from wage disagreements, poor working conditions, unequal employment opportunities, or conflicts between local workers and external laborers. If not managed properly, these disputes can also contribute to broader social

issues, such as security risks and disruption of livelihoods. Effective communication, fair labor practices, and dispute resolution mechanisms are crucial to minimize these impacts.

Impact	Labour disputes
Type of impact	Negative
Type of Effect	Direct
Duration	Short term during the construction phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	Medium on the basis that it can disrupt timelines for construction activities.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.7. Child and Forced Labour

Child and forced labor during construction can have severe negative impacts on the project and local community. Child labor exposes children to hazardous conditions, deprives them of education, and causes long-term physical and psychological harm. Forced labor exploits vulnerable individuals under coercion or threat, violating human rights, creating unsafe work environments, and contributing to social inequality. These practices can damage the project's reputation, lead to legal and regulatory repercussions, loss of investor confidence, and community opposition. Preventing child and forced labor requires strict enforcement of labor standards, regular monitoring, and collaboration with local stakeholders.

Impact	Child and forced labour
Type of impact	Negative
Type of Effect	Direct
Duration	Short term during construction phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High on the basis that it violates human rights
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.8. Security

The security situation in Baidoa City, Somalia, is unstable but still faces threats from insurgent groups, local conflicts, and crime. These risks could significantly impact the construction phase of a proposed hybrid solar power plant, leading to delays, increased costs, and potential harm to personnel.

Impact	Security
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	Medium given that could result in potential health and safety risks
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.2.2.3.9. Occupational Health and Safety

Workers will confront occupational health and safety hazards during the construction phase. Slips and falls, tool use, being struck by items, moving machinery, working in confined spaces, exposure to chemicals, hazardous materials, bright sunlight, high temperatures, and electric shocks and burns when handling live components are all examples of such hazards. These risks increase the possibility of injury or death because of an accident. The impact on occupational health and safety during the construction phase is expected to be somewhat considerable. All construction activities will be constrained to the project site, resulting in high sensitivity and low magnitude.

Contractors involved in the construction of the hybrid power plant shall be required to develop and implement a comprehensive Occupational Health and Safety (OHS) plan. This plan should address all potential hazards workers may face, including risks related to heavy machinery operation, working at heights during solar panel

installations, electrical hazards, exposure to extreme weather conditions, and potential fire and explosion risks from BESS and fuel storage. The OHS plan should incorporate proper personal protective equipment (PPE) requirements, emergency response procedures, worker training programs, and regular safety audits to ensure compliance. Additionally, clear protocols for handling hazardous materials, mitigating dust and noise pollution, and preventing accidents should be established to protect both workers and the surrounding community.

Similarly, a detailed operation manual for the power plant should be prepared to guide personnel in maintaining a safe working environment throughout the facility's lifespan. This manual should outline standard operating procedures (SOPs) for equipment handling, regular maintenance schedules, and risk mitigation measures to prevent accidents and ensure efficient operations. It should include safety guidelines for battery storage system management, fire suppression strategies, and protocols for responding to emergencies such as electrical faults, fuel leaks, or system failures. Periodic OHS training and drills should also be conducted to keep operational staff well-prepared for any unforeseen incidents.

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety s the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3.10. Community Health and Safety Risks

The construction phase of the proposed hybrid power plant in Baidoa may pose significant community health and safety risks due to increased exposure to construction-related hazards. The movement of heavy machinery, noise, dust, and emissions could negatively affect air quality, leading to respiratory issues and other health problems for nearby residents. Additionally, the influx of workers may strain local healthcare facilities and services. Safety risks could arise from accidental injuries, road accidents involving construction vehicles, or exposure to hazardous materials like fuel or chemicals. Local communities may also be exposed to increased security risks, particularly if proper safety measures are not in place.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Major
Significance of the impact with mitigation	Minor

6.2.2.3.11. Fire Hazards

The construction phase may increase fire hazards due to the presence of flammable materials, fuel storage, and the operation of heavy machinery and equipment. Accidental sparks from welding, machinery, or electrical faults could ignite fires, especially in dry conditions, posing risks to workers, nearby communities, and the environment. Furthermore, improper storage or handling of flammable substances, such as fuel or chemicals, could lead to hazardous situations, including uncontrolled fires. These fire risks could cause significant property damage, disrupt construction activities, and harm local ecosystems.

Impact	Fire hazards
Type of impact	Negative
Type of effect	Direct
Duration	Short-term during the construction phase.
Reversibility	Could be irreversible as it could result in potential irreversible risks

Receptor sensitivity	High as safety s the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3. IMPACTS DURING OPERATION PHASE

6.3.1. Positive Impacts

6.3.1.1. Employment Creation

Employment opportunities will be created during the operation phase of the project. Opportunities that will be created include unskilled, semi-skilled to skilled jobs. These will involve security personnel, and staff to operate and maintain the Mini-grid. Employment will increase skill transfers. The impact significance is low as it will employ people to manage the station. The recommended enhancement measures include; BEC-BAIDOA ensuring that they prioritise the local community in allocating job opportunities, ensure that job opportunities are not discriminatory; and provide equal opportunities to both men and women in employment.

6.3.1.2. Reduction of Pollution Associated with Thermal Power Generation

BEC-BAIDOA plans to establish a hybrid power plant to reduce its reliance on thermal power generation and reduce greenhouse gas emissions. The plant, which combines solar, Battery Energy Storage System (BESS), and diesel, is expected to significantly reduce emissions compared to the existing diesel power plant. Solar energy can replace a significant portion of diesel-generated electricity, potentially cutting GHG emissions by up to 40-60% depending on the plant's operational capacity. The Battery Energy Storage System (BESS) enhances efficiency by storing excess solar energy for later use, reducing the need for diesel during peak demand. This transition not only lowers carbon emissions but also reduces the plant's overall environmental footprint, contributing to long-term sustainability goals. The proposed hybrid power plant is expected to be a reliable and affordable solution for consumers and organizations.

6.3.1.3. Improved Quality of Life

Access to electricity at the household level and schools will enable children to study longer hours and access education programs through radio and TV channels. This will also allow schools to utilize information technology and communication, which are becoming a part of the education sector. The impact is significant as it will provide power to schools over a long period, allowing for additional study time in the night and morning. Enhancements proposed include connecting more learning institutions with electricity and partnering with the South West State government for street lighting. Electricity access will also improve communication, as charging mobile phones will be easier and cheaper. Access to mass media like radio and TV will provide households with a wide range of information for decision-making. This maiden project aims to supply power through solar due to increasing demand in BAIDOA, South West State and the FRS. Once operational, household and public institutions, such as dispensaries and shopping centers, will benefit from stable and affordable power supply.

6.3.2. Negative Impacts

6.3.2.1. Impacts on Biophysical Environment

6.3.2.1.1. Landscape and Visual

During the operation phase of the proposed hybrid power plant in Baidoa, the landscape and visual environment may be negatively impacted by the presence of large-scale infrastructure such as the power plant facility, transmission lines, and associated structures. The height and design of these structures could alter the natural aesthetic of the area, potentially disrupting the scenic views and visual appeal of the surrounding landscape. The visibility of the plant, especially from nearby residential areas or rural lands, could lead to concerns about visual pollution and its impact on the quality of life for local communities.

Impact	Landscape and visual
Type of impact	Negative
Type of effect	Direct and Indirect
Duration	Long term as it will be relevant all throughout operation phase

Reversibility	Irreversible as visual impacts will be relevant all throughout the operation phase
Receptor Sensitivity	Low given that the location of the project in an otherwise rural setup with a few settlements.
Magnitude	Medium given that project will be visible within immediate vicinity and up to some kilometers
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3.2.1.2. Soil, Groundwater and Surface Water Contamination

During the operation phase, there is a potential risk of soil, groundwater, and surface water contamination due to the management and disposal of waste products, chemicals, and cooling fluids used in the plant's operation. Leaks or spills of fuel, oil, and other hazardous substances could seep into the soil, contaminating it and potentially reaching groundwater reserves, which are crucial for local drinking water and agriculture. Additionally, runoff from the plant's operational areas could carry pollutants into nearby surface water bodies, affecting water quality and aquatic life.

Impact	Soil, ground water and surface water contamination
Type of impact	Negative
Type of effect	Direct as it will affect soil only
Duration	Short-term changes in soil character and chemical composition may occur, but long-term consequences are unlikely unless major contamination is cleaned up.
Reversibility	Reversible as localized spills and soil compacted areas can be cleaned and restored.
Receptor Sensitivity	Low – the quality of the soil is not unique in the area and does not have significant agricultural value.
Magnitude	Low as site the contamination is likely to occur only in a few restricted locations within the Project Site.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.1.3. Flood Risks

During the operation phase, there could be an increased risk of flooding due to changes in land use and water drainage patterns around the facility. The construction of infrastructure such as roads, buildings, and paved surfaces could reduce natural water absorption in the area, leading to increased surface runoff during heavy rains. This could overwhelm local drainage systems and lead to localized flooding, particularly in nearby communities or low-lying areas. Additionally, the alteration of natural landscapes to accommodate the power plant could exacerbate flood risks.

Impact	Flood risk
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term if changes to natural drainage patterns are introduced, although this will be avoided to the extent possible.
Reversibility	Changes to natural drainage flows are likely to be reversible as they could be restored once the site is decommissioned and restored.
Receptor Sensitivity	Medium – nearby land users that could be impacted from changes in drainage flows.
Magnitude	Low-to medium as the generation of floodwater is seasonal although could impact receptors outside of the Project Site located within the Project Area.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor.

6.3.2.1.4. Air Quality

Dust

During the operation phase, dust emissions could negatively impact air quality, particularly around the construction site and facility. Activities such as the movement of vehicles, equipment, and material handling could generate dust, which may be carried by the wind and affect surrounding areas. This could pose health risks to local communities, especially vulnerable groups such as children, the elderly, and individuals with

respiratory conditions. Prolonged exposure to dust can lead to respiratory problems, eye irritation, and other health issues.

Impact	Air quality (Dust)
Type of impact	Negative
Type of effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions at the end of the project when appropriate mitigation measures are implemented.
Receptor sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Low-to-medium given that the generation of dust is expected to be from extent sources during the operation phase.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Vehicle and genset exhaust emissions

Air quality could be negatively affected by emissions from vehicles and generators used on-site. The movement of operational vehicles and equipment, as well as the use of backup diesel generators, could release pollutants such as carbon monoxide (CO), nitrogen oxides (NOx), sulfur dioxide (SO₂), and particulate matter (PM) into the air. These emissions may contribute to air pollution, with potential adverse effects on local air quality, human health, and the environment. Prolonged exposure to these pollutants could exacerbate respiratory issues and other health problems in the local population.

Impact	Air quality (Vehicles and diesel generators exhaust emissions)
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions after construction works is completed
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of dust is limited to the Project Site, and the area is not prone to large-scale wind-blown erosion.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.1.5. Noise and Vibrations

During the operation phase of the proposed hybrid power plant in Baidoa, noise and vibrations could negatively impact the surrounding community and the local environment. The operation of machinery, generators, and other equipment within the plant will generate continuous noise, which could disturb nearby residents, particularly in rural or residential areas. Prolonged exposure to elevated noise levels can lead to health issues such as stress, sleep disturbances, and hearing problems. Additionally, vibrations from large machinery and equipment may affect nearby structures and infrastructure, potentially causing damage over time.

Impact	Noise
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities with the Project Site.
Reversibility	Reversible given that noise levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.1.6. Biodiversity

Fauna

The effects on local fauna can be varied but will generally be minimal. The presence of solar panels will alter

the natural habitat by reducing vegetation cover, which may affect wildlife associated with the area. The solar panels themselves can also cause behavioral changes in some animals, as they may reflect light or create temperature differentials, and the "lake effect"^{43,44,45} which could negatively affect avifauna by creating the "lake effect". The "lake effect" of solar power plants refers to the reflective properties of large solar panel arrays, which can resemble water bodies to migratory birds. This visual illusion may cause birds to attempt landing on the panels, mistaking them for lakes or wetlands. As a result, birds can collide with the panels or exhaust themselves searching for water, leading to injury or death. This effect can be particularly concerning for migratory species that rely on specific water bodies during their long journeys. In areas like BAIDOA, where migratory routes pass through, the "lake effect" could negatively impact local and migratory bird populations. Mitigation measures, such as using less reflective materials or creating visual deterrents, are crucial to minimizing the ecological impact on bird species.

Additionally, the proposed power plant infrastructure, such as fencing, may limit animal movement across their natural ranges, potentially disrupting migration patterns or access to water and food sources. However, the overall impact is expected to be low-medium, especially with mitigation measures in place, such as habitat restoration around the plant and designing wildlife-friendly access points. Careful monitoring of local fauna will also help minimize the long-term ecological impact.

Impact	Fauna
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Irreversible: some species could be displaced from the project site during construction, including the NT and VU species.
Receptor Sensitivity	High - Presence of NT and VU fauna species in and around the project area.
Magnitude	Low-medium as site operation activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas while others become habituated.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

Flora

The presence of infrastructure such as roads, transmission lines, and the power plant itself could disrupt natural habitats, reducing the area available for native plant species to thrive. Additionally, air emissions, water discharges, and the release of heat from the plant could degrade soil quality and water resources, which are critical for plant growth. Pollution from these activities could also lead to the spread of invasive species, further threatening the survival of local flora.

Impact	Flora
Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Reversible: Vegetation restoration activities can be undertaken during the operation phase, including the management of invasive plant species.
Receptor sensitivity	Low – no documented presence of endangered flora species
Magnitude	Low – Vegetation regeneration and restoration will ensure most open locations in the Project Site recover.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

⁴³Barros, A. J. D., & Barros, A. (2017). Ecological impacts of solar power plants: A review. *Renewable and Sustainable Energy Reviews*, 67, 47-58. <https://doi.org/10.1016/j.rser.2016.08.046>

⁴⁴Wiggins, K., & Athey, J. (2019). Assessing the impact of solar arrays on local bird populations: The case of desert environments. *Ecology and Evolution*, 9(10), 6008-6020. <https://doi.org/10.1002/ece3.5235>

⁴⁵Zeppel, M. J. B., & Murray, B. R. (2021). Solar power and its effects on avian species: An analysis of recent data. *Journal of Renewable Energy*, 16(1), 45-60. <https://doi.org/10.1080/15435075.2021.1942649>

6.3.2.1.7. Soil erosion

The installation of solar panels typically involves clearing the land and removing existing vegetation, which can initially increase the risk of soil erosion, especially in an arid environment like Baidoa where soil is often loose and prone to erosion. However, once operational, the panels themselves can provide some protection by reducing the impact of wind and water on the soil surface.

Impact	Soil erosion
Type of impact	Negative
Type of effect	Direct and indirect as the project site is located in an area prone to soil erosion
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized. Additionally, the agents of erosion tend to be seasonal and spatial.
Receptor sensitivity	Low – the project site is located in an area with low agricultural activities so eroded soil will not cause eutrophication/alter water quality of any nearby surface water resources in the Project Area.
Magnitude	Low – the solar panels will provide protection by reducing the impact of wind and water on the Project Site’s soil surface.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3.2.1.8. Wastes

Solid waste generation

Solid waste generation is expected from various sources, including plant maintenance activities, packaging materials, and waste from operational equipment. This could include discarded materials such as plastics, metal scraps, broken machinery parts, and used filters, as well as domestic waste from workers on-site. If not properly managed, the accumulation of solid waste could lead to environmental pollution, affecting soil, water, and local wildlife. Improper disposal practices could also contribute to unsanitary conditions around the plant and nearby communities.

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect as the project will involve the use of different sets of materials
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Liquid waste generation

Liquid waste generation is anticipated from various activities such as cooling processes, equipment maintenance, and wastewater from sanitation facilities. This could include wastewater containing oils, chemicals, or other pollutants from plant operations, as well as runoff from industrial areas. If improperly managed, this liquid waste could contaminate nearby soil and water sources, posing risks to both the local environment and public health.

Impact	Waste water
Type of impact	Negative
Type of Effect	Direct
Duration	Short Term as it is limited to the construction phase only
Reversibility	Water abstraction is expected to be reversible. The use of waste treatment/disposal facilities is expected to be non-reversible as once space in landfill facilities is used, this will be permanently used.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact without mitigation	Negligible

6.3.2.2. Impacts on Infrastructure and Utilities

6.3.2.2.1. Water Consumption

During the operation phase, water consumption is relatively low compared to other types of power generation. However, some water is required for routine maintenance activities, such as cleaning the solar panels to ensure optimal performance. On average, cleaning solar panels typically requires about 2-4 litres of water per panel. For the proposed 3.5 MW solar farm, the number of panels can vary based on the panel specifications, but a rough estimate can be made. For example, if each panel is around 300 watts, a 3.5 MW installation would have about 11,667 panels (3,500,000 watts / 300 watts per panel) translating to approximately 40,000 litres per cleaning session. The water demand for a 4MW generator set (genset) will depend on several factors, including the type of generator, cooling system design, number of generators and operational conditions. However, for a diesel genset, the water demand for cooling typically ranges from 1.5 to 2.5 liters per kWh produced. Using an average water consumption of 2 litres per kWh, the estimated water demand for a 4 MW genset operating continuously could be around 8,000 liters per hour.

In arid regions like Baidoa, where water resources are scarce, the amount of water used for these cleaning operations can be a concern. Efficient water management practices, such as using minimal amounts of water and employing alternative cleaning methods like dry or semi-dry techniques, can help reduce water consumption. Additionally, capturing and reusing rainwater or implementing water-saving technologies can further mitigate the impact on local water resources. By adopting these measures, the hybrid power plant can minimize its water footprint and contribute to the sustainable management of scarce water resources in the region. The impact is assessed to be negligible due to very low magnitude of the impact.

Impact	Water consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as the water will be required during both construction and operation phases
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor sensitivity	Medium due to importance of water supply conditions within the project area. Additionally, BEC-BAIDOA will invest in its own borehole for the project activities
Magnitude	Low as water requirements are considered relatively low during the operation phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.2.2. Energy Consumption

The hybrid power plant, which integrates renewable energy sources like solar and Battery Energy Storage Systems, has low energy consumption, but still relies on diesel generators as a backup. This fuel, typically diesel, contributes to inefficient energy use and higher carbon emissions compared to fully renewable alternatives. During periods of low solar availability or high-energy demand, generators may run for extended periods, consuming significant amounts of fuel, increasing operational costs and pollution. This inefficiency and greenhouse gas emissions further dampen the sustainability advantages of the hybrid system, highlighting the need for more optimized renewable energy solutions to reduce fuel consumption.

Impact	Energy consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as energy will be required during both construction and operation phases
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but BEC-BAIDOA will be required to implement energy saving measures at the project site during construction and operation phases.
Magnitude	Low as energy requirements are considered relatively low during the operation phase of the project
Significance of the impact without mitigation	Minor

Significance of the impact with mitigation	Minor
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6.3.2.3. Impacts on Social Environment

6.3.2.3.1. Impact to Livelihoods from Grazing Land Access Restrictions

The proposed Hybrid Power Plant's operation could potentially affect local livelihoods, especially for livestock-dependent communities. The installation of solar panels could limit traditional grazing areas, potentially affecting animal health and productivity. The impact of trespassing and unauthorized access is expected to be minor to negligible.

Impact	Impact to livelihoods from grazing land access restrictions
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term the potentials of grazing within the Project Site will be gone permanently.
Reversibility	Irreversible
Receptor sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.3.2. Trespassing of Unauthorized Personnel

The danger of unauthorized persons entering the Project Site can provide a number of obstacles, but it is projected to be minor during the Project's operational period. Unauthorized entry to the facility can pose safety risks, such as accidents or injuries owing to unfamiliarity with the equipment and operational protocols. Furthermore, there is a possibility of vandalism, theft, or damage to valuable components such as solar panels and electrical equipment.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of Effect	Direct
Duration	Short term depending on security measures at the Project Site.
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3.2.3.3. Worker Influx – Incoming Workforce

The influx of workers, despite the potential for increased investments in other sectors, could have significant impacts on the local community and infrastructure. The increased power supply in the city and surrounding areas could lead to increased demand for housing and amenities, potentially increasing competition for accommodation and services.

Impact	Worker influx – incoming workforce and workforce accommodation
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as some workers are likely to permanently settle in the Project Area
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low because of homogenous nature of the local Somali communities.
Magnitude	Low-to-medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.4. Gender-based Violence

The operation phase of a hybrid power plant in BAIDOA may still pose a risk of gender-based violence, albeit at a reduced scale compared to the construction phase. The presence of long-term employees could perpetuate unequal gender relations and create environments where GBV might occur, affecting the community's social fabric and vulnerable groups' well-being. Inadequate monitoring, weak enforcement of

workplace policies, and insufficient community awareness programs could exacerbate these risks. Effective operational protocols and ongoing community engagement are crucial to mitigate these risks.

Impact	Gender-based violence
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as some workers are likely to permanently settle in the Project Area
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	High
Magnitude	Low-to-medium
Significance of the impact without mitigation	Major
Significance of the impact with mitigation	Minor

6.3.2.3.5. Labour Disputes

Labor disputes can significantly impact the project's performance and the local community. These disputes can lead to strikes, disrupting the plant's operations and affecting power reliability. Financial losses for operators and negative impacts on local businesses and residents are also expected. Prolonged disputes can damage relationships, fostering mistrust and tension, and increase the risk of violence or unrest. Addressing these disputes promptly is crucial for the plant's smooth operation and the well-being of the local community.

Impact	Labour disputes
Type of impact	Negative
Type of Effect	Direct
Duration	Short term
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High on the basis that it can disrupt power plant operations
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.6. Child and Forced Labour

Child labor and forced labor in power plants can lead to long-term physical and psychological harm, undermine socio-economic structures, and perpetuate cycles of poverty and inequality. These practices violate human rights, create fear and mistrust among workers, and can result in legal consequences and increased scrutiny from regulatory bodies. Addressing these issues through ethical labor practices, community engagement, and effective monitoring systems is crucial for ensuring the integrity of the hybrid power plant's operations and fostering a safe, equitable work environment.

Impact	Child and forced labour
Type of impact	Negative
Type of Effect	Direct
Duration	Short term
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High on the basis that it violates human rights
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.7. Risks Related to Poor or Inadequate Stakeholder Engagement (Conflict)

Inadequate stakeholder engagement during the operation phase can lead to negative impacts, such as strained relationships, overlooked environmental concerns, and potential opposition to the project. This can result in protests, delays, and legal challenges, disrupting power supply and increasing costs. Inadequate engagement can also damage trust, damage the plant's reputation, and hinder future collaboration. Continuous, transparent, and inclusive stakeholder engagement is crucial for the plant's smooth operation and long-term success.

Impact	Risks related to poor or inadequate stakeholder engagement (Conflict)
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as community/stakeholders' engagements need to be a continuous and regular exercise.

Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but BEC-BAIDOA will be required to implement stakeholders' engagements programmes.
Magnitude	Low-to-medium depending on implementation of mitigation measures.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.8. Occupational Health and Safety

Occupational health and safety (OHS) will be a critical concern due to potential hazards associated with plant operations. Workers may be exposed to risks such as high noise levels, machinery malfunctions, electrical hazards, and exposure to harmful emissions or chemicals. Additionally, the physical environment could present risks such as slips, trips, falls, and heat stress, especially in high-temperature areas or during maintenance activities.

Impact	Occupational health and safety
Type of impact	Negative
Type of Effect	Direct
Duration	Long term as it is expected during the entire operation phase
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High given that could result in potential health and safety risks to the workforce.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.9. Community Health and Safety Risks

During the operation phase of the proposed hybrid power plant in Baidoa, community health and safety risks could arise from the ongoing plant activities. Potential hazards include air and water pollution from emissions and discharges, which could affect the health of nearby residents, especially vulnerable groups such as children and the elderly. The presence of heavy machinery and equipment may also increase the risk of accidents or injuries to the surrounding community, particularly if safety protocols are not properly communicated or enforced. Additionally, noise and vibrations from plant operations could cause disturbances to local communities, affecting their well-being.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term & long-term
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be low when compared to the construction and existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.10. Fire Hazards

Fire threats are a severe concern to the Project Site due to the presence of electrical equipment and the dry, arid climate. The storage of fuel for generators in a hybrid power plant involves substantial fire threats, which could cause extensive damage to the power plant infrastructure, disrupt energy production, and result in injuries or fatalities. Poor ventilation, inadequate fire suppression systems, and exposure to heat or electrical sparks all contribute to these dangers. The location of the BESS shall be determined through a comprehensive Safety Analysis that considers the potential risks associated with thermal runaway—a critical failure mode in lithium-ion batteries where excessive heat triggers uncontrollable chemical reactions. This phenomenon can lead to the rapid release of energy, resulting in fires, explosions, and the emission of hazardous gases. A robust Safety Analysis shall assess factors such as safe separation distances from occupied structures, ventilation requirements, fire suppression systems, and emergency response measures. Additionally, it shall account for environmental conditions, battery chemistry, and the likelihood of cascading failures to minimize risks.

Impact	Fire hazards
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected that appropriate measures on fire suppression will be implemented during the operation phase
Reversibility	Could be irreversible as it could result in potential irreversible risks
Receptor sensitivity	High as safety is the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4. KEY IMPACTS DURING THE DECOMMISSIONING

The decommissioning phase of a hybrid power plant comprising solar photovoltaic (PV) panels, a Battery Energy Storage System (BESS), and diesel generators involves the safe dismantling and removal of infrastructure, while minimizing environmental impacts. This phase includes the proper disposal of solar panels, batteries, and associated equipment, as well as the decommissioning of the gensets, which may contain hazardous materials like oil and fuel residues. Special care must be taken to manage waste, prevent soil and groundwater contamination, and handle potentially toxic substances in the BESS. Additionally, the site will need to be restored, which could involve removing any residual structures, addressing soil erosion, and replanting vegetation.

6.4.1. Positive Impacts

6.4.1.1. Employment Opportunities

Once the project has served its purpose it will then be decommissioned. This will involve demolition and removal of the facility. During demolition, unskilled, semi-skilled and skilled employment opportunities will be available to the public.

6.4.1.2. Site Rehabilitation

After demolition of the proposed project, rehabilitation of the project site will be carried out to restore it to its original status or to a better state than it was. This will include replacement of topsoil and re-vegetation, which will lead to restoration of the visual, vegetative and aesthetic state of the site.

6.4.2. Negative Impacts

6.4.2.1. Impacts on Biophysical Environment

6.4.2.1.1. Impacts on Landscape and Visual

During the decommissioning phase, landscape and visual impacts could arise from the removal of infrastructure, including solar PV panels, the Battery Energy Storage System (BESS), and diesel generators. The dismantling of these structures may lead to temporary visual disruptions, such as the presence of construction equipment, heavy machinery, and cleared areas. The removal of transmission lines and other associated infrastructure could result in visible scars on the landscape.

Impact	Landscape and visual
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term
Reversibility	Irreversible
Receptor Sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.4.2.1.2. Impacts on Biological Environment

During the decommissioning phase, the biological environment may be impacted by disturbances to local flora and fauna. The dismantling of infrastructure, increased human activity, and heavy machinery operations can disrupt wildlife habitats, and displace species. Soil disturbances and vegetation removal may lead to habitat

degradation, while noise and vibrations could stress or displace local fauna. Additionally, improper handling of hazardous materials, such as residual chemicals from the Battery Energy Storage System (BESS) or diesel generators, could contaminate nearby ecosystems.

Impact	Biological environment
Type of impact	Negative
Type of Effect	Direct and indirect as it will affect Fauna /Flora
Duration	Short term as impacts will be limited to the decommissioning period.
Reversibility	Reversible: some species could be removed from the site after decommissioning.
Receptor Sensitivity	Low
Magnitude	Medium as site decommissioning activities will be restricted only in the project site.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.1.3. Solid Waste Generation

During the decommissioning phase of the hybrid power plant in Baidoa, significant amounts of solid waste will likely be generated, including dismantled solar panels, components of the Battery Energy Storage System (BESS), diesel generator parts, electrical wiring, metal scraps, and construction debris. Improper disposal of these materials could lead to environmental pollution, with potential soil and water contamination from hazardous substances such as metals, plastics, and chemical residues. Additionally, accumulated waste could create unsightly conditions and negatively affect the surrounding community and ecosystem.

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect as different sets of materials from decommissioning will be available
Duration	Short term as it will likely occur only during decommissioning phase.
Reversibility	Reversible
Receptor sensitivity	Low – the project site is located in an area with no adjacent settlements.
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.1.4. Noise and Vibrations

Noise and vibrations from heavy machinery, equipment dismantling, and transport activities could affect the surrounding environment and nearby communities. Prolonged exposure to high noise levels may disturb local residents, disrupt wildlife, and negatively affect the well-being of workers and nearby populations. Vibrations caused by demolition activities and the movement of machinery could also damage nearby structures or disturb soil stability.

Impact	Noise and Vibrations
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities with the Project Site.
Reversibility	Reversible given that noise levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.2. Impacts on Infrastructure & Utilities

6.4.2.2.1. Water Resources

Water consumption may increase due to activities such as dust suppression, equipment cleaning, and site restoration. Excessive or inefficient water use could strain local water resources, particularly in a region where water scarcity is a common challenge. This could affect the availability of water for nearby communities, agriculture, and ecosystems.

Impact	Water resources
Type of impact	Negative
Type of Effect	Direct
Duration	Short Term as it is limited to the decommissioning phase
Reversibility	Reversible as water resources in general can be considered rechargeable
Receptor Sensitivity	Medium due to importance of water supply conditions within the area
Magnitude	Low as water requirements are considered relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3. Impacts on Social Environment

6.4.2.3.1. Impacts on Occupational Health and Safety

Occupational safety and health (OSH) risks may arise due to the use of heavy machinery, dismantling of structures, handling of hazardous materials, and high-risk activities such as working at heights or in confined spaces. Workers may face exposure to electrical hazards, sharp objects, falling debris, or toxic substances from components like solar panels, Battery Energy Storage Systems (BESS), and diesel generators.

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the decommissioning phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.2. Impact to Livelihoods from Grazing Land Access Restrictions

During the decommissioning phase, access to grazing lands may be temporarily restricted due to the presence of machinery, equipment, and ongoing site restoration activities. This could disrupt the livelihoods of local pastoralist communities who rely on these areas for livestock grazing, potentially leading to reduced access to critical resources and increased pressure on alternative grazing lands. However, the BEC-BAIDOA will not be in anyway obliged for any compensatory action because the proposed project site is private and is under legal ownership of BEC-BAIDOA.

Impact	Impact to livelihoods from grazing land access restrictions
Type of impact	Negative
Type of effect	Direct/indirect
Duration	Short term because the decommissioning activities will take a shorter period.
Reversibility	Reversible as land area will be changed into other land use activities, including grazing.
Receptor Sensitivity	Low as the area is not unique pastureland and there are adjacent areas of similar quality available locally and throughout the region.
Magnitude	Low as the number of pastoralists active is relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.4.2.3.3. Trespassing of Unauthorized Personnel

Decommissioning activities may pose health and safety risks to locals. Unauthorized entry into the project site by curious locals, contractors without authorization and even herdsmen, especially excavation-area working areas can result in injury or fatality.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of effect	Direct
Duration	Short term
Reversibility	Could be irreversible as it could result in potential permanent health and safety impacts
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.

Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.4. Worker Influx – Incoming Workforce

The decommissioning phase of workforce can have negative impacts on the local community and environment. The increase in the population can strain resources like water, food, and healthcare services, leading to competition. Temporary accommodation camps may cause environmental degradation, improper waste disposal, and pressure on land use. In this regard, the siting of accommodation facilities for the workers shall be in defined areas, and will be done following proper procedures, including undertaking of environmental and social impact assessments. The social fabric may be disrupted, causing tensions, security risks, and conflicts. Poorly managed worker camps can exacerbate these issues. Proper planning and adequate facilities are crucial to mitigate these negative effects.

Impact	Worker influx
Type of impact	Negative
Type of Effect	Direct
Duration	Short term
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.5. Gender-based Violence

The predominantly male workforce and stress of decommissioning activities can exacerbate power imbalances and vulnerabilities, leading to increased risks of sexual harassment, exploitation, and abuse, particularly for women and girls. Inadequate supervision, limited reporting mechanisms, and weak enforcement of protective measures contribute to GBV incidents. Preventive measures like strong policies, awareness training, and support services are crucial for community safety and a safe decommissioning process.

Impact	Gender-based violence
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety of the victims
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.6. Labour Disputes

Labor disputes during the decommissioning phase can significantly affect the project's completion and local economy. Workers may face uncertainty about job security, severance pay, or contract termination, leading to disputes over wages, benefits, and working conditions. Unresolved disputes can escalate tensions, negatively affecting morale and productivity. Effective conflict resolution and communication strategies are crucial to mitigate these challenges.

Impact	Labour disputes
Type of impact	Negative
Type of Effect	Direct
Duration	Short term during the decommissioning phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	Medium on the basis that it can disrupt timelines for decommissioning activities.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.7. Child and Forced Labour

The decommissioning phase of a project can lead to child and forced labor if improper practices are not enforced, increasing vulnerability for marginalized groups like children. Child labor deprives young individuals of education and development opportunities, while forced labor violates human rights and dignity. Unethical practices can harm individuals, the project's reputation, and community trust. Strict monitoring and adherence to labor laws are crucial to prevent these issues.

Impact	Child and forced labour
Type of impact	Negative
Type of Effect	Direct
Duration	Short term during decommissioning phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High on the basis that it violates human rights
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.8. Security

Security risks during the decommissioning phase of a hybrid power plant in Baidoa may arise from the potential for theft, vandalism, or unauthorized access to the site, given the valuable materials and equipment being dismantled and removed. The process may also attract opportunistic criminal activities due to the temporary nature of the phase and reduced site oversight. Additionally, community tensions could escalate if stakeholder engagement is insufficient, leading to misunderstandings about the project's closure.

Impact	Security
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	Medium given that could result in potential health and safety risks
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.9. Community Health and Safety Risks

Community health and safety risks during the decommissioning phase could stem from increased traffic, noise, and dust emissions generated by dismantling activities and the transportation of materials. Improper handling or disposal of hazardous substances, such as residual fuel or battery materials, poses risks of contamination to local water and soil, potentially affecting community health. Additionally, the presence of heavy machinery and demolition activities could lead to accidents involving nearby residents if adequate safety barriers and signage are not in place.

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.10. Fire Hazards

During the decommissioning phase, fire hazards increase due to equipment dismantling and combustible materials. Inadequate fire prevention measures can lead to injuries, property loss, and environmental damage. A fire outbreak can disrupt activities, delay project timelines, and strain emergency response resources. Smoke and pollutants released during a fire can negatively impact air quality, posing health risks to nearby residents.

Impact	Fire hazards
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Type of impact	Negative
Type of effect	Direct
Duration	Short-term during the decommissioning phase.
Reversibility	Could be irreversible as it could result in potential irreversible risks
Receptor sensitivity	High as safety is the Project's highest priority.
Magnitude	Low given that it is generally controlled throughout general best practice measurements
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.5. SUMMARY OF THE IMPACTS

The tables below provide a summary of the key impacts of the Project on the physical, biological, and social environment and infrastructure and utilities during the construction, operation and decommissioning phases. The final specific plan and monitoring requirement for the project will be annexed to the ESIA while all inputs will be completed.

6.5.1. Construction Phase

Table 6-4: Summary of key impacts during the Construction phase of the solar plant

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Long term	Irreversible	Low	Medium	Minor	Negligible
	Soil, ground and surface water contamination	Direct	Short term	Reversible	Low	Low	Moderate	Minor
	Flood risk	Direct	Long term	Reversible	Medium	Low/medium	Moderate	Minor
	Air quality (Dust)	Direct	Short term	Reversible	Low	Medium	Moderate	Negligible
	Air quality (vehicle and genset emissions)	Direct	Short-term	Reversible	Low	Medium	Moderate	Minor
	Noise and Vibrations	Direct	Short term	Reversible	Low	Medium	Minor	Negligible
	Biodiversity (Fauna)	Direct	Long-term	Irreversible	Low	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct	Long-term	Reversible	Low	Low/medium	Moderate	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
Wastes (liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible	
Impacts on infrastructure and utilities	Water consumption	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
	Energy consumption	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on social environment	Impacts on livelihoods from grazing land access restrictions	Direct	Long term	Irreversible	Low	Low	Minor	Negligible
	Archaeology and cultural heritage	Direct	Short term	Irreversible	Low	Medium	Minor	Negligible
	Trespassing of unauthorized personnel	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Worker influx – incoming workforce	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Gender-based violence	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Labour disputes	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Child and forced labour	Direct	Short term	Irreversible	High	Medium	Minor	Minor
	Security	Direct	Short term	Irreversible	Medium	Low	Minor	Minor
	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Minor	Negligible
Community health and safety risks	Direct	Short term	Irreversible	High	High	Moderate	Minor	
Fire hazards	Direct	Short-term	Irreversible	High	Low	Minor	Negligible	

6.5.2. Operation Phase

Table 6-5: Summary of key impacts during the Operation phase of the solar plant

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and Visual	Direct/indirect	Long term	Irreversible	Low	Medium	Minor	Negligible
	Soil, ground/surface water contamination	Direct	Short-term	Reversible	Low	Low	Moderate	Minor
	Flood risks	Direct	Long term	Reversible	Medium	Low	Moderate	Minor
	Air quality (Dust)	Direct	Short-term	Reversible	Low	Low/medium	Moderate	Minor
	Air quality (Vehicle and genset emissions)	Direct	Short-term	Reversible	Low	Medium	Moderate	Minor
	Noise and Vibrations	Direct	Short-term	Reversible	Low	Medium	Moderate	Minor
	Biodiversity (Fauna)	Direct/indirect	Long-term	Irreversible	High	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct/indirect	Long-term	Reversible	Low	Low	Minor	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on infrastructure and utilities	Wastes (Solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (Liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Water consumption	Direct	Short/long-term	Reversible	Medium	Low	Minor	Minor
Impacts on social environment	Energy consumption	Direct	Short/long-term	Reversible	Low	Low	Minor	Minor
	Impacts to livelihoods from grazing land access restrictions	Direct	Long term	Irreversible	Low	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short-term	Reversible	Low	Low	Moderate	Negligible
	Worker influx-incoming workforce and workforce accommodation	Direct	Short/long-term	Reversible/irreversible	Low	Low/medium	Moderate	Minor
	Gender-based violence	Direct	Short/long-term	Irreversible	High	Low/medium	Major	Minor
	Impact to livelihoods from grazing land access restrictions	Direct	Long-term	Irreversible	Low	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Worker influx – incoming workforce	Direct	Short-term	Reversible	Low	Low/medium	Moderate	Minor
	Gender-based Violence	Direct	Short/long-term	Reversible	High	Low/medium	Moderate	Minor
	Labour disputes	Direct	Short-term	Reversible	High	Medium	Moderate	Minor
	Child and forced labour	Direct	Short-term	Reversible	High	Medium	Moderate	Minor
	Security	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Risks related to poor/inadequate stakeholder engagement	Direct/indirect	Short/long-term	Reversible	Medium	Low/medium	Moderate	Minor
Occupational health and safety	Direct	Long-term	Irreversible	High	Low	Moderate	Minor	
Community health and safety risks	Direct	Short/long-term	Irreversible	High	High	Moderate	Minor	
Fire hazards	Direct	Short/long-term	Irreversible	High	Low	Moderate	Minor	

6.5.3. Construction Phase

Table 6-6: Summary of key impacts during the decommissioning phase of the solar plant

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Short term	Irreversible	Low	High	Minor	Minor
	Biological environment	Direct/indirect	Short term	Reversible/Irreversible	Low	Medium	Moderate	Minor
	Solid waste generation	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Noise and vibration	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
Impacts on infrastructure and utilities	Water resources	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
Impacts on social environment	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Minor	Minor
	Impact to livelihoods from grazing land access restrictions	Direct	Short term	Irreversible	High	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Worker influx – incoming workforce	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Gender-based violence	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Labour disputes	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Child and forced labour	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Security	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Community health and safety risks	Direct	Short term	Irreversible	High	Low	Moderate	Minor
Fire hazards	Direct	Short term	Irreversible	High	Low	Moderate	Minor	

6.6. ASSESSMENT OF CUMULATIVE IMPACTS

The Environmental and Social Impact Assessment (ESIA) considered the cumulative impacts (Table 6.7) that could result from the additional impacts of other existing and/or planned developments in the area.

Table 6-7: Summary of key cumulative impacts for the proposed power plant project

Attribute	Cumulative Impacts
Landscape and visual	Over time, the facility could alter the area's visual character, affecting cultural and aesthetic values for local communities. If other developments are planned in the region, such as additional energy or infrastructure projects, the combined visual footprint could further diminish the natural landscape's integrity. Mitigation measures should include careful site selection to minimize visibility from key viewpoints, incorporating design features that blend with the environment, and establishing vegetative buffers. Transparent engagement with stakeholders to address concerns about visual impacts is essential to balance development with the preservation of local landscape aesthetics.
Land Use	As Baidoa is a region with strong reliance on land-based activities, the project could exacerbate land-use pressures, particularly if combined with other developments such as urban expansion or additional energy projects. These impacts may lead to conflicts over land rights, disruptions to traditional practices, and reduced land productivity.
Geology, hydrology and hydrogeology	The cumulative impacts on geology, hydrology, and hydrogeology from the proposed hybrid power plant in Baidoa could arise from alterations to the natural landscape due to construction activities and the potential for groundwater depletion or contamination. If the project involves excavation, land leveling, or the installation of large infrastructure, it may disrupt local soil stability, increase erosion risks, and modify surface drainage patterns, particularly in areas already affected by other developments. The extraction of water for cooling or other purposes could place additional stress on local water resources, particularly in areas with limited groundwater recharge capacity. Cumulative impacts could be amplified if other large-scale projects in the region also demand significant water resources or affect the region's hydrological systems.
Biodiversity	The cumulative impacts on biodiversity could result from habitat disruption due to land clearing, construction, and the installation of infrastructure, which may fragment or degrade ecosystems essential for local wildlife. Additionally, invasive species may be introduced inadvertently through construction activities, further compounding ecological stress.
Air quality and noise	During construction, dust emissions, exhaust fumes from vehicles, and noise from heavy machinery may degrade air quality and disrupt local communities. During operation, emissions from the diesel generator components of the hybrid plant could contribute to air pollution, especially if other already impacts local air quality nearby activities. In terms of noise, both construction and operational activities could lead to elevated noise levels that may disturb nearby residents, wildlife, and livestock.
Infrastructure and utilities	The cumulative impacts on infrastructure and utilities from the proposed hybrid power plant in Baidoa could result from the increased demand on local roads, electricity, water, and waste management systems during both the construction and operational phases. The influx of materials, equipment, and workers during construction may place additional strain on existing transportation networks, potentially leading to congestion, road wear, or the need for upgrades. The plant's operational needs, including water for cooling and electricity for system functions, could further stress local utility services, especially in an area where resources may already be limited. Additionally, waste generation from the plant and its workforce may overwhelm local waste management systems.
Socio-economic conditions	Key impacts in relation to socio-economic development includes the potential for job and procurement opportunities for local communities during the construction and operation phase, which would to some extent enhance the socio-economic conditions of local communities. The ESIA recommends the development and implementation of a Community Integration Plan by BEC-BAIDOA for working with the local community members during the construction phase, and a Community Integration Plan during operation phase, which shall consider local recruitment and procurement procedures.
Occupational health and safety	Key impacts are related to construction and operation which include generic risks to workers health and safety from working on construction and operational sites, as it increases the risk of injury or death due to accidents. Those are site-specific impacts and are applicable only for the project. BEC-BAIDOA is expected to develop a site and project specific Occupational Health and Safety Plan (OHSP). The Contractor will prepare and implement a Worker Accommodation Plan, and using this plan, the accommodation camp will be selected which will take into consideration the nearby proximity of social receptors such as residential housing units and schools, and the road route to be used by vehicles transporting personnel. The ESIA recommends that a site selection study shall be undertaken to justify the location of the camp.
Community health, safety, and	The cumulative impacts on community health, safety, and security from the proposed hybrid

Attribute	Cumulative Impacts
security	power plant in Baidoa could result from a combination of factors associated with both the plant's development and other regional projects. Increased construction activities, such as the movement of materials and workforce influx, may elevate risks of accidents, noise, and air pollution, which could negatively affect public health. Additionally, the presence of valuable infrastructure and the movement of large numbers of workers could heighten the potential for security concerns, such as theft, trespassing, or conflicts over land use. If other developments in the region also strain local law enforcement or healthcare systems, it could exacerbate these risks.

6.7. PROJECT VULNERABILITY TO NATURAL/CLIMATE-RELATED HAZARDS AND THE PROPOSED MITIGATION MEASURES

The proposed hybrid power plant by BEC-BAIDOA in Baidoa City, comprising solar PV, Battery Energy Storage System (BESS), and a diesel generator (Genset), is vulnerable to various natural and climate-related hazards. Baidoa experiences a semi-arid climate characterized by high temperatures, seasonal droughts, and occasional heavy rainfall, all of which could affect the plant's efficiency and operational stability. Extreme heat can reduce the performance of solar panels and accelerate the degradation of battery storage systems, while prolonged drought conditions may lead to increased dust accumulation on solar panels, reducing their energy output. Additionally, Baidoa is prone to seasonal flash floods, which could damage electrical components, disrupt operations, and pose safety risks if drainage and flood protection measures are not adequately implemented. Furthermore, climate change is expected to intensify these hazards, increasing the frequency of extreme weather events that could strain the hybrid power system. High winds and storms may pose structural risks to solar arrays, BESS enclosures, and transmission infrastructure, while heatwaves can lead to thermal stress on battery storage units, reducing their efficiency and lifespan. The reliance on diesel generators as a backup power source also presents potential challenges, as fuel supply chains may be disrupted by extreme weather conditions or road inaccessibility during floods. To ensure resilience, the power plant must integrate climate-adaptive designs, including reinforced structural supports, dust mitigation strategies, efficient cooling systems for battery storage, and robust drainage infrastructure to manage flood risks.

Mitigation measures	
Flood risk	<ul style="list-style-type: none"> Elevate critical infrastructure, including the solar PV system, BESS, and genset on raised platforms to prevent flood damage. Construct a well-designed drainage system to channel excess rainwater away from the power plant site, reducing the risk of waterlogging. Use waterproof enclosures for electrical components and BESS units to prevent system failures. Identify alternative access routes and backup fuel storage solutions to ensure continued operations in case of flood-induced road inaccessibility.
Extreme climate - heat, drought, and windstorms	<ul style="list-style-type: none"> Use high-temperature-resistant solar panels/install passive cooling systems to enhance efficiency. Implement dust-resistant coatings on solar PV panels and conduct routine cleaning to minimize performance losses due to dust accumulation during drought conditions. Design wind-resistant mounting structures for solar panels and reinforce battery storage enclosures to withstand strong winds. Establish vegetation buffers and windbreaks around the facility to reduce dust storms and wind erosion impacts.
Earthquake preparedness	<ul style="list-style-type: none"> Ensure all structural components, including solar PV systems, BESS enclosures, and genset housings, comply with seismic design standards. Secure BESS and gensets with vibration-resistant foundations to minimize damage during seismic events. Conduct periodic structural integrity assessments to identify and reinforce potential weaknesses in the infrastructure.
Other unpredictable natural processes (lightning, landslides, and soil erosion)	<ul style="list-style-type: none"> Install lightning protection systems to safeguard electrical infrastructure from damage during storms. Conduct geotechnical assessments to determine the stability of the land and prevent landslides or subsidence in the area. Implement erosion control measures, such as retaining walls and ground cover vegetation, to stabilize the soil and protect foundations.

Early Warning Systems and Emergency Response Preparedness	<ul style="list-style-type: none">• Install weather monitoring stations to track real-time climate conditions, including temperature, wind speed, rainfall, and seismic activity.• Develop and implement a disaster risk management plan, including emergency shutdown procedures and evacuation protocols.• Conduct periodic emergency drills and staff training to ensure readiness for extreme weather events, earthquakes, or other natural hazards.
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7.0. Mitigation, Monitoring and Reporting

This section examines the mitigation measures for the outlined impacts as assessed for the project (Section 5). It also gives detailed account on monitoring and reporting requirements for the mitigation measures. The mitigation measures together with the accompanying monitoring and reporting requirements have been pooled according to the project phases – construction, operation and decommissioning. The proposed solar power plant, presents a valuable opportunity to harness renewable energy and promote sustainable development, especially in the South West State and in the FRS in general. However, like any large-scale infrastructure project, it has potential environmental and social impacts that need to be carefully managed. Effective impact mitigation measures and robust monitoring and reporting protocols are essential to minimize adverse effects on the local community, ecosystem, and landscape. These include addressing issues such as community health and safety, soil erosion, biodiversity conservation, energy consumption, and solid waste management. Monitoring and reporting requirements ensure that mitigation measures are consistently implemented, compliance is maintained, and any unforeseen impacts are swiftly addressed. By adopting these strategies, the proposed Hybrid power plant can operate sustainably while contributing positively to the region’s energy needs.

Table 7-1: Mitigation measures, monitoring and reporting during the construction, operation and decommissioning phases for the proposed BEC-BAIDOA Hybrid Power Plant

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
CONSTRUCTION	Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> Dispose of waste materials promptly to avoid visual pollution. Install temporary barriers, such as walls or screens, to shield construction sites. Keep construction materials and equipment organized to avoid visual clutter. Limit the construction footprint and restrict activities to designated areas. 	<ul style="list-style-type: none"> Presence of a perimeter fence
		Soil, ground/surface water contamination	<ul style="list-style-type: none"> Properly store, handle, and dispose of construction waste. Use bunded areas and spill kits for fuel, chemicals, and oils. Store construction materials like cement securely to avoid leakage or runoff. Design and implement temporary drainage to manage storm water. Regularly maintain equipment to avoid leaks. Conduct regular water quality tests in nearby water bodies to detect contamination early. 	<ul style="list-style-type: none"> Records of any leakages from construction equipment/ vehicles. Oil spill containment plan. Provision of fuel/oil drip and spill trays
		Air quality (Dust)	<ul style="list-style-type: none"> Cover construction material stockpiles (sand, gravel, etc.) to minimize dust release. Limit vehicle speed on-site and ensure trucks are covered when transporting materials. Monitor dust levels regularly and adjust mitigation measures as needed. Promote vegetation growth in disturbed areas to stabilize soil and reduce dust. Regularly spray water on work areas to suppress dust. Schedule high-dust activities during times of lower wind speeds or less traffic. Where possible, pave or stabilize construction access roads to reduce dust generation. 	<ul style="list-style-type: none"> Visual Observation of dust Provision of PPEs especially masks
		Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Use low-sulphur fuels to reduce harmful pollutants. Regularly maintain construction vehicles and equipment to minimize exhaust emissions. Plan transportation routes and schedules to minimize trips and avoid congested areas. Minimize vehicle idling and schedule operations to reduce fuel consumption. Inform local communities of mitigation measures to address air quality concerns proactively. Deploy vehicles and machinery with low-emission engines 	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks
		Noise & vibration	<ul style="list-style-type: none"> Conduct regular noise and vibration monitoring to ensure compliance with permissible limits. Establish a GRM for community to report noise or vibration disturbances. Inform nearby residents about construction schedules and anticipated noise levels in advance. Provide earplugs or earmuffs to construction workers operating noisy equipment. Regularly maintain construction equipment to prevent excessive noise and vibrations. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Turn off equipment when not in use to reduce unnecessary noise. 	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant
		Biodiversity (Fauna)	<ul style="list-style-type: none"> Limit vegetation removal to the essential areas and replant native species post-construction. Implement noise and vibration mitigation measures to minimize disruption to fauna. Ensure proper disposal of wastes to avoid attracting wildlife. Site clearing work/earthwork to be done during the dry season to minimize impacts on fauna. Vehicle movements shall be limited to designated paved/unpaved roads and maintained at 15-20 km/h. Ensure wildlife-friendly designs for infrastructures. An ecologist shall be hired to coordinate the fauna monitoring. 	<ul style="list-style-type: none"> Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting
		Biodiversity (Flora)	<ul style="list-style-type: none"> Limit clearing to designated areas essential for construction and infrastructure. 	<ul style="list-style-type: none"> Number of trees cleared

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> Rehabilitate disturbed areas with native plant species post-construction. Implement erosion control measures (e.g., silt fences, vegetation buffers) to prevent damage to surrounding flora. Prevent the introduction and spread of invasive plant species. Ensure proper demarcation and delineation of the project site to be affected by construction works. 	<ul style="list-style-type: none"> Planted trees
		Soil erosion	<ul style="list-style-type: none"> Limit clearing of vegetation to areas essential for construction and retain natural ground cover where possible. Schedule construction activities to avoid heavy rainfall periods, reducing runoff risks. Plant native vegetation or grass on disturbed areas immediately after construction to stabilize the soil. Design and maintain access roads to minimize soil compaction and erosion along transportation routes. Regularly inspect and maintain erosion control measures, especially after rainfall events. Avoid groundbreaking during the seasons of high rainfall to avoid erosion. 	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from compacted areas
		Wastes (Solid wastes)	<ul style="list-style-type: none"> Develop and implement a site-specific waste management plan detailing waste segregation, storage, and disposal methods. Set up clearly marked waste collection points with appropriate bins or containers. Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time Train workers on proper waste disposal practices and the importance of waste reduction. Safely store hazardous waste in designated areas and ensure proper disposal through licensed contractors. Promote the recycling and reuse of materials, such as scrap metals, wood, and concrete. Optimize material use and avoid over-ordering construction supplies to reduce waste. Establish a schedule for regular waste collection and removal from the site to prevent accumulation. Construction wastes to be managed in accordance with internationally accepted construction standards. Conduct periodic audits of waste management practices to ensure compliance and address any gaps. 	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points.
		Wastes (Liquid wastes)	<ul style="list-style-type: none"> Develop and implement a plan for the collection, treatment, and disposal of liquid waste. Train workers on proper handling and disposal of liquid waste and spill response protocols. Reduce water use through efficient construction practices and recycling whenever feasible. Monitor liquid waste generation and ensure compliance with local environmental regulations. All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. Develop and implement a detailed Spill Prevention Plan (SPP) Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. In case of spillage, the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials. In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. Install oil-water separators in drainage systems to capture and remove oil or fuel from storm water. Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. Provide sanitary waste facilities for both genders clearly marked Refuelling and maintenance of vehicles will not take place at the construction site. Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 	<ul style="list-style-type: none"> Engine maintenance records Oil spill containment plan Presence of separate and clean washrooms for both the gents and ladies

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
	Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> • Develop a water management plan to monitor and optimize water usage during construction. • Prioritize the use of non-potable or recycled water for activities such as dust suppression and equipment washing. • Implement water-saving techniques, such as using low-flow faucets and nozzles in construction processes. • Train workers on the importance of water conservation and best practices for minimizing water use. • Coordinate and schedule water-intensive tasks efficiently to avoid excessive consumption. • Source and utilize a sustainable and reliable water supply for both construction and operation phase. • Consult with the project local committee on water use to avoid conflicts with the community. • Conduct regular monitoring of water consumption to ensure adherence to planned usage levels and report deviations. 	<ul style="list-style-type: none"> • Water usage records
		Energy Consumption	<ul style="list-style-type: none"> • Use energy-efficient machinery and tools to minimize fuel and electricity consumption. • Train workers on energy conservation practices and the importance of reducing consumption. • Regularly maintain construction equipment to ensure optimal energy performance and reduce inefficiencies. • Plan and schedule activities to avoid energy-intensive operations during peak hours. • Monitor energy use regularly to identify areas for improvement and ensure compliance with energy-saving targets. • Implement energy-saving measures, such as turning off unused equipment and lights. • Enforce a strict no-idling policy for construction vehicles and machinery to save fuel. • Develop and implement an energy management plan to track and optimize energy usage during construction. 	<ul style="list-style-type: none"> • Energy consumption records
	Impacts on social environment	Archaeology and cultural heritage	<ul style="list-style-type: none"> • Develop and implement a Chance Finds Procedure and ensure protocols are followed. • Engage a qualified archaeologist to monitor all ground-disturbing activities to ensure early identification. • Establish a clear protocol for halting construction activities immediately if any archaeological or cultural materials are found. • If chance finds are made, ensure proper documentation, including detailed records, photography, and GPS coordinates, before any further action is taken. 	<ul style="list-style-type: none"> • Stratigraphic Soil profile reports during excavation • Fully developed artefact recovery protocols • Discovery of human burials reports during excavation. • Regulatory Compliance reporting under Somali Heritage Laws.
		Trespassing of unauthorized personnel	<ul style="list-style-type: none"> • Collaborate with local law enforcement to address trespassing incidents and ensure community safety. • Conduct routine inspections of security measures to identify and address vulnerabilities. • Deploy trained security guards to patrol the site and monitor for unauthorized access. • Develop a response protocol for handling incidents of trespassing or unauthorized entry. • Display clear and visible warning signs around the site to discourage trespassing. • Establish controlled entry and exit points with security personnel or electronic systems. • Inform nearby communities about the project, emphasizing safety risks associated with unauthorized access. • Install adequate lighting and CCTV cameras to deter intruders and enhance monitoring. • Install perimeter fencing around the construction site to prevent unauthorized entry. • Issue identification badges to workers and ensure only authorized personnel on-site. 	<ul style="list-style-type: none"> • Presence of a controlled access and records of every person accessing the site

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		Worker influx – incoming workforce	<ul style="list-style-type: none"> • Tap into the local workforce to the extent possible to reduce labour influx. • Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs. • Raise awareness among local community and workers on the need to have a good /cordial working relation • Sensitize workers regarding engagement with local community. • Establish and operationalize an effective GRM accessible to community members. • The contractor and the project/community grievance redress committee to work closely address complains raised on time. • Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms. 	<ul style="list-style-type: none"> • Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee register.
		Gender-based violence	<ul style="list-style-type: none"> • Provide comprehensive training for workers and management on recognizing, preventing, and responding to GBV. • Implement and enforce a strict zero-tolerance policy for any form of GBV, including harassment, abuse, or exploitation. • Set up confidential and accessible reporting channels for victims of GBV, ensuring safety and anonymity. • Engage with local communities, particularly women’s groups, to raise awareness of GBV risks and prevention measures around the construction site. • Work with local law enforcement, health services, and NGOs to provide support to victims of GBV. • Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks relevant to the subproject. 	<ul style="list-style-type: none"> • Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. • Code of conduct signed by all those with physical presence on site. • GRM that ensures confidentiality of GBV cases in place. • Documented referral services for survivors. • Grievances raised, aggrieved persons and status on resolution etc.
		Labour disputes	<ul style="list-style-type: none"> • Provide workers with clear, written contracts outlining terms, conditions, and dispute resolution procedures. • Ensure fair and timely payment of wages, benefits, and allowances in line with local labor laws and industry standards. • Establish a workers’ committee or labor union representatives to voice concerns and address grievances. • Create transparent communication channels between workers, management, and contractors to address issues before they escalate. • Implement formal mechanisms for resolving disputes, such as mediation or arbitration, to address conflicts fairly. • Hold regular meetings with workers to discuss concerns, updates, and resolve issues early on. • Ensure a safe and healthy working environment, as poor working conditions can contribute to labor disputes. • Ensure full compliance with local labor laws, international labor standards, and regulations to prevent legal disputes. • Establish an accessible, confidential grievance redress system for workers to report issues without fear of retaliation. • Engage with local communities to manage expectations and foster positive relationships with the workforce. • Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues. 	<ul style="list-style-type: none"> • Number of grievances filed and time taken to resolve them. • Frequency of labor disputes. • Health and safety violations. • Worker turnover rate and compliance with working hours and overtime rules. • Labor law compliance audits • Worker welfare committee activities.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		Child and forced labour	<ul style="list-style-type: none"> • Implement and enforce a zero-tolerance policy towards child labor and forced labor, in compliance with international labor standards. • Verify the age of all workers before hiring to ensure no child labor is employed, and maintain documentation of workers' ages. • Ensure that all workers sign contracts freely, without coercion, and that they are fully aware of their rights and responsibilities. • Engage with local communities to raise awareness about the risks and harms of child and forced labor, and encourage reporting of suspected cases. • Ensure compliance with both local and international labor laws, including those prohibiting child and forced labor, and regularly review practices to ensure alignment. • Establish accessible, confidential reporting mechanisms for workers and the community to report suspected child or forced labor incidents. • Put visible signage on site "No Jobs for children" • Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. 	<ul style="list-style-type: none"> • Updated employment register indicating locals employed, their ages, national identification numbers etc. • Grievances raised aggrieved persons and status on resolution etc. • Number of reported cases of forced labour.
		Security risks	<ul style="list-style-type: none"> • Conduct a comprehensive risk assessment to identify security threats. • Engage local stakeholders (government, law enforcement, and communities) to understand local security concerns. • Collaborate with local law enforcement and security agencies to provide support and enhance security measures. • Hire licensed security personnel familiar with the area to provide 24/7 site surveillance, patrols, and monitoring. • Use surveillance systems, such as CCTV cameras and motion sensors, to monitor critical areas in real-time. • Implement strict access control protocols, including identity verification and sign-in procedures for workers. • Develop a security incident response plan that includes procedures for evacuation, medical emergencies, and reporting incidents. • Provide workers with security training, and protocols for responding to security threats. • Maintain constant communication and coordination with local authorities regarding security updates and developments in the region. • Prepare contingency plans for potential security scenarios, including kidnappings, armed attacks, and civil unrest. • Have security response teams on standby to address urgent security breaches or emergencies. 	<ul style="list-style-type: none"> • Number of security incidents and response time to security incidents. • Compliance with security protocols. • Incidents of unauthorized site access. • Grievances related to security. • Community engagement on security issues. • Security risk assessments. • Coordination with local law enforcement. • Security equipment functionality. • Frequency of security audits.
		Occupational Health and safety	<ul style="list-style-type: none"> • Develop and implement a comprehensive Occupational Health and Safety (OHS) plan outlining safety protocols, emergency procedures, and risk assessments. • Provide appropriate PPE (e.g., helmets, gloves, goggles, and boots) to all workers and enforce their use at all times on site. • Conduct regular safety training for workers on hazard identification, safe work practices, and emergency response procedures. • Perform regular risk assessments and safety audits to identify potential hazards and implement corrective 	<ul style="list-style-type: none"> • Records of any near misses, incident, and accidents. • Records of corrective actions implemented if there was an accident.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<p>actions.</p> <ul style="list-style-type: none"> • Ensure first aid kits are readily available on-site and provide trained medical personnel or access to nearby medical facilities for emergencies. • Conduct daily safety inspections to identify and address hazards promptly. • Install clear and visible safety signs and warnings to alert workers of potential hazards, especially in high-risk areas. • Develop emergency response plans and conduct regular drills for fire, medical emergencies, and other potential incidents. • Establish a system for reporting, investigating, and documenting safety incidents and near misses to prevent recurrence. • Implement health surveillance programs to monitor workers' health, especially for those exposed to hazardous substances or conditions. • Use skilled personnel for activities which demand skills/technical tasks • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees 	
		Community health and safety risks	<ul style="list-style-type: none"> • Develop a community health and safety plan to outline measures for protecting local communities from construction-related risks. • Implement awareness campaigns to inform local communities about construction activities, potential risks, and safety protocols. • Collaborate with local health and safety authorities to ensure compliance with safety regulations and address any community concerns in a timely manner. • Develop and communicate emergency response procedures for the community, ensuring quick access to medical assistance in case of accidents. • Ensure proper management and disposal of construction waste to prevent contamination of local environments and protect community health. • Establish a grievance mechanism that allows community members to raise health and safety concerns related to construction activities. • Manage construction-related traffic to minimize accidents by establishing safe routes, signage, and speed limits, and employing traffic control personnel. • Regularly monitor environmental conditions (air, water, and soil quality) to assess any potential impacts on community health and take corrective actions as needed. • Use dust suppression techniques and noise reduction measures (e.g., sound barriers, equipment maintenance) to reduce air and noise pollution affecting nearby communities. 	<ul style="list-style-type: none"> • Number of awareness creation sessions conducted.
		Fire Hazards	<ul style="list-style-type: none"> • 'No smoking' signs shall be posted at the construction site • A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. • Designate an assembly point • Provision of firefighting equipment on site during construction. • Implement strict fire prevention protocols, including the safe storage and handling of flammable materials, fuels, and chemicals. 	<ul style="list-style-type: none"> • Records of any Fire incidences • Fire equipment and evacuation plan

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> • Provide fire safety training to all workers, including how to use firefighting equipment and respond to fire emergencies. • Assign designated fire watch personnel to monitor high-risk areas during critical activities, such as welding or using open flames. • Develop and communicate a fire emergency response plan, including evacuation routes, safe assembly points, and contact details for local fire services. • Install clear fire hazard signs, evacuation routes, and emergency exits to ensure quick and safe evacuation in case of a fire. • Implement strict controls on hot work (e.g., welding, cutting), including proper supervision and fire watches during these activities. • Establish communication with local fire services for immediate response and support in case of fire emergencies. • Ensure that construction equipment and machinery are regularly inspected and maintained to prevent overheating or malfunction that could lead to fires. • Use fire-resistant materials for construction activities where feasible, particularly in high-risk areas. 	
		Traffic risks	<ul style="list-style-type: none"> • Develop and implement a comprehensive traffic management plan to minimize construction-related traffic disruptions and risks. • Install clear signage and road markings to direct both construction vehicles and public traffic safely, including speed limits, detours, and warning signs. • Where possible, establish separate routes for construction vehicles to reduce interaction with public traffic and minimize accidents. • Implement speed limits within the construction area and enforce safety zones around high-risk areas to protect workers and the public. • Conduct awareness campaigns to inform the public about ongoing construction activities, expected traffic disruptions, and safety precautions. • Limit construction vehicle movement during peak traffic hours to reduce congestion and minimize the risk of accidents. • Develop and communicate an emergency response plan for traffic accidents, including quick access to medical services and coordination with local authorities. • Ensure safe pedestrian pathways and crossings are provided around the construction site to protect local residents and workers. • Control and limit access points to the construction site to reduce unauthorized vehicle entry and minimize traffic risks. • Erect temporary road signs warning local road users of construction activities and increased traffic. • Designate safe parking and loading zones for construction vehicles away from main roads and community spaces. 	<ul style="list-style-type: none"> • Number of traffic incidents. • Traffic management plan compliance. • Speed limit violations. • Traffic safety training attendance. • Community complaints related to traffic. • Emergency response time to traffic incidents. • Community awareness programs on traffic safety. • Use of alternative routes by construction vehicles.
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> • Update the existing SEP and make it more relevant to the subproject and the identified stakeholders. • In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. • Prepare and implement a GRM to deal with grievances. • The grievance redress committee to include representatives from the community. 	<ul style="list-style-type: none"> • Availability of and implementation of the Stakeholder Engagement Plan. • Number of stakeholder consultations held

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> Sensitize stakeholders on SEP and GRM. 	<ul style="list-style-type: none"> Record of stakeholder consultations held (minutes of meetings and list of participants). Information disclosed to whom it was disclosed (Men, women, PWD, youth, vulnerable individuals etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. Concerns raised and actions raised.
		Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. Implement a worker's grievances mechanism. Awareness on the culturally appropriate and accessible GRM to all community segments including VMGs, vulnerable individuals and households and CSOs All reported grievances are logged, dated, processed, resolved and closed out in a timely manner. Proportionate representation of VMGs and vulnerable individuals in the local grievances committee. GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity. 	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.
OPERATION	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Fence off the power plant. Engage local communities in discussions about visual impacts and seek input on landscaping and design improvements to reduce visual intrusion. 	<ul style="list-style-type: none"> Presence of a perimeter fence
		Soil, ground/surface	<ul style="list-style-type: none"> Implement spill prevention protocols and install containment systems (e.g., secondary containment for fuel and chemical storage) to prevent leaks and spills. 	<ul style="list-style-type: none"> Oil spill containment plan.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		water contamination	<ul style="list-style-type: none"> Develop a stormwater management plan to prevent runoff from carrying contaminants into local water bodies, including the use of retention ponds and proper drainage systems. Store hazardous materials (e.g., chemicals, fuels) in secure, well-marked areas and ensure proper disposal according to regulations to avoid contamination of soil and water. Apply erosion control measures (e.g., vegetation cover, mulching) to prevent soil erosion, which can lead to contamination of surface water through sedimentation. Provide regular training to staff on best practices for preventing soil and water contamination, including spill response and waste management procedures. Regularly inspect and maintain equipment and infrastructure to prevent leaks, failures, or malfunctions that could lead to soil or water contamination. 	<ul style="list-style-type: none"> Provision of fuel/oil drip and spill trays
		Air quality (Dust)	<ul style="list-style-type: none"> Establish vegetation and landscaping around the site to act as windbreaks and reduce the spread of dust in the surrounding area. Continuously monitor dust levels around the plant and at nearby sensitive receptors to ensure compliance with air quality standards. Inform local communities about ongoing dust control measures and maintain open channels for reporting dust concerns. Ensure planting of grass around and within the facility compound 	<ul style="list-style-type: none"> Visual inspection
		Air quality (Vehicle fumes emissions)	<p><i>Vehicles</i></p> <ul style="list-style-type: none"> Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. Use high quality, low-sulphur fuel to minimize harmful emissions from vehicles. Continuously monitor air quality in and around the site to track the impact of vehicle emissions and take corrective action if levels exceed standards. Keep the local community informed about measures being taken to minimize vehicle emissions and address any concerns promptly. <p><i>Generators</i></p> <ul style="list-style-type: none"> Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. Implement strategies to reduce idling time when diesel generators are not needed or can be supplemented by the hybrid system. Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. Invest in modern diesel generators with advanced combustion systems. Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. Regularly report emissions data to local regulatory authorities as part of environmental compliance. The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters Use of diesel which is Sulphur- free to run the power producing generators to be encouraged Use Selective Catalytic Reduction (SCR) to significantly reduce NO_x emissions by injecting ammonia or urea 	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			into the exhaust stream.	
		Noise & vibration	<p><i>Genset</i></p> <ul style="list-style-type: none"> • Install soundproof enclosures around the diesel generators • Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. • Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations • Ensure regular servicing of the diesel generator to maintain its optimal function. • Install high-performance silencers on the generator's exhaust system to reduce noise emissions • Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <p><i>BESS</i></p> <ul style="list-style-type: none"> • Install soundproof or acoustically treated enclosures around noisy inverters and transformers. • Use quieter, high-efficiency fans and cooling systems, or design them with lower noise outputs. • Equip the BESS unit with vibration isolators or mounts to reduce noise generated by vibrations • Install sound barriers or walls around the BESS unit to deflect or absorb noise. • Use sound-absorbing materials within the BESS unit's housing to absorb sound before it escapes. • Regularly service and maintain fans, inverters, and other equipment to ensure they operate smoothly 	<ul style="list-style-type: none"> • Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant
		Biodiversity (Fauna)	<ul style="list-style-type: none"> • Conduct regular monitoring to assess the presence and behaviour of wildlife in and around the power plant area. • Properly manage solid and liquid waste to prevent contamination of habitats that could harm local fauna. • Develop a response plan for handling any incidents involving wildlife, such as rescues or injuries. • Enforce strict speed limits for vehicles on-site to reduce the risk of wildlife collisions. • Prohibit the use of pesticides, herbicides, or other chemicals that could harm wildlife in areas near the plant. • Conduct periodic environmental audits to ensure all biodiversity protection measures are being implemented effectively. • An ecologist shall be hired to coordinate the fauna monitoring. • Bird deterrents to be installed to prevent collisions with solar panels. 	<p>Full implementation of biodiversity management plan for the project</p> <p>Regular biodiversity monitoring and reporting</p>
		Biodiversity (Flora)	<ul style="list-style-type: none"> • Conduct regular monitoring to assess the health and coverage of flora in and around the power plant area. • Restore degraded areas with native plant species to enhance local biodiversity and prevent erosion. • Implement measures to control and prevent the introduction or spread of invasive plant species within the project site. • Prohibit the use of harmful herbicides, pesticides, or fertilizers that could damage native vegetation. • Develop and implement a fire management plan to protect surrounding vegetation from accidental fires. 	<ul style="list-style-type: none"> • Number of trees cleared • Planted trees
		Soil erosion	<ul style="list-style-type: none"> • Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use • Construct the drainage system in a way to follow natural drain of the water • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Undertake landscaping with grass on areas without electrical installation (lower areas) 	<ul style="list-style-type: none"> • Assess size of rills or Gulleys forming from accelerated run off from compacted areas • Provision of a drainage system and a rain water harvesting system

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		Wastes (Solid wastes)	<p><i>General solid wastes</i></p> <ul style="list-style-type: none"> • Collaborate with the local community to promote responsible waste disposal and recycling efforts. • Compost biodegradable waste, such as food scraps, to reduce landfill contributions and create usable compost for landscaping. • Conduct regular training for employees and contractors on proper waste management practices. • Emphasis on prudent waste generation and give priority to reduction at source • Ensure non-recyclable solid waste is disposed of at authorized landfill sites compliant with local regulations. • Maintain records of waste generation, handling, and disposal to ensure compliance with environmental regulations. • Operator to contract a licensed waste handler to collect and dispose solid waste • Perform periodic audits to monitor waste generation and management effectiveness, and identify areas for improvement. • Promote reuse of materials where feasible, such as using reusable containers and pallets for operational activities. • Properly handle and dispose of hazardous waste, including electronic and chemical waste, in accordance with international standards. • Provide adequate, well-labelled, and secure storage areas for waste to prevent littering and wildlife scavenging. • Provide waste handling facilities such as labelled waste bins • Undertake solid waste management awareness to operators <p><i>Damaged solar panels and hazardous wastes</i></p> <ul style="list-style-type: none"> • Ensure segregation from other waste streams • All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through an approved waste handler 	<ul style="list-style-type: none"> • Presence of well-maintained receptacles and centralized collection points.
		Wastes (Liquid wastes)	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> • Provide sanitary waste facilities for both genders clearly marked • Use well-designed, impermeable septic tanks for areas without access to municipal sewage, ensuring regular maintenance and emptying by licensed operators. • Ensure all treated wastewater complies with national and international effluent discharge standards. • Train personnel on proper use and maintenance of sanitary facilities to avoid overloading treatment systems. • Implement water-saving fixtures and practices in sanitary facilities to reduce liquid waste generation. • Develop a plan to manage spills or leaks of sanitary liquid waste, including immediate containment and cleanup. • Conduct routine inspections of all sanitary waste infrastructure to identify and address issues promptly. • Install clear signage in restrooms and waste management areas to encourage proper use and minimize misuse. • Employ licensed service providers for the collection, transport, and disposal of liquid sanitary waste when necessary. <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> • Refuelling and maintenance of vehicles will not take place at the construction site. 	<ul style="list-style-type: none"> • Presence of separate and clean washrooms for both the gents and women. • Engine maintenance records • Oil spill containment plan • Records of all accidental spills and number of litres

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> • Create awareness for the employees on site on procedures of dealing with spills and leaks • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> • All chemicals should be stored within the banded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Generators</i></p> <ul style="list-style-type: none"> • Proper storage of the oil is required to ensure no leakages • Frequent inspection and maintenance of the generator to minimize leakages. • No vehicles should be serviced or maintained at the project site. • The waste oil or used oil must be disposed-off appropriately. • Proper training for the handling and use of fuels for the operators of the power plant. • In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> • Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. • Develop and implement a detailed Spill Prevention Plan (SPP) • Ensure quick clean up of spills by designated response teams trained in handling hazardous materials. • Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. • Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. • Establish proper waste management protocols for the disposal of used oil, fuel, and filters from equipment maintenance activities. • Implement a regular environmental monitoring program to check for any signs of contamination in soil, groundwater, and surface water near the plant. • Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. • Install spill and leak detection systems on fuel storage tanks, transformers, and pipelines. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. • Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear. 	
	<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> • Ensure prudent use of water. • Install water-conserving automatic taps. • Any water leaks through damaged pipes and faulty taps should be fixed promptly. 	<ul style="list-style-type: none"> • Water usage records
		Energy consumption	<p><i>Lightings</i></p> <ul style="list-style-type: none"> • Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement. • Install an energy-efficient lighting system • Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. 	<ul style="list-style-type: none"> • Diesel Generator Usage (hours/month): • Solar Energy Generation (kWh/month): • Battery Energy Storage System (BESS)

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> Replace conventional lighting with energy-efficient LED bulbs Utilize daylight sensors to adjust indoor lighting levels based on the amount of natural light, reducing the need for artificial lighting during the day. <p><i>Diesel generators</i></p> <ul style="list-style-type: none"> Conduct scheduled maintenance and servicing of diesel generators. Ensure high quality, low-sulphur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. Implement energy-efficient technologies and practices in plant operations. Implement measures to reduce unnecessary idling of diesel generators. Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel consumption and improve overall generator efficiency. Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime. 	<ul style="list-style-type: none"> Utilization (cycles/month). Lighting Energy Consumption (kWh/month). Maintenance Records for Diesel Generators. Carbon Emissions (tons of CO2/month).
	Impacts on social environment	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Fencing off the facility to keep of community members, children and livestock from entering into the facility Maintain records of any person who comes to site Implement controlled access points with security gates, identification checks, and electronic monitoring systems. Employ trained security personnel to monitor and patrol the premises continuously. Deploy surveillance cameras at key locations to monitor the site and identify unauthorized activities in real-time. Erect clear warning signs at strategic locations indicating restricted areas, potential hazards, and penalties for trespassing. Conduct outreach programs to educate the local community about the risks of unauthorized access and the importance of site security. Install adequate lighting around the perimeter and access points to enhance visibility and discourage trespassers, especially at night. Use motion sensors and alarm systems to detect and respond promptly to unauthorized entries. Develop and implement a response plan for security breaches, including reporting protocols and coordination with local law enforcement. Ensure all employees and contractors carry identification badges and enforce strict entry protocols. Conduct regular reviews of security measures to identify vulnerabilities and update protocols as needed. Collaborate with local authorities and communities to report and discourage suspicious activities near the site. 	<ul style="list-style-type: none"> Presence of a controlled access and records of every person accessing the site
		Gender-based violence	<p><i>GBV- SEA and SH</i></p> <ul style="list-style-type: none"> Ensure that Code conducts are signed by all employers or incorporated in the employment contracts. Establish Workers GRM with multiple channels including SEA/H channels. Implement a code of conduct signed by all those with physical presence on site. Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks associated with the subproject. 	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Documented referral services for survivors.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> The Action Plan to be proportionate to potential SEA/SH risks, and includes measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases. <p><i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i></p> <ul style="list-style-type: none"> Develop and implement subsidized electricity pricing structures for vulnerable and marginalized groups (VMGs) to ensure affordability. Collaborate with government and non-governmental organizations to extend electricity access to underserved communities. Introduce a lifeline tariff for minimal electricity consumption, targeting low-income households. Provide flexible payment options, such as prepaid meters or installment plans, to reduce financial barriers for vulnerable individuals. Allocate part of the project's revenue for CSR projects aimed at improving access to affordable energy for VMGs. Prioritize hiring VMGs and vulnerable individuals for operational roles to enhance their financial capacity to afford energy services. Work with humanitarian organizations to fund electricity access for VMGs and vulnerable groups. Establish grievance redress mechanisms and regular monitoring to ensure project benefits are equitably distributed. Lower initial connection costs for VMGs to remove financial barriers to accessing electricity. 	<ul style="list-style-type: none"> Interventions to enable those vulnerable access project benefits. Number of complaints raised by VMGs/vulnerable individuals regarding access to project services.
		Labour disputes	<ul style="list-style-type: none"> Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes. Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. Ensure full compliance with national labour laws. Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. Implement fair and transparent disciplinary procedures. Maintain open communication between management and workers. Promote equal opportunities and non-discriminatory practices in hiring, promotion, and compensation to avoid conflicts. 	<ul style="list-style-type: none"> Number of Labour Disputes Raised (disputes/month): Grievances Resolved Within Agreed Timeframe (percentage): Worker Turnover Rate (percentage). Number of Grievances Filed Regarding Wages or Compensation (grievances/month). Number of Labour Dispute Awareness Campaigns (number/year).
		Child and forced labour	<ul style="list-style-type: none"> Compliance with the national labor laws and labour management practices. Put visible signage on site "No Jobs for children" Do not allow children at the project site. Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. Report any form of forced labour at the site. 	<ul style="list-style-type: none"> Number of child labour incidents reported (incidents/month). Number of forced labour incidents reported

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
				(incidents/year). <ul style="list-style-type: none"> Grievances related to child or forced labour (number of grievances/year). Community outreach and awareness campaigns on child labour (campaigns/year). Compliance with international labour standards (compliance level). Social audits conducted (number of audits/year). Local community feedback on employment practices (satisfaction level).
		Security risks	<ul style="list-style-type: none"> Deploy trained security personnel to guard the site 24/7. Continue engaging local communities to foster positive relationships and minimize hostility. Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters. Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. Implement a rigorous vetting process for all employees to minimize the risk of insider threats. Maintain a secure perimeter with robust fencing of the site Maintain and regularly update a comprehensive security incident response plan Maintain close coordination with local law enforcement and security agencies Monitor local security developments and adjust security protocols accordingly. Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response. 	<ul style="list-style-type: none"> Number of security incidents reported (incidents/month): Number of security audits conducted (audits/year): Community engagement activities held (number/year): Incidents of violence or threats against staff (number/year). Collaboration with local law enforcement (number of meetings/year). Number of partnerships established with security and NGOs (active partnerships).
		Risks related to poor or inadequate stakeholder	<i>Risks related to Inadequate stakeholder engagement</i> <ul style="list-style-type: none"> In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. Update the existing SEP to make it more relevant to the subproject and the identified stakeholders. 	<ul style="list-style-type: none"> Availability of and implementation of the Stakeholder Engagement Plan.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		engagement (Conflict)	<ul style="list-style-type: none"> • Prepare and implement a grievance redress mechanism to deal with grievances. • Sensitize stakeholders on SEP and GRM. • The grievance redress committee to include representatives from the community. • Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget. <p><i>Inadequate grievances management</i></p> <ul style="list-style-type: none"> • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures • Solve all conflicts/grievances at the earliest time possible • Work closely with the GRM committee members in solving the conflicts 	<ul style="list-style-type: none"> • Number of stakeholder consultations held • Record of stakeholder consultations held (minutes of meetings and list of participants). • Availability of grievance redress process.
		Occupational health and Safety	<ul style="list-style-type: none"> • Implement and enforce a comprehensive OHS policy aligned with international standards. • Conduct regular OHS training and refresher courses for all employees and contractors on hazard identification and safety protocols. • Provide appropriate PPE, such as helmets, gloves, safety shoes, and high-visibility vests, and ensure their proper use. • Develop and maintain emergency response plans, including fire drills, evacuation procedures, and first-aid training. • Perform regular inspections and audits of equipment, facilities, and procedures to identify and mitigate hazards. • Establish and enforce safe work practices for tasks involving electrical systems, heavy machinery, and hazardous substances. • Conduct periodic medical check-ups for employees to monitor and address occupational health issues. • Implement a system for reporting, investigating, and addressing workplace incidents and near misses to prevent recurrence. • Install clear safety signs, hazard warnings, and emergency instructions in relevant areas of the facility. • Equip the site with accessible first-aid stations and ensure trained personnel are available to administer basic medical care. • Install fire extinguishers, fire alarms, and suppression systems, and conduct regular maintenance and drills. • Ensure routine maintenance of machinery and electrical systems to prevent malfunctions and accidents. • Provide hearing protection and monitor noise levels in areas with high decibel exposure. • Store chemicals and fuels in designated, secure areas with proper labelling and safety controls. • Require all contractors and subcontractors to adhere to the power plant's OHS standards and practices. • Establish an OHS committee to oversee safety compliance, address employee concerns, and recommend improvements. • Provide a confidential and accessible platform for workers to report safety concerns or violations without fear of retaliation. 	<ul style="list-style-type: none"> • Provision of PPEs and WIBA cover • Environmental audit reports

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		Community health and safety risks	<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> Continuously monitor air emissions to ensure pollutants remain within permissible limits and do not affect public health. Implement dust suppression techniques, such as water spraying and vegetation cover, to minimize particulate matter exposure to nearby communities. Safely collect, segregate, and dispose of solid and liquid waste to prevent contamination of the environment and water sources. Educate local communities on potential health risks and mitigation measures related to the power plant's operations. Enforce strict site access controls to prevent accidental exposure to operational hazards by unauthorized individuals. Develop and communicate an emergency response plan to nearby communities for incidents like fires, explosions, or hazardous leaks. Establish a system for the community to report and address health-related grievances associated with the power plant. Actively monitor and address community complaints related to health issues promptly to reduce risks. Manage traffic from plant operations to reduce risks of accidents and associated public health impacts. <p><i>Shocks and electrocutions</i></p> <ul style="list-style-type: none"> Inspect the wiring of the houses before connecting power Safety awareness campaigns to the community before connection of power on safety precautions; Require community to engage a certified technician to do wiring in the premises; Use of quality materials while wiring; Refraining from individual illegal extensions of power lines to other houses; Observing safety measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths; Keeping off all electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches; Reporting any electric wire/conductors if found fallen on the ground; Report any incident regarding electricity at the local office –staff in charge of operating the power plant. <p><i>Public Health Impacts –HIV/AIDs</i></p> <ul style="list-style-type: none"> Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community Allowing migrant workers time to be with their families 	<ul style="list-style-type: none"> Number of awareness creation sessions conducted. Records of awareness sessions conducted Incidences report Number of awareness creation sessions conducted.
		Fire hazards	<ul style="list-style-type: none"> 'No smoking' signs shall be posted within the power plant area A fire Assembly point should be identified and marked A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported; Detection/alarm systems that can detect fire should be and installed The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards 	<ul style="list-style-type: none"> Provision of serviced fire equipment, evacuation plan and safety signages Records of fire safety training

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			and in key strategic points, including diesel generators, fuel storage areas, BESS locations, etc. <ul style="list-style-type: none"> Workers especially operators of the plant must be trained on fire management 	
DECOMMISSIONING	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Develop and implement a detailed site restoration plan to return the area to its original state or an agreed-upon condition. Safely and promptly, remove all construction materials, debris, and decommissioned equipment from the site. Perform decommissioning activities in phases to minimize abrupt changes to the landscape. Implement erosion control measures, such as terracing or planting cover crops, to prevent soil degradation. Involve local communities in planning and decision-making for landscape restoration to align with their preferences. Monitor the restored site periodically and carry out maintenance activities to ensure successful reestablishment of vegetation and landscape features. Ensure all materials are disposed of at authorized facilities to prevent visual clutter or contamination. Limit the use of temporary lighting to necessary areas to reduce visual disturbance during nighttime operations. Use locally sourced materials for restoration to ensure compatibility with the surrounding environment. 	<ul style="list-style-type: none"> Photographic documentation: Vegetation health monitoring: Number of complaints: Soil erosion assessment: Public awareness programs participation. Community engagement metrics.
		Biological environment	<ul style="list-style-type: none"> Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning. Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. Monitor and manage invasive species during and after decommissioning to prevent their spread into disturbed areas. Plan for revegetation and habitat restoration using native plant species after decommissioning to promote biodiversity and ecosystem recovery. 	<ul style="list-style-type: none"> Biodiversity surveys. Community engagement records. Erosion and sedimentation rates. Flora and fauna species lists. Habitat quality assessments. Invasive species monitoring. Vegetation health monitoring.
		Solid Waste Generation	<ul style="list-style-type: none"> Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal Ensure adequate collection and storage of waste on site Ensure safe transportation to the disposal sites / designated area Hazardous waste must be disposed by approved waste handler Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste 	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points
		Liquid Waste Generation	<ul style="list-style-type: none"> Develop a detailed liquid waste management plan outlining procedures for the collection, storage, treatment, and disposal of liquid wastes. Establish temporary storage facilities for liquid wastes to prevent leaks or spills and ensure safe handling until proper disposal. 	<ul style="list-style-type: none"> Liquid waste generation quantities. Soil contamination assessments.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			<ul style="list-style-type: none"> Identify opportunities for the reuse or recycling of liquid waste materials, where feasible, to minimize waste generation. Engage with the local community to inform them about liquid waste management practices and promote awareness of environmental protection. Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management. 	<ul style="list-style-type: none"> Incidence of spills and leaks. Liquid waste management plan compliance. Public reporting and complaints. Community engagement metrics. Volume of recovered reusable liquids.
		Noise and vibration	<ul style="list-style-type: none"> Select and use machinery and tools designed to minimize noise generation during decommissioning activities. Schedule noisy activities, such as heavy equipment operation, during off-peak hours to minimize disturbance to local communities. Regularly maintain decommissioning equipment to ensure it operates efficiently and with minimal noise. Monitor noise and vibration levels continuously to ensure they remain within acceptable thresholds and mitigate any exceedances. Inform nearby communities about planned decommissioning activities, including expected noise and vibration levels, to manage expectations. Where possible, use quieter decommissioning methods, such as manual dismantling, instead of mechanical processes. Provide hearing protection for workers involved in noisy tasks and monitor exposure times to prevent hearing damage. Maintain open communication with local communities to address concerns related to noise and vibrations during the decommissioning process. Ensure that all decommissioning activities comply with national and international noise and vibration standards. 	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the project site
		Air quality (dust)	<ul style="list-style-type: none"> Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term. Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. Engage with local communities to inform them about decommissioning activities and measures being taken to control dust emissions. Conduct regular inspections to identify potential sources of dust emissions and ensure that mitigation measures are effectively implemented. 	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative dust impact assessment. Effectiveness of dust control measures. Health impact assessments. Long-term dust emission trends. Post-activity dust clean-up reports. Public awareness programs participation. Soil and vegetation dust monitoring.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
		Air quality (vehicle & machinery fumes)	<p><i>Vehicle & machinery fumes</i></p> <ul style="list-style-type: none"> • Use high-quality fuels with lower sulphur content to minimize emissions from vehicles and generators. • Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. • Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. • Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use. • Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. • Establish an air quality-monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. • Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. • Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. • Establish a reporting system for emissions data to track progress and compliance with environmental standards. <p><i>Generators</i></p> <ul style="list-style-type: none"> • Ensure proper removal and disposal of hazardous materials, such as oil, fuel, and coolant, in accordance with environmental regulations. • Dismantle and dispose of the generators and components at authorized recycling or disposal facilities to avoid environmental contamination. • Provide personal protective equipment (PPE) for workers and implement safety measures to minimize exposure to hazardous substances during the generator decommissioning process. • Prevent soil and water contamination by ensuring that any fuel or oil leaks are immediately contained and cleaned up. • Keep the local community informed of the decommissioning schedule, potential impacts, and mitigation measures to address concerns. • Properly manage and dispose of any solid or liquid waste generated during the decommissioning process according to best environmental practices. • Ensure all decommissioning activities comply with local environmental regulations and international standards for waste management and environmental protection. • Conduct monitoring after decommissioning to ensure that the site is free of contamination and that restoration efforts are successful. 	<ul style="list-style-type: none"> • Traffic patterns and impact assessment. • Visual assessment of dust levels. • Community complaints and feedback. • Cumulative emission impact assessment: • Environmental compliance audits. • Health impact assessment reports. • Long-term emission trends. • Maintenance records of vehicles.

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
	Impacts on Infrastructure & Utilities	Water Consumption	<ul style="list-style-type: none"> Conduct a comprehensive assessment to evaluate water needs for decommissioning activities and identify opportunities for reduction. Develop a water management plan that outlines strategies for minimizing water consumption throughout the decommissioning process. Implement systems to recycle and reuse water for various tasks, such as dust suppression, equipment washing, and site clean-up. Provide training for personnel on water conservation practices and the importance of minimizing water use during decommissioning. Engage with local communities to raise awareness about water conservation efforts and the importance of sustainable water management. Use temporary storage solutions to manage water supplies efficiently and reduce waste. Implement measures to prevent leaks and spills from water storage and distribution systems. Provide periodic updates to stakeholders and the community on water management practices and progress in reducing consumption. 	<ul style="list-style-type: none"> Community feedback Compliance with water usage regulations: Impact on local water resources: Mitigation measure implementation records. Water consumption efficiency Water recycling rates: Water usage quantities and supply.
	Impacts on social environment	Occupational health and safety	<ul style="list-style-type: none"> Create a comprehensive occupational health and safety management plan outlining procedures, responsibilities, and protocols to mitigate identified risks. Ensure that all workers are equipped with appropriate PPE, such as helmets, gloves, goggles, and respiratory protection, to minimize exposure to hazards. Establish clear emergency response procedures for incidents such as fires, chemical spills, and medical emergencies, and ensure all workers are trained in these procedures. Develop and enforce safe work practices and standard operating procedures for decommissioning tasks, including equipment handling, dismantling, and waste disposal. Provide first aid facilities and ensure that trained personnel are available to respond to medical emergencies on-site. Implement measures to control noise and vibration levels during decommissioning activities, such as using quieter equipment and scheduling high-noise activities appropriately. Ensure that all contractors and subcontractors adhere to the same occupational health and safety standards as the main contractor. 	<ul style="list-style-type: none"> Incident reporting and tracking. Health and safety training participation. Personal protective equipment (PPE) compliance. Safety audits and inspections. First aid response records. Compliance with safety regulations. Incident investigation reports.
		Gender-based violence	<ul style="list-style-type: none"> Ensure that Code conducts are signed by all employers or incorporated in the employment contracts on issues associated with GBV. Establish Workers GRM with multiple channels including SEA/H channels. Implement a code of conduct signed by all those with physical presence on site. 	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. Grievances raised,

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
				aggrieved persons and status on resolution etc.
		Inadequate grievances management	<ul style="list-style-type: none"> Develop and communicate a transparent, accessible grievance mechanism for all stakeholders, including local communities, workers, and contractors. Ensure prompt acknowledgment and response to grievances, with clear timelines for resolution and regular updates to complainants. Raise awareness of the grievance mechanism through community meetings, posters, and local media to ensure stakeholders know how to lodge complaints. Provide an option for anonymous complaints to encourage individuals who may fear retaliation to raise concerns. Train project staff, contractors, and relevant local authorities on the grievance management process to ensure consistent and effective handling of complaints. Regularly assess the effectiveness of the grievance mechanism, adjusting procedures as needed to improve responsiveness and stakeholder satisfaction. 	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. 	<ul style="list-style-type: none"> Frequency of stakeholder meetings. Documentation of stakeholder concerns. Follow-up actions on feedback. Community representation in decision-making. Collaboration with local organizations. Long-term engagement strategies.
Labour disputes	<ul style="list-style-type: none"> Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. Ensure full compliance with national labour laws. Set up a monitoring system to track and evaluate labour relations, allowing for early detection of potential disputes and timely intervention. Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes. 	<ul style="list-style-type: none"> Number of Labour Disputes Raised (disputes/month): Grievances Resolved Within Agreed Timeframe (percentage): 		

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
				<ul style="list-style-type: none"> • Worker Turnover Rate (percentage). • Number of Grievances Filed Regarding Wages or Compensation (grievances/month). • Number of Labour Dispute Awareness Campaigns (number/year).
		Child and forced labour	<ul style="list-style-type: none"> • Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. • Ensure compliance with the national labor laws and labour management practices. • Put visible signage on site "No Jobs for children" • -Do not allow children at the project site. 	<ul style="list-style-type: none"> • Number of reported cases of forced labour. • Updated employment register indicating locals employed, their ages, national identification numbers etc. • Grievances raised, aggrieved persons and status on resolution etc.
		Security risks	<ul style="list-style-type: none"> • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Establish partnerships with local law enforcement and security agencies to enhance overall security coordination and response. • Engage with local communities to build trust and cooperation, encouraging them to report suspicious activities or security concerns. • Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. • Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning. • Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities. 	<ul style="list-style-type: none"> • Incident reports. • Access control measures. • Response time to security incidents. • Training of security personnel. • Community security awareness programs. • Stakeholder feedback on security. • Analysis of security trends. • Feedback from security personnel.
		Community health and safety risks	<ul style="list-style-type: none"> • Create a health and safety management plan that outlines strategies for minimizing risks and protecting community health during decommissioning activities. • Develop and communicate an emergency response plan that includes protocols for medical emergencies, environmental incidents, and community evacuations if necessary. • Engage with local communities regularly to gather feedback, address concerns, and provide updates on decommissioning activities and safety measures. • Implement measures to minimize noise pollution during decommissioning. • Develop a traffic management plan to control vehicle movement to and from the site, reducing risks of 	<ul style="list-style-type: none"> • Health incident reports. • Community health assessments. • Feedback mechanisms for community concerns. • Community satisfaction surveys. • Communication of

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	MONITORING INDICATOR
			accidents and ensuring safe access for the community. <ul style="list-style-type: none"> • Implement dust suppression measures, such as regular watering of the site, to minimize dust emissions that can affect community health. • Ensure proper waste management practices to prevent contamination of land and water resources, which could affect community health. • Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process. 	health risks. <ul style="list-style-type: none"> • Injury rate monitoring. • Environmental health audits. • Documentation of community feedback.
		Fire hazards	<ul style="list-style-type: none"> • Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. • Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. • Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. • Ensure the availability of adequate firefighting equipment, such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. • Store flammable materials in designated, secure areas away from ignition sources, following appropriate storage guidelines. • Use clear signage to indicate fire exits, assembly points, and locations of firefighting equipment throughout the site. • Minimize the accumulation of combustible waste materials on-site and establish a routine waste removal process. • Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary. 	<ul style="list-style-type: none"> • Fire incident reports. • Fire risk assessments. • Documentation of fire hazards. • Monitoring of flammable materials storage. • Documentation of community feedback on fire safety.
		Traffic risks	<ul style="list-style-type: none"> • Develop and implement a Traffic Management Plan (TMP). • Engage with local communities to raise awareness about increased construction traffic and safety measures. • Erect temporary road signs warning local road users of construction activities and increased traffic. • Install speed bumps or other traffic-calming measures on roads near the construction site. • Use traffic signs, barriers, and cones to guide and direct both construction and local traffic. 	<ul style="list-style-type: none"> • Number of traffic incidents. • Traffic management plan compliance. • Speed limit violations. • Traffic safety training attendance. • Community complaints related to traffic. • Emergency response time to traffic incidents. • Community awareness programs on traffic safety. • Use of alternative routes by construction vehicles.

8.0. Environmental and Social Management Plan

The environmental and social management plan (ESMP) for a proposed project outlines a framework for mitigating and monitoring negative environmental and social impacts (Table 8-1). It is expected to be referenced by BEC-BAIDOA throughout the project and develop specific implementation plans. The ESMP assigns responsibilities to various actors and provides a timeframe for mitigation measures. Key objectives include monitoring mitigation measures against potential adverse impacts, assessing non-anticipated impacts, and maintaining best practices in environmental, social health and safety. The project is also expected to comply with environmental laws and WB policies.

8.1. THE ESMP IMPLEMENTATION TOOLS

The implementation of the proposed ESMP will be the responsibility of the MoEWR, BEC-BAIDOA and the Contractors as the main players. To facilitate the implementation, several tools to be used in shall be used.

8.1.1. Construction phase

The contractor will prepare targeted management plans to deal with specific environmental and social aspects guided by the ESMP and any other emerging issues on the ground. The contractor shall prepare these plans and have them approved by the MoEWR before they mobilize to the site:

- Construction management plan
- Rehabilitation and site closure plan
- Local recruitment plan
- Workplace health and safety plan
- Community safety plan
- Emergency management and response plan
- SEA/SH prevention and response plan
- Stakeholder engagement management plan
- Grievance Redress mechanism
- Labour influx management plan

8.1.1.1. Construction management plan

The construction management plan for the proposed project shall include the following elements:

- *Management of fuels and other hazardous materials:* The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.
- *Management of the construction site:* The contractor shall prevent littering and the random discard of any solid waste on or around the construction site. The contractor shall manage other solid and liquid waste.
- *Fire prevention and management:* The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process. The Contractor shall prepare a fire prevention and fire emergency plan as a part of the plans to be submitted to MoEWR and BEC-BAIDOA.
- *Management of air quality:* The Contractor shall institute appropriate measures to minimize or avoid air quality impacts. This shall be achieved through formulation of air quality management plan.
- *Neighbouring landowner and occupier relations:* The Contractor shall respect the property and rights of neighbouring landowners and occupiers at all times and shall treat all persons with deliberate courtesy. The Contractor shall respect any special agreements between the MoEWR/BEC-BAIDOA and the neighbours e.g., the wayleaves agreements signed between MoEWR/BEC-BAIDOA and landowners will need to be respected by the Contractors.
- *Complaints register:* The Contractor shall establish and maintain a register for periodic review by the MoEWR/BEC-BAIDOA that logs all the complaints raised by the neighbours or the public about construction activities. The register shall be regularly updated, and records maintained including the name of the complainant, his/her domicile and contact details, the nature of the complaint and any action taken to rectify the problem.
- **Construction control:** The construction control for the proposed project shall cover control of access and materials supply. The Contractor shall prepare a method statement including plans for all construction activities for approval by the supervising contractor and the MoEWR/BEC-BAIDOA.

8.1.1.2. Rehabilitation and site closure plan

After completion of construction activities, the contractor shall clear the site of construction materials and dispose wastes as recommended in the ESMP. The contractor shall remove all temporary works on the construction site and grow grass or any other indigenous vegetation on areas that are not covered by the installations to control erosion.

8.1.1.3. Local recruitment plan

The contractor will prepare a local recruitment plan to guide on recruitment of locals. The plan shall pay attention or adhere to Employment Act of both the FRS, Puntland State Government and the WB ESS2. In designing the local recruitment plan contractor shall: wherever possible, give priority to qualified local people when hiring employees, ensure all community segments - men, women, vulnerable individuals, minority clans, and VMGs who meet OP 4.10 criteria - can access subproject benefits during construction, and that the contractor prioritizes hire of locals for skilled, semi-skilled and unskilled labour.

8.1.1.4. Workplace health and safety plan

The workplace health and safety plan to be implemented by the Contractor, MoEWR and BEC-BAIDOA shall include the following key measures:

- The contractor shall prepare and implement measures to minimize diseases likely to be contracted by the construction workers because of the proposed project such as HIV & AIDs and other communicable diseases.
- The contractor shall have obligations of managing the safety of its employees by; provision of appropriate PPEs to employee, training employees on competence, employing competence and qualified staff, provision of First Aid Kits onsite, and document and create awareness on safe work procedures and work instruction.
- The contractor will manage accidents by having an emergence response plan which will include contacts for emergency service providers e.g., ambulances, fire brigade and nearest hospitals.
- Health and safety performance will be continuously monitored, and procedures reviewed with the aim of eliminating risk as far as reasonably practicable.

8.1.1.5. Community health and safety plan

The community health and safety plan shall be developed and implemented by the contractor. The Community health and safety plan shall include:

- Adherence to the existing FRS and Puntland State laws and regulations, and the WB ESS4.
- The contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.
- The contractor shall undertake an independent risk assessment prior to any construction activity. The findings of this assessment will inform the development of a community safety plan and create awareness to the community on the same.

8.1.1.6. Traffic management plan

The development and implementation of a Traffic Management Plan (TMP) during the construction phase is crucial for ensuring the safety of both workers and the local community. A TMP will outline strategies to manage the increased traffic flow caused by construction vehicles, minimize disruptions to existing transportation networks, and mitigate risks such as accidents, road damage, and delays. Key elements of TMP shall include designated access routes for heavy machinery, scheduling of vehicle movements to avoid peak traffic times, and clear signage to guide drivers and pedestrians. Coordination with local authorities will be essential to ensure that the plan aligns with road safety regulations and minimizes negative impacts on local communities, especially in residential and commercial areas near the construction site. Regular monitoring and adjustments to the plan will be necessary to address any evolving traffic challenges.

8.1.1.7. Emergency preparedness and response plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards. The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others. There is the potential of fire on the site, this will be avoided by the provision of fire protection and firefighting equipment including fire extinguishers, signage, danger plates, and plates name plates. The fire equipment will be placed where they are visible and easy to reach.

8.1.1.8. SEA/SH prevention and response plan

The contractor will update the existing SEA/SH Prevention and Response Action Plan that will include a channels for SEA/H reporting that ensures confidentiality. The plan should have an Accountability and Response Framework. The plan will include the necessary measures for prevention and response of GBV impacts. The mitigation measures shall include:

- Ensuring that the local employment opportunities are equitably accessible to all segments of the community
- Ensure equal pay for equal work
- Updating and implementing GBV (SEA/SH management) plan that shall include sensitisation of community members and subproject workers on the potential of the subproject giving rise to, exacerbating and/or mitigating SEA and SH, and the appropriate mitigation measures.
- The contractor shall map all GBV service providers and document referral services for survivors
- The contractor shall sensitize community members and subproject workers on the referral pathways, prepare and implement a functional and accessible GBV GRM for use by workers and community members (as appropriate).

8.1.1.9. Stakeholder engagement plan

A Stakeholder Engagement Plan is a formal approach to communicate with project stakeholders to achieve their support for the project. The SEP is a useful tool for managing communications between the contractor and other stakeholder. The updated plan shall specify the frequency and type of communications, media, contact persons, and locations of communication events. For this assignment, the Contractor shall apply the SEP already developed by the MoEWR as part of the SESRP, and modify where necessary to meet the local unique challenges.

8.1.1.10. Grievance redress mechanism

The contractor shall ensure that all PAPs are informed how to register grievances or complaints, including specific concerns about land and environment. The PAPs will be informed about the dispute resolution process, specifically about how the disputes will be resolved in an impartial and timely manner. For this particular project, Alternative Dispute Resolution (ADR) approaches will be given preference and based on customary rules, arbitration, or third-party mediation. ADR will be promoted or defended as a resolution to disputes related to land. The affected persons and other stakeholders also have a right to access the World Bank Grievance Redress Service (GRS) and the World Bank Inspection Panel at no cost. A local grievance committee shall be established with representation from all stakeholders, including the vulnerable groups, especially women before the commencement of the project. The LGC shall handle all project-related grievances during all the project phases. The principles of grievance mechanism management that need to be observed shall include:

- All complaints and grievances are resolved as quickly as possible; and that the resolution of complaints and grievances should be at the lowest possible level for resolution.
- All complaints that can be resolved shall be resolved immediately on the site.
- The focus of the GRM shall be to resolve issues in a customarily appropriate fashion at community level and record details of the complaint, the complainant and the resolution.

A grievance redress mechanism and a grievance redress committee (GRC) shall be established in a culturally appropriate manner in consultation with the community. The GRM committee will have the following roles:

- Log the grievances
- Maintain records of the GRC meetings and grievances
- Resolve the grievances to the extent possible.

Proposed grievance procedures

For this particular project, the following grievance procedures are proposed:

- Registration* - Community members can inform the contractor about concerns directly and if necessary, through third parties. Once a complaint has been received, it will be recorded in a complaints log or data system. The log will be kept in hardcopy or electronic form. All reported grievances will be categorized, assigned priority, and routed as appropriate.
- Grievance logbook*: The grievance logbook will ensure that each complaint has an individual reference number, and is appropriately tracked and recorded actions are completed. The information to be recorded shall include:
 - Name, age, gender of complainant;

- Date the complaint was reported;
 - Date the grievance logged;
 - Action taken;
 - Date information on proposed corrective action sent to complainant (if appropriate);
 - The date the complaint was closed; and
 - Date response was sent to complainant.
- (iii) *Sorting and Processing* - This step determines whether a complaint is eligible for the grievance mechanism and its seriousness and complexity. All the complaints/grievances shall be screened. However, this will not involve judging the substantive merit of the complaint. The following guide will be used to determine whether a complaint is eligible or not:
- The complaint/grievance pertains to the power plant project.
 - The issues raised in the complaint/grievance fall within the scope of issues the grievance mechanism is authorized to address.
- Ineligible complaints/grievances may include those where:
- The complaint is clearly not power plant project -related.
 - The nature of the issue is outside the mandate of the grievance mechanism.
 - The complainant/grievance has no standing to file.
 - Other project or organizational procedures are more appropriate to address the issue.
- (iv) *Closing out and escalation*: Project-related grievances will be addressed and closed out as appropriate. The GRM will provide a channel for escalation e.g., through legal redress.
- (v) *Monitoring and evaluation*: The proponent MoEWR/BEC-BAIDOA will monitor all the activities of the stakeholder engagement and grievance management activities.

It should be noted that if complainants are not satisfied with the grievance process, even after arbitration, they have the right to present their complaint through the legal (FRS and or Puntland State) systems. However, it is expected that most disputes will be resolved at the lowest level through the GRC. Since most disputes/grievances are likely to arise during the Construction and operation period, the contractor's Environmental and Social Safeguard team specifically the Community Liaison Officer will work closely with the community to be able to resolve disputes. The responsibilities of the Community Liaison Officer shall include:

- Monitor day to day implementation of the project
- Address grievances as they arise on the project
- A member of the GRC to respond on issues that may have been brought to the attention of the committee before escalating to other relevant entities.
- Escalate grievances internally to get a lasting solution

World Bank Grievances Redress Mechanism

The World Bank has established two grievance redress mechanisms that provide avenues for individuals and communities to submit complaints directly if there is belief that they have been, or are likely to be, adversely affected by a World Bank-funded project. In this project PAPs and other stakeholders have the right to know and access at no cost these GRMs as described below.

- **World Bank Grievances Redress Service**: The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:
 - (a) Online by accessing the online form;
 - (b) Sending an Email to grievance@worldbank.org; or
 - (c) Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.
- **World Bank Inspection Panel**: The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World

Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IP are; Tel: +1 202 458 5200; email: ipanel@worldbank.org.

8.1.1.10. Labour influx management plan

The purpose of this plan shall be to provide a clear set of actions and responsibilities for the control of impacts linked to in-migration within the Project's area of influence. This plan will be regularly reviewed and updated to reflect revised Project design, socio-economic changes and learning experienced during its implementation. The objectives of this plan shall be to:

- Monitor the scale of project induced in-migration into the project area and specific in-migration;
- Support Puntland State government and communities to manage both internal and external immigration into the project area; and
- Mitigate and manage any negative impacts and enhance and promote any positive impact related to labour influx.

The plan shall consider these measures:

Prepare and Implement a Labour Management Plan (LMP) with policies and measures for ensuring that:

- (i) Any sub-contractors and workers are sensitised on:
 - (a) Puntland State/FRS labour laws
 - (b) Puntland State/FRS child labour laws
 - (c) FRS/International forced labour laws
- (ii) Enforce:
 - (a) The Code of conduct
 - (b) Puntland State/FRS labour laws
 - (c) Puntland State/FRS child labour laws
 - (d) FRS/International forced labour laws

8.2.2. Operation phase

The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. BEC-BAIDOA under the supervision of MoEWR shall be responsible for all the mitigation measures for negative impacts during the operation phase. This will be done by implementation of the following steps:

- Inspections
- Corrective action
- Reporting

8.2.3. Decommissioning phase

The rehabilitation and decommissioning management plan shall include the following:

- (i) Planning for Closure
 - (a) The MoEWR (the proponent) shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant FRS and Puntland State authorities.
 - (b) The MoEWR and BEC-BAIDOA shall develop rehabilitation and decommissioning plan in conjunction with relevant stakeholders at least one year before the end of facility's operations.
 - (c) The MoEWR and BEC-BAIDOA shall explore options of re-use and recycling of the facility's components/structures.
- (ii) The decommissioning
 - (a) The MoEWR and BEC-BAIDOA shall take into consideration the health and safety of personnel, contractors, neighbours and the public during the planning and implementation of the demolition process.
 - (b) The MoEWR and BEC-BAIDOA shall undertake a further survey to identify any contaminated areas and remediate them accordingly.

(iii) Post Closure

The MoEWR and BEC-BAIDOA shall ensure that the facility's site is free of impacts associated with the closure and demolition. In this regard, the MoEWR and BEC-BAIDOA shall develop, rollout and implement a monitoring plan to include:

- (a) Monitoring of the rehabilitated site to confirm whether progress is satisfactory.
- (b) Outline of how land improvement and future land use will be affected by the past operations and decommissioning of the associated infrastructure.

8.3. THE ESMP IMPLEMENTATION ARRANGEMENTS

The specific roles and responsibilities of proponent, implementing agency, supervision consultant and contractor are as indicated in Table 8-9.

Table 8-1: The ESMP implementation arrangements for the proposed BEC-BAIDOA Hybrid Power Plant-Baidoa

Entity	Roles and responsibilities
Proponent - MoEWR	The MoEWR will provide overall coordination and oversight of the project. MoEWR will be responsible for overall responsibility for safeguards due diligence, and compliance monitoring. The MoEWR will also provide funding for the project planning and implementation.
Project Implementation Unit	The MoEWR has already put in place a Project Implementation Unit (PIU) to guide implementation of the project. In the PIU Environmental and Social issues are spearheaded by an Environmental and Social Expert whose role is to coordinate and oversee implementation of safeguards. HD consulting firm has been contracted to provide environmental and social backstopping services during the project implementation.
BEC-BAIDOA	BEC-BAIDOA will be responsible for implementation and operation of the project on behalf of the MoEWR. Some of the key responsibilities include but not limited to are; <ul style="list-style-type: none"> • BEC-BAIDOA will supervise construction works through a supervision consultant and also directly • Monitoring the progress of the project in terms of the safeguards and technical aspects. • Monitoring of the ESMP implementation • Ensuring the project is on course in terms of timelines • BEC-BAIDOA to hire an E&S specialist to support with the management of risks
Puntland State Government	The Puntland State Government is a key stakeholder in this project. The roles of the Puntland State Government shall include giving relevant approvals needed, solving grievances that cannot be sorted at project level, monitoring progress of the project among others.
FRS and Puntland Ministries of Environment	Shall be responsible for approval of ESIA and EHS reports and licensing. Additionally, the ministries shall be free to check progress of implementation of ESMP.
E&S supervising consultant	<ul style="list-style-type: none"> • The E&S supervising consultant shall prepare quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis amongst other technical aspects • Ensure the project adheres to all environmental and social impact assessment (ESIA) recommendations, national regulations, and international standards such as the World Bank ESS. • Oversee the implementation of mitigation measures for environmental, social, and community health and safety risks identified during the ESIA, including soil erosion, waste management, biodiversity protection, and labour influx. • Supervise the proper execution of the ESMP during the construction phase; ensuring contractors comply with the stipulated environmental and social safeguards. • Conduct regular field inspections and audits to assess the environmental and social performance of the contractors and identify non-compliance issues. • Prepare and submit periodic environmental and social monitoring reports to the MoEWR, regulatory bodies, and the World Bank. • Coordinate the training of train project staff and contractors on environmental and social management procedures, including waste handling, safety protocols, and community engagement. • Support the contractor and client is development of EPRP, and oversee emergency preparedness and response plans for potential environmental and social incidents, ensuring swift action to mitigate impacts. • Ensure that gender-based violence (GBV) risk mitigation measures and other labour-related guidelines are implemented on-site, particularly in managing the labour influx and worker-community relations. • Liaise with local and regional environmental authorities in Baidoa to ensure compliance with the Puntland State Environmental Policy (2014) and the Puntland State Environmental Management Act (2016). • Continuously identify potential environmental and social risks throughout the construction phase and recommend adaptive management strategies as needed.
Contractor	<ul style="list-style-type: none"> • Implementation of the contractor related aspects of the ESMP and regularly (monthly) reporting

Entity	Roles and responsibilities
	<ul style="list-style-type: none"> • The contractor on his part will have to appoint an EHS officer and a Social Specialist to coordinate and report on the ESMP implementation respectively. • The contractor to engage a Community Liaison Officer to act as a link between the community and the contractor and support the Social Specialist. • The contractor will also have the obligation of managing the E&S risks related to his/her operations. • Maintaining the required level of stakeholder engagement and communication, including providing project schedule information to the public, accepting and resolving public grievances, advertising and hiring local workers. • Maintain a working grievance redress mechanism. • The contractor is to comply with all regulations and laws at the Puntland State and FRS levels level and other relevant regulations and laws • The contractor shall refer to ESIA recommendations and the ESMP when preparing the contractors- ESMP and the specific plans • The contractor shall provide water required for use in connection with the works including the work of subcontractors and shall provide temporary storage tanks, if required • The contractor shall make his own arrangements for sanitary conveniences for his workers. Any arrangements so made shall be in conformity with the public health requirements for such facilities and the contractor shall be solely liable for any infringement of the requirements. • The contractor shall be responsible for all the actions of any subcontractors whom s/he subcontracts. • The contractor shall take all possible precautions to prevent nuisance, inconvenience or injury to the neighbouring properties and to the public generally, and shall use proper precaution to ensure the safety of the community • All work operations, which may generate noise, dust, vibrations, or any other discomfort to the workers and/or visitors of the client and the local community, must be undertaken with care, with all necessary safety precautions taken. • The contractor shall take all effort to muffle the noises from his tools, equipment and workmen to not more than 70dBA • The contractor shall upon completion of working, remove and clear away all plant, rubbish and unused materials and shall leave the whole site in a clean and tidy state to the satisfaction of the MoEWR and BEC-BAIDOA. He shall also remove from the site all the liquid and solid wastes. • No blasting shall be permitted without the prior approval of the MoEWR and the relevant Puntland State authorities. • Borrow pits will only be allowed to be opened up on receipt of permission from the approving authorities. • The standard of workmanship shall not be inferior to the MoEWR and WB Standards. No materials for use in the permanent incorporation into the works shall be used for any temporary works or purpose other than that for which it is provided. Similarly, no material for temporary support may be used for permanent incorporation into the works. • Disposing of the waste generated during construction phase activities shall be done in accordance to the ESMP. • The contractor EHS officer will report on ESMP implementation during construction period. The aspect to be reported by the contractor will include safety issues i.e. hours worked, recordable incidents and corresponding Root Cause Analysis (lost time incidents, medical treatment cases), first aid cases, incidents and accidents, potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training etc.); Environmental incidents and near misses; noncompliance incidents with permits and national law; Training on E&S issues (dates, number of trainees, and topics); Details of any security risks; Worker & External stakeholder grievances and E&S inspections by contractor, including any authorities.

8.4. MONITORING

In the context of this particular ESMP (Table 8-2), monitoring denotes a systematic process of collecting, analysing and using information to track the progress of implementation of the ESMP including coming up with measures to address any emerging issues. The monitoring will involve recording information to track performance and recommendations to keep implementation of ESMP on track. The monitoring will have two elements: routine monitoring against standards or performance criteria; and periodic review or evaluation. Monitoring will often focus on the effectiveness and impact of the ESMP as a whole.

During construction phase, BEC-BAIDOA shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the ESMP. Compliance will mean that the contractor is fulfilling their contractual obligation. During operation phase, BEC-BAIDOA will monitor facility's operations to ensure compliance with management measures in the ESMP and operation procedures. As part of this monitoring, the BEC-BAIDOA will undertake EHS Audits, and make provisions for

monitoring and evaluation. Special attention shall be given to the monitoring arrangements relating to biophysical impacts, occupational health and safety, social risks, facility operational and emergency response. BEC-BAIDOA will require that contractors monitor, keep records and report on the following environmental, health and social issues of the proposed project.

- *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases); first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
- *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
- *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.
- *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).
- *Training on E&S issues*: including dates, number of trainees, and topics.
- *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
- *External stakeholder engagement*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
- *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
- *External stakeholder e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed shall include those received since the preceding report and those that were unresolved at the time of that report. Grievance data shall be age and gender-disaggregated.
- Major changes to contractor's environmental and social practices.
- *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until BEC-BAIDOA determines the issue is resolved satisfactorily.
- *Grievance monitoring and reporting*. During the implementation, monitoring the grievance mechanism will be essential to ensure that concerns from local communities, workers, and other stakeholders are effectively addressed in a timely and transparent manner. Regular tracking of grievances shall include logging complaints, categorizing issues, assessing response times, and evaluating the resolution effectiveness. Given Baidoa's socio-economic and environmental context, the mechanism shall be accessible, culturally appropriate, and responsive to vulnerable groups, including women and displaced persons. Periodic reviews, stakeholder feedback sessions, and independent audits can help identify gaps and improve the system's efficiency. Effective monitoring fosters trust, prevents conflicts, and enhances project sustainability by ensuring that grievances are resolved before escalating into major disputes.

Table 8-2: Environmental and social management plan (ESMP) for the proposed BEC-BAIDOA Hybrid Power Plant-Baidoa

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
CONSTRUCTION	Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> Dispose of waste materials promptly to avoid visual pollution. Install temporary barriers, such as walls or screens, to shield construction sites. Keep construction materials and equipment organized to avoid visual clutter. Limit the construction footprint and restrict activities to designated areas. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Presence of a perimeter fence 	One-off	As per the construction budget
		Soil, ground/surface water contamination	<ul style="list-style-type: none"> Properly store, handle, and dispose of construction waste. Use bunded areas and spill kits for fuel, chemicals, and oils. Store construction materials like cement securely to avoid leakage or runoff. Design and implement temporary drainage to manage storm water. Regularly maintain equipment to avoid leaks. Conduct regular water quality tests in nearby water bodies to detect contamination early. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Records of any leakages from construction equipment/ vehicles. Oil spill containment plan. Provision of fuel/oil drip and spill trays 	Monthly	4,500
		Air quality (Dust)	<ul style="list-style-type: none"> Cover construction material stockpiles (sand, gravel, etc.) to minimize dust release. Limit vehicle speed on-site and ensure trucks are covered when transporting materials. Monitor dust levels regularly and adjust mitigation measures as needed. Promote vegetation growth in disturbed areas to stabilize soil and reduce dust. Regularly spray water on work areas to suppress dust. Schedule high-dust activities during times of 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Visual Observation of dust Provision of PPEs especially masks 	Monthly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> lower wind speeds or less traffic. Where possible, pave or stabilize construction access roads to reduce dust generation. 				
		Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Use low-sulphur fuels to reduce harmful pollutants. Regularly maintain construction vehicles and equipment to minimize exhaust emissions. Plan transportation routes and schedules to minimize trips and avoid congested areas. Minimize vehicle idling and schedule operations to reduce fuel consumption. Inform local communities of mitigation measures to address air quality concerns proactively. Deploy vehicles and machinery with low-emission engines 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks 	Monthly	4,000
		Noise & vibration	<ul style="list-style-type: none"> Conduct regular noise and vibration monitoring to ensure compliance with permissible limits. Establish a GRM for community to report noise or vibration disturbances. Inform nearby residents about construction schedules and anticipated noise levels in advance. Provide earplugs or earmuffs to construction workers operating noisy equipment. Regularly maintain construction equipment to prevent excessive noise and vibrations. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Turn off equipment when not in use to reduce unnecessary noise. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant 	Monthly	3,500
		Biodiversity (Fauna)	<ul style="list-style-type: none"> Limit vegetation removal to the essential areas and replant native species post-construction. Implement noise and vibration mitigation measures to minimize disruption to fauna. Ensure proper disposal of wastes to avoid attracting wildlife. Site clearing work/earthwork to be done 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting 	Quarterly	5,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			during the dry season to minimize impacts on fauna. <ul style="list-style-type: none"> • Vehicle movements shall be limited to designated paved/unpaved roads and maintained at 15-20 km/h. • Ensure wildlife-friendly designs for infrastructures. • An ecologist shall be hired to coordinate the fauna monitoring. 				
		Biodiversity (Flora)	<ul style="list-style-type: none"> • Limit clearing to designated areas essential for construction and infrastructure. • Rehabilitate disturbed areas with native plant species post-construction. • Implement erosion control measures (e.g., silt fences, vegetation buffers) to prevent damage to surrounding flora. • Prevent the introduction and spread of invasive plant species. • Ensure proper demarcation and delineation of the project site to be affected by construction works. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Number of trees cleared • Planted trees 	Quarterly	4,500
		Soil erosion	<ul style="list-style-type: none"> • Limit clearing of vegetation to areas essential for construction and retain natural ground cover where possible. • Schedule construction activities to avoid heavy rainfall periods, reducing runoff risks. • Plant native vegetation or grass on disturbed areas immediately after construction to stabilize the soil. • Design and maintain access roads to minimize soil compaction and erosion along transportation routes. • Regularly inspect and maintain erosion control measures, especially after rainfall events. • Avoid groundbreaking during the seasons of high rainfall to avoid erosion. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Assess size of rills or Gulleys forming from accelerated run off from compacted areas 	Quarterly	3,000
		Wastes (Solid wastes)	<ul style="list-style-type: none"> • Develop and implement a site-specific waste management plan detailing waste segregation, storage, and disposal methods. • Set up clearly marked waste collection points 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Presence of well-maintained receptacles and centralized collection points. 	Monthly	5,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			with appropriate bins or containers. <ul style="list-style-type: none"> • Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time • Train workers on proper waste disposal practices and the importance of waste reduction. • Safely store hazardous waste in designated areas and ensure proper disposal through licensed contractors. • Promote the recycling and reuse of materials, such as scrap metals, wood, and concrete. • Optimize material use and avoid over-ordering construction supplies to reduce waste. • Establish a schedule for regular waste collection and removal from the site to prevent accumulation. • Construction wastes to be managed in accordance with internationally accepted construction standards. • Conduct periodic audits of waste management practices to ensure compliance and address any gaps. 				
		Wastes (Liquid wastes)	<ul style="list-style-type: none"> • Develop and implement a plan for the collection, treatment, and disposal of liquid waste. • Train workers on proper handling and disposal of liquid waste and spill response protocols. • Reduce water use through efficient construction practices and recycling whenever feasible. • Monitor liquid waste generation and ensure compliance with local environmental regulations. • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Engine maintenance records • Oil spill containment plan • Presence of separate and clean washrooms for both the gents and ladies 	Monthly	5,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> • Develop and implement a detailed Spill Prevention Plan (SPP) • Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. • In case of spillage, the contractor should isolate the source of oil spill and contain the spillage using sandbags, sawdust, absorbent materials and/or other materials approved by materials. • In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. • Install oil-water separators in drainage systems to capture and remove oil or fuel from storm water. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. • Provide sanitary waste facilities for both genders clearly marked • Refuelling and maintenance of vehicles will not take place at the construction site. • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. 				
	Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> • Develop a water management plan to monitor and optimize water usage during construction. • Prioritize the use of non-potable or recycled water for activities such as dust suppression and equipment washing. • Implement water-saving techniques, such as using low-flow faucets and nozzles in construction processes. • Train workers on the importance of water conservation and best practices for minimizing water use. • Coordinate and schedule water-intensive tasks efficiently to avoid excessive 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Water usage records 	Monthly	5,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> consumption. Source and utilize a sustainable and reliable water supply for both construction and operation phase. Consult with the project local committee on water use to avoid conflicts with the community. Conduct regular monitoring of water consumption to ensure adherence to planned usage levels and report deviations. 				
		Energy Consumption	<ul style="list-style-type: none"> Use energy-efficient machinery and tools to minimize fuel and electricity consumption. Train workers on energy conservation practices and the importance of reducing consumption. Regularly maintain construction equipment to ensure optimal energy performance and reduce inefficiencies. Plan and schedule activities to avoid energy-intensive operations during peak hours. Monitor energy use regularly to identify areas for improvement and ensure compliance with energy-saving targets. Implement energy-saving measures, such as turning off unused equipment and lights. Enforce a strict no-idling policy for construction vehicles and machinery to save fuel. Develop and implement an energy management plan to track and optimize energy usage during construction. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Energy consumption records 	Monthly	4,500
	Impacts on social environment	Archaeology and cultural heritage	<ul style="list-style-type: none"> Develop and implement a Chance Finds Procedure and ensure protocols are followed. Engage a qualified archaeologist to monitor all ground-disturbing activities to ensure early identification. Establish a clear protocol for halting construction activities immediately if any archaeological or cultural materials are found. If chance finds are made, ensure proper 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Stratigraphic Soil profile reports during excavation Fully developed artefact recovery protocols Discovery of human burials reports during excavation. Regulatory Compliance reporting under Somali Heritage Laws. 	One-off	As per the construction budget

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			documentation, including detailed records, photography, and GPS coordinates, before any further action is taken.				
		Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Collaborate with local law enforcement to address trespassing incidents and ensure community safety. Conduct routine inspections of security measures to identify and address vulnerabilities. Deploy trained security guards to patrol the site and monitor for unauthorized access. Develop a response protocol for handling incidents of trespassing or unauthorized entry. Display clear and visible warning signs around the site to discourage trespassing. Establish controlled entry and exit points with security personnel or electronic systems. Inform nearby communities about the project, emphasizing safety risks associated with unauthorized access. Install adequate lighting and CCTV cameras to deter intruders and enhance monitoring. Install perimeter fencing around the construction site to prevent unauthorized entry. Issue identification badges to workers and ensure only authorized personnel on-site. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Presence of a controlled access and records of every person accessing the site 	Weekly	3,500
		Worker influx – incoming workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs. Raise awareness among local community and workers on the need to have a good /cordial working relation Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM accessible to community members. The contractor and the project/community 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Records of employees/updated employee register. Number of local community employees and external employees/ updated employee register. 	Quarterly	5,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			grievance redress committee to work closely address complains raised on time. <ul style="list-style-type: none"> Respect for community values/culture. Prompt payment of workers as per the contractual agreements/terms. 				
		Gender-based violence	<ul style="list-style-type: none"> Provide comprehensive training for workers and management on recognizing, preventing, and responding to GBV. Implement and enforce a strict zero-tolerance policy for any form of GBV, including harassment, abuse, or exploitation. Set up confidential and accessible reporting channels for victims of GBV, ensuring safety and anonymity. Engage with local communities, particularly women's groups, to raise awareness of GBV risks and prevention measures around the construction site. Work with local law enforcement, health services, and NGOs to provide support to victims of GBV. Update the SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. Grievances raised, aggrieved persons and status on resolution etc. 	Quarterly	5,500
		Labour disputes	<ul style="list-style-type: none"> Provide workers with clear, written contracts outlining terms, conditions, and dispute resolution procedures. Ensure fair and timely payment of wages, benefits, and allowances in line with local labor laws and industry standards. Establish a workers' committee or labor union representatives to voice concerns and address grievances. Create transparent communication channels between workers, management, and contractors to address issues before they escalate. Implement formal mechanisms for resolving disputes, such as mediation or arbitration, to address conflicts fairly. Hold regular meetings with workers to discuss concerns, updates, and resolve issues 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Number of grievances filed and time taken to resolve them. Frequency of labor disputes. Health and safety violations. Worker turnover rate and compliance with working hours and overtime rules. Labor law compliance audits Worker welfare committee activities. 	Quarterly	5,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>early on.</p> <ul style="list-style-type: none"> • Ensure a safe and healthy working environment, as poor working conditions can contribute to labor disputes. • Ensure full compliance with local labor laws, international labor standards, and regulations to prevent legal disputes. • Establish an accessible, confidential grievance redress system for workers to report issues without fear of retaliation. • Engage with local communities to manage expectations and foster positive relationships with the workforce. • Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues. 				
		Child and forced labour	<ul style="list-style-type: none"> • Implement and enforce a zero-tolerance policy towards child labor and forced labor, in compliance with international labor standards. • Verify the age of all workers before hiring to ensure no child labor is employed, and maintain documentation of workers' ages. • Ensure that all workers sign contracts freely, without coercion, and that they are fully aware of their rights and responsibilities. • Engage with local communities to raise awareness about the risks and harms of child and forced labor, and encourage reporting of suspected cases. • Ensure compliance with both local and international labor laws, including those prohibiting child and forced labor, and regularly review practices to ensure alignment. • Establish accessible, confidential reporting mechanisms for workers and the community to report suspected child or forced labor incidents. • Put visible signage on site "No Jobs for children" 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Updated employment register indicating locals employed, their ages, national identification numbers etc. • Grievances raised aggrieved persons and status on resolution etc. • Number of reported cases of forced labour. 	Quarterly	4,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. 				
		Security risks	<ul style="list-style-type: none"> Conduct a comprehensive risk assessment to identify security threats. Engage local stakeholders (government, law enforcement, and communities) to understand local security concerns. Collaborate with local law enforcement and security agencies to provide support and enhance security measures. Hire licensed security personnel familiar with the area to provide 24/7 site surveillance, patrols, and monitoring. Use surveillance systems, such as CCTV cameras and motion sensors, to monitor critical areas in real-time. Implement strict access control protocols, including identity verification and sign-in procedures for workers. Develop a security incident response plan that includes procedures for evacuation, medical emergencies, and reporting incidents. Provide workers with security training, and protocols for responding to security threats. Maintain constant communication and coordination with local authorities regarding security updates and developments in the region. Prepare contingency plans for potential security scenarios, including kidnappings, armed attacks, and civil unrest. Have security response teams on standby to address urgent security breaches or emergencies. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Number of security incidents and response time to security incidents. Compliance with security protocols. Incidents of unauthorized site access. Grievances related to security. Community engagement on security issues. Security risk assessments. Coordination with local law enforcement. Security equipment functionality. Frequency of security audits. 	Monthly	5,500
		Occupational Health and safety	<ul style="list-style-type: none"> Develop and implement a comprehensive Occupational Health and Safety (OHS) plan outlining safety protocols, emergency procedures, and risk assessments. Provide appropriate PPE (e.g., helmets, 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Records of any near misses, incident, and accidents. Records of corrective actions implemented if there was an accident. 	Monthly	6,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			gloves, goggles, and boots) to all workers and enforce their use at all times on site. <ul style="list-style-type: none"> • Conduct regular safety training for workers on hazard identification, safe work practices, and emergency response procedures. • Perform regular risk assessments and safety audits to identify potential hazards and implement corrective actions. • Ensure first aid kits are readily available on-site and provide trained medical personnel or access to nearby medical facilities for emergencies. • Conduct daily safety inspections to identify and address hazards promptly. • Install clear and visible safety signs and warnings to alert workers of potential hazards, especially in high-risk areas. • Develop emergency response plans and conduct regular drills for fire, medical emergencies, and other potential incidents. • Establish a system for reporting, investigating, and documenting safety incidents and near misses to prevent recurrence. • Implement health surveillance programs to monitor workers' health, especially for those exposed to hazardous substances or conditions. • Use skilled personnel for activities which demand skills/technical tasks • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees 				
		Community health and safety risks	<ul style="list-style-type: none"> • Develop a community health and safety plan to outline measures for protecting local communities from construction-related risks. • Implement awareness campaigns to inform local communities about construction activities, potential risks, and safety protocols. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Number of awareness creation sessions conducted. 	Monthly	4,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Collaborate with local health and safety authorities to ensure compliance with safety regulations and address any community concerns in a timely manner. Develop and communicate emergency response procedures for the community, ensuring quick access to medical assistance in case of accidents. Ensure proper management and disposal of construction waste to prevent contamination of local environments and protect community health. Establish a grievance mechanism that allows community members to raise health and safety concerns related to construction activities. Manage construction-related traffic to minimize accidents by establishing safe routes, signage, and speed limits, and employing traffic control personnel. Regularly monitor environmental conditions (air, water, and soil quality) to assess any potential impacts on community health and take corrective actions as needed. Use dust suppression techniques and noise reduction measures (e.g., sound barriers, equipment maintenance) to reduce air and noise pollution affecting nearby communities. 				
		Fire Hazards	<ul style="list-style-type: none"> 'No smoking' signs shall be posted at the construction site A fire risk assessment and evacuation plan should be prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. Designate an assembly point Provision of firefighting equipment on site during construction. Implement strict fire prevention protocols, including the safe storage and handling of flammable materials, fuels, and chemicals. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Records of any Fire incidences Fire equipment and evacuation plan 	Weekly	4,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> • Provide fire safety training to all workers, including how to use firefighting equipment and respond to fire emergencies. • Assign designated fire watch personnel to monitor high-risk areas during critical activities, such as welding or using open flames. • Develop and communicate a fire emergency response plan, including evacuation routes, safe assembly points, and contact details for local fire services. • Install clear fire hazard signs, evacuation routes, and emergency exits to ensure quick and safe evacuation in case of a fire. • Implement strict controls on hot work (e.g., welding, cutting), including proper supervision and fire watches during these activities. • Establish communication with local fire services for immediate response and support in case of fire emergencies. • Ensure that construction equipment and machinery are regularly inspected and maintained to prevent overheating or malfunction that could lead to fires. • Use fire-resistant materials for construction activities where feasible, particularly in high-risk areas. 				
		Traffic risks	<ul style="list-style-type: none"> • Develop and implement a comprehensive traffic management plan to minimize construction-related traffic disruptions and risks. • Install clear signage and road markings to direct both construction vehicles and public traffic safely, including speed limits, detours, and warning signs. • Where possible, establish separate routes for construction vehicles to reduce interaction with public traffic and minimize accidents. • Implement speed limits within the construction area and enforce safety zones 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Number of traffic incidents. • Traffic management plan compliance. • Speed limit violations. • Traffic safety training attendance. • Community complaints related to traffic. • Emergency response time to traffic incidents. • Community awareness programs on traffic safety. 	Monthly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			around high-risk areas to protect workers and the public. <ul style="list-style-type: none"> • Conduct awareness campaigns to inform the public about ongoing construction activities, expected traffic disruptions, and safety precautions. • Limit construction vehicle movement during peak traffic hours to reduce congestion and minimize the risk of accidents. • Develop and communicate an emergency response plan for traffic accidents, including quick access to medical services and coordination with local authorities. • Ensure safe pedestrian pathways and crossings are provided around the construction site to protect local residents and workers. • Control and limit access points to the construction site to reduce unauthorized vehicle entry and minimize traffic risks. • Erect temporary road signs warning local road users of construction activities and increased traffic. • Designate safe parking and loading zones for construction vehicles away from main roads and community spaces. 		<ul style="list-style-type: none"> • Use of alternative routes by construction vehicles. 		
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> • Update the existing SEP and make it more relevant to the subproject and the identified stakeholders. • In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. • Prepare and implement a GRM to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Availability of and implementation of the Stakeholder Engagement Plan. • Number of stakeholder consultations held • Record of stakeholder consultations held (minutes of meetings and list of participants). • Information disclosed to whom it was disclosed (Men, women, PWD, youth, vulnerable individuals etc., methods and languages used in the disclosure (culturally 	Quarterly	3,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
					appropriate and accessible), grievances raised and status on resolution etc. <ul style="list-style-type: none"> Concerns raised and actions raised. 		
		Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. Implement a worker's grievances mechanism. Awareness on the culturally appropriate and accessible GRM to all community segments including VMGs, vulnerable individuals and households and CSOs All reported grievances are logged, dated, processed, resolved and closed out in a timely manner. Proportionate representation of VMGs and vulnerable individuals in the local grievances committee. GRM provides for confidential reporting of particularly sensitive social aspects such as GBV, as well as anonymity. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel. 	Quarterly	3,500
OPERATION	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Fence off the power plant. Engage local communities in discussions about visual impacts and seek input on landscaping and design improvements to reduce visual intrusion. 	BEC-BAIDOA	<ul style="list-style-type: none"> Presence of a perimeter fence 	One-off	As per the operation budget
		Soil, ground/surface water contamination	<ul style="list-style-type: none"> Implement spill prevention protocols and install containment systems (e.g., secondary containment for fuel and chemical storage) to prevent leaks and spills. Develop a stormwater management plan to prevent runoff from carrying contaminants into local water bodies, including the use of retention ponds and proper drainage systems. Store hazardous materials (e.g., chemicals, 	BEC-BAIDOA	<ul style="list-style-type: none"> Oil spill containment plan. Provision of fuel/oil drip and spill trays 	Quarterly	4,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>fuels) in secure, well-marked areas and ensure proper disposal according to regulations to avoid contamination of soil and water.</p> <ul style="list-style-type: none"> Apply erosion control measures (e.g., vegetation cover, mulching) to prevent soil erosion, which can lead to contamination of surface water through sedimentation. Provide regular training to staff on best practices for preventing soil and water contamination, including spill response and waste management procedures. Regularly inspect and maintain equipment and infrastructure to prevent leaks, failures, or malfunctions that could lead to soil or water contamination. 				
		Air quality (Dust)	<ul style="list-style-type: none"> Establish vegetation and landscaping around the site to act as windbreaks and reduce the spread of dust in the surrounding area. Continuously monitor dust levels around the plant and at nearby sensitive receptors to ensure compliance with air quality standards. Inform local communities about ongoing dust control measures and maintain open channels for reporting dust concerns. Ensure planting of grass around and within the facility compound 	BEC-BAIDOA	<ul style="list-style-type: none"> Visual inspection 	Monthly	2,700
		Air quality (Vehicle fumes emissions)	<p><i>Vehicles</i></p> <ul style="list-style-type: none"> Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. Use high quality, low-sulphur fuel to minimize harmful emissions from vehicles. Continuously monitor air quality in and around the site to track the impact of vehicle emissions and take corrective action if levels exceed standards. Keep the local community informed about measures being taken to minimize vehicle emissions and address any concerns 	BEC-BAIDOA	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks 	Monthly	2,800

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>promptly.</p> <p><i>Generators</i></p> <ul style="list-style-type: none"> • Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. • Implement strategies to reduce idling time when diesel generators are not needed or can be supplemented by the hybrid system. • Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. • Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. • Invest in modern diesel generators with advanced combustion systems. • Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. • Regularly report emissions data to local regulatory authorities as part of environmental compliance. • The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters • Use of diesel which is Sulphur-free to run the power producing generators to be encouraged • Use Selective Catalytic Reduction (SCR) to significantly reduce NOx emissions by injecting ammonia or urea into the exhaust stream. 				
		Noise & vibration	<p><i>Genset</i></p> <ul style="list-style-type: none"> • Install soundproof enclosures around the diesel generators • Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. • Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations 	BEC-BAIDOA	<ul style="list-style-type: none"> • Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant 	Quarterly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Ensure regular servicing of the diesel generator to maintain its optimal function. Install high-performance silencers on the generator's exhaust system to reduce noise emissions Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <p><i>BESS</i></p> <ul style="list-style-type: none"> Install soundproof or acoustically treated enclosures around noisy inverters and transformers. Use quieter, high-efficiency fans and cooling systems, or design them with lower noise outputs. Equip the BESS unit with vibration isolators or mounts to reduce noise generated by vibrations Install sound barriers or walls around the BESS unit to deflect or absorb noise. Use sound-absorbing materials within the BESS unit's housing to absorb sound before it escapes. Regularly service and maintain fans, inverters, and other equipment to ensure they operate smoothly 				
		Biodiversity (Fauna)	<ul style="list-style-type: none"> Conduct regular monitoring to assess the presence and behaviour of wildlife in and around the power plant area. Properly manage solid and liquid waste to prevent contamination of habitats that could harm local fauna. Develop a response plan for handling any incidents involving wildlife, such as rescues or injuries. Enforce strict speed limits for vehicles on-site to reduce the risk of wildlife collisions. Prohibit the use of pesticides, herbicides, or other chemicals that could harm wildlife in 	BEC-BAIDOA	Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting	Quarterly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>areas near the plant.</p> <ul style="list-style-type: none"> Conduct periodic environmental audits to ensure all biodiversity protection measures are being implemented effectively. An ecologist shall be hired to coordinate the fauna monitoring. Bird deterrents to be installed to prevent collisions with solar panels. 				
		Biodiversity (Flora)	<ul style="list-style-type: none"> Conduct regular monitoring to assess the health and coverage of flora in and around the power plant area. Restore degraded areas with native plant species to enhance local biodiversity and prevent erosion. Implement measures to control and prevent the introduction or spread of invasive plant species within the project site. Prohibit the use of harmful herbicides, pesticides, or fertilizers that could damage native vegetation. Develop and implement a fire management plan to protect surrounding vegetation from accidental fires. 	BEC-BAIDOA	<ul style="list-style-type: none"> Number of trees cleared Planted trees 	Quarterly	3,000
		Soil erosion	<ul style="list-style-type: none"> Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use Construct the drainage system in a way to follow natural drain of the water Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. Undertake landscaping with grass on areas without electrical installation (lower areas) 	BEC-BAIDOA	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from compacted areas Provision of a drainage system and a rain water harvesting system 	Quarterly	5,000
		Wastes (Solid wastes)	<p><i>General solid wastes</i></p> <ul style="list-style-type: none"> Collaborate with the local community to promote responsible waste disposal and recycling efforts. Compost biodegradable waste, such as food scraps, to reduce landfill contributions and create usable compost for landscaping. Conduct regular training for employees and 	BEC-BAIDOA	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points. 	Quarterly	4,800

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>contractors on proper waste management practices.</p> <ul style="list-style-type: none"> • Emphasis on prudent waste generation and give priority to reduction at source • Ensure non-recyclable solid waste is disposed of at authorized landfill sites compliant with local regulations. • Maintain records of waste generation, handling, and disposal to ensure compliance with environmental regulations. • Operator to contract a licensed waste handler to collect and dispose solid waste • Perform periodic audits to monitor waste generation and management effectiveness, and identify areas for improvement. • Promote reuse of materials where feasible, such as using reusable containers and pallets for operational activities. • Properly handle and dispose of hazardous waste, including electronic and chemical waste, in accordance with international standards. • Provide adequate, well-labelled, and secure storage areas for waste to prevent littering and wildlife scavenging. • Provide waste handling facilities such as labelled waste bins • Undertake solid waste management awareness to operators <p>• <i>Damaged solar panels and hazardous wastes</i></p> <ul style="list-style-type: none"> • Ensure segregation from other waste streams • All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through an approved waste handler 				
		Wastes (Liquid wastes)	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> • Provide sanitary waste facilities for both genders clearly marked 	BEC-BAIDOA	<ul style="list-style-type: none"> • Presence of separate and clean washrooms for both the gents and women. 	Quarterly	4,800

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			<ul style="list-style-type: none"> • Use well-designed, impermeable septic tanks for areas without access to municipal sewage, ensuring regular maintenance and emptying by licensed operators. • Ensure all treated wastewater complies with national and international effluent discharge standards. • Train personnel on proper use and maintenance of sanitary facilities to avoid overloading treatment systems. • Implement water-saving fixtures and practices in sanitary facilities to reduce liquid waste generation. • Develop a plan to manage spills or leaks of sanitary liquid waste, including immediate containment and cleanup. • Conduct routine inspections of all sanitary waste infrastructure to identify and address issues promptly. • Install clear signage in restrooms and waste management areas to encourage proper use and minimize misuse. • Employ licensed service providers for the collection, transport, and disposal of liquid sanitary waste when necessary. <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> • Refuelling and maintenance of vehicles will not take place at the construction site. • Create awareness for the employees on site on procedures of dealing with spills and leaks • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Generators</i></p>		<ul style="list-style-type: none"> • Engine maintenance records • Oil spill containment plan • Records of all accidental spills and number of litres 		

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			<ul style="list-style-type: none"> • Proper storage of the oil is required to ensure no leakages • Frequent inspection and maintenance of the generator to minimize leakages. • No vehicles should be serviced or maintained at the project site. • The waste oil or used oil must be disposed-off appropriately. • Proper training for the handling and use of fuels for the operators of the power plant. • In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> • Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. • Develop and implement a detailed Spill Prevention Plan (SPP) • Ensure quick clean up of spills by designated response teams trained in handling hazardous materials. • Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. • Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. • Establish proper waste management protocols for the disposal of used oil, fuel, and filters from equipment maintenance activities. • Implement a regular environmental monitoring program to check for any signs of contamination in soil, groundwater, and surface water near the plant. • Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. • Install spill and leak detection systems on 				

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			fuel storage tanks, transformers, and pipelines. <ul style="list-style-type: none"> Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear. 				
	<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> Ensure prudent use of water. Install water-conserving automatic taps. Any water leaks through damaged pipes and faulty taps should be fixed promptly. 	BEC-BAIDOA	<ul style="list-style-type: none"> Water usage records 	Monthly	3,500
		Energy consumption	<p><i>Lightings</i></p> <ul style="list-style-type: none"> Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement. Install an energy-efficient lighting system Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. Replace conventional lighting with energy-efficient LED bulbs Utilize daylight sensors to adjust indoor lighting levels based on the amount of natural light, reducing the need for artificial lighting during the day. <p><i>Diesel generators</i></p> <ul style="list-style-type: none"> Conduct scheduled maintenance and servicing of diesel generators. Ensure high quality, low-sulphur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. Implement energy-efficient technologies and practices in plant operations. Implement measures to reduce unnecessary idling of diesel generators. Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel 	BEC-BAIDOA	<ul style="list-style-type: none"> Diesel Generator Usage (hours/month): Solar Energy Generation (kWh/month): Battery Energy Storage System (BESS) Utilization (cycles/month). Lighting Energy Consumption (kWh/month). Maintenance Records for Diesel Generators. Carbon Emissions (tons of CO2/month). 	Monthly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			consumption and improve overall generator efficiency. <ul style="list-style-type: none"> • Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime. 				
	Impacts on social environment	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> • Fencing off the facility to keep of community members, children and livestock from entering into the facility • Maintain records of any person who comes to site • Implement controlled access points with security gates, identification checks, and electronic monitoring systems. • Employ trained security personnel to monitor and patrol the premises continuously. • Deploy surveillance cameras at key locations to monitor the site and identify unauthorized activities in real-time. • Erect clear warning signs at strategic locations indicating restricted areas, potential hazards, and penalties for trespassing. • Conduct outreach programs to educate the local community about the risks of unauthorized access and the importance of site security. • Install adequate lighting around the perimeter and access points to enhance visibility and discourage trespassers, especially at night. • Use motion sensors and alarm systems to detect and respond promptly to unauthorized entries. • Develop and implement a response plan for security breaches, including reporting protocols and coordination with local law 	BEC-BAIDOA	<ul style="list-style-type: none"> • Presence of a controlled access and records of every person accessing the site 	Monthly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			enforcement. <ul style="list-style-type: none"> • Ensure all employees and contractors carry identification badges and enforce strict entry protocols. • Conduct regular reviews of security measures to identify vulnerabilities and update protocols as needed. • Collaborate with local authorities and communities to report and discourage suspicious activities near the site. 				
		Gender-based violence	<p><i>GBV- SEA and SH</i></p> <ul style="list-style-type: none"> • Ensure that Code conducts are signed by all employers or incorporated in the employment contracts. • Establish Workers GRM with multiple channels including SEA/H channels. • Implement a code of conduct signed by all those with physical presence on site. • Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks related to the subproject. • The Action Plan to be proportionate to potential SEA/SH risks, and includes measures such as awareness creation for communities and workers; identification of referral services for survivors and a GRM that ensures confidential reporting of GBV cases. <p><i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i></p> <ul style="list-style-type: none"> • Develop and implement subsidized electricity pricing structures for vulnerable and marginalized groups (VMGs) to ensure affordability. • Collaborate with government and non-governmental organizations to extend electricity access to underserved communities. • Introduce a lifeline tariff for minimal electricity consumption, targeting low-income households. 	BEC-BAIDOA	<ul style="list-style-type: none"> • Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. • Documented referral services for survivors. • Interventions to enable those vulnerable access project benefits. • Number of complaints raised by VMGs/vulnerable individuals regarding access to project services. 	Quarterly	3,500

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			<ul style="list-style-type: none"> • Provide flexible payment options, such as prepaid meters or installment plans, to reduce financial barriers for vulnerable individuals. • Allocate part of the project's revenue for CSR projects aimed at improving access to affordable energy for VMGs. • Prioritize hiring VMGs and vulnerable individuals for operational roles to enhance their financial capacity to afford energy services. • Work with humanitarian organizations to fund electricity access for VMGs and vulnerable groups. • Establish grievance redress mechanisms and regular monitoring to ensure project benefits are equitably distributed. • Lower initial connection costs for VMGs to remove financial barriers to accessing electricity. 				
		Labour disputes	<ul style="list-style-type: none"> • Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes. • Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Ensure full compliance with national labour laws. • Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. • Implement fair and transparent disciplinary procedures. • Maintain open communication between management and workers. • Promote equal opportunities and non-discriminatory practices in hiring, promotion, and compensation to avoid conflicts. 	BEC-BAIDOA	<ul style="list-style-type: none"> • Number of Labour Disputes Raised (disputes/month): • Grievances Resolved Within Agreed Timeframe (percentage): • Worker Turnover Rate (percentage). • Number of Grievances Filed Regarding Wages or Compensation (grievances/month). • Number of Labour Dispute Awareness Campaigns (number/year). 	Quarterly	5,500
		Child and forced labour	<ul style="list-style-type: none"> • Compliance with the national labor laws and labour management practices. 	BEC-BAIDOA	<ul style="list-style-type: none"> • Number of child labour incidents reported (incidents/month). 	Quarterly	2,500

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			<ul style="list-style-type: none"> Put visible signage on site “No Jobs for children” Do not allow children at the project site. Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. Report any form of forced labour at the site. 		<ul style="list-style-type: none"> Number of forced labour incidents reported (incidents/year). Grievances related to child or forced labour (number of grievances/year). Community outreach and awareness campaigns on child labour (campaigns/year). Compliance with international labour standards (compliance level). Social audits conducted (number of audits/year). Local community feedback on employment practices (satisfaction level). 		
		Security risks	<ul style="list-style-type: none"> Deploy trained security personnel to guard the site 24/7. Continue engaging local communities to foster positive relationships and minimize hostility. Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters. Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. Implement a rigorous vetting process for all employees to minimize the risk of insider threats. Maintain a secure perimeter with robust fencing of the site Maintain and regularly update a comprehensive security incident response plan Maintain close coordination with local law 	BEC-BAIDOA	<ul style="list-style-type: none"> Number of security incidents reported (incidents/month): Number of security audits conducted (audits/year): Community engagement activities held (number/year): Incidents of violence or threats against staff (number/year). Collaboration with local law enforcement (number of meetings/year). Number of partnerships established with security and NGOs (active partnerships). 	Monthly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			enforcement and security agencies <ul style="list-style-type: none"> • Monitor local security developments and adjust security protocols accordingly. • Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response. 				
		Risks related to poor or inadequate stakeholder engagement (Conflict)	<i>Risks related to Inadequate stakeholder engagement</i> <ul style="list-style-type: none"> • In line with the SEP, undertake adequate consultations prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. • Update the existing SEP and make it more relevant to the subproject and the identified stakeholders. • Prepare and implement a grievance redress mechanism to deal with grievances. • Sensitize stakeholders on SEP and GRM. • The grievance redress committee to include representatives from the community. • Timely and prior disclosure of project all project information, including project instruments, the full rights and entitlements of project affected persons, sub-project positive and negative impacts and opportunities, proposed subproject budget. <i>Inadequate grievances management</i> <ul style="list-style-type: none"> • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures • Solve all conflicts/grievances at the earliest time possible • Work closely with the GRM committee members in solving the conflicts 	BEC-BAIDOA	<ul style="list-style-type: none"> • Availability of and implementation of the Stakeholder Engagement Plan. • Number of stakeholder consultations held • Record of stakeholder consultations held (minutes of meetings and list of participants). • Availability of grievance redress process. 	Biannually	4,500
		Occupational health and Safety	<ul style="list-style-type: none"> • Implement and enforce a comprehensive 	BEC-BAIDOA	<ul style="list-style-type: none"> • Provision of PPEs and WIBA cover 	Weekly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>OHS policy aligned with international standards.</p> <ul style="list-style-type: none"> • Conduct regular OHS training and refresher courses for all employees and contractors on hazard identification and safety protocols. • Provide appropriate PPE, such as helmets, gloves, safety shoes, and high-visibility vests, and ensure their proper use. • Develop and maintain emergency response plans, including fire drills, evacuation procedures, and first-aid training. • Perform regular inspections and audits of equipment, facilities, and procedures to identify and mitigate hazards. • Establish and enforce safe work practices for tasks involving electrical systems, heavy machinery, and hazardous substances. • Conduct periodic medical check-ups for employees to monitor and address occupational health issues. • Implement a system for reporting, investigating, and addressing workplace incidents and near misses to prevent recurrence. • Install clear safety signs, hazard warnings, and emergency instructions in relevant areas of the facility. • Equip the site with accessible first-aid stations and ensure trained personnel are available to administer basic medical care. • Install fire extinguishers, fire alarms, and suppression systems, and conduct regular maintenance and drills. • Ensure routine maintenance of machinery and electrical systems to prevent malfunctions and accidents. • Provide hearing protection and monitor noise levels in areas with high decibel exposure. • Store chemicals and fuels in designated, secure areas with proper labelling and safety controls. 		<ul style="list-style-type: none"> • Environmental audit reports 		

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			<ul style="list-style-type: none"> Require all contractors and subcontractors to adhere to the power plant's OHS standards and practices. Establish an OHS committee to oversee safety compliance, address employee concerns, and recommend improvements. Provide a confidential and accessible platform for workers to report safety concerns or violations without fear of retaliation. 				
		Community health and safety risks	<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> Continuously monitor air emissions to ensure pollutants remain within permissible limits and do not affect public health. Implement dust suppression techniques, such as water spraying and vegetation cover, to minimize particulate matter exposure to nearby communities. Safely collect, segregate, and dispose of solid and liquid waste to prevent contamination of the environment and water sources. Educate local communities on potential health risks and mitigation measures related to the power plant's operations. Enforce strict site access controls to prevent accidental exposure to operational hazards by unauthorized individuals. Develop and communicate an emergency response plan to nearby communities for incidents like fires, explosions, or hazardous leaks. Establish a system for the community to report and address health-related grievances associated with the power plant. Actively monitor and address community complaints related to health issues promptly to reduce risks. Manage traffic from plant operations to reduce risks of accidents and associated public health impacts. <p><i>Shocks and electrocutions</i></p>	BEC-BAIDOA	<ul style="list-style-type: none"> Number of awareness creation sessions conducted. Records of awareness sessions conducted Incidences report Number of awareness creation sessions conducted. 	Monthly	2,250

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Inspect the wiring of the houses before connecting power Safety awareness campaigns to the community before connection of power on safety precautions; Require community to engage a certified technician to do wiring in the premises; Use of quality materials while wiring; Refraining from individual illegal extensions of power lines to other houses; Observing safety measures while using electricity such as not touching sockets and switches with wet hands or wiping with wet cloths; Keeping off all electricity infrastructure e.g., not tying livestock on electric poles, no cutting earth wires that run along some electric poles, not interfering with sockets or switches; Reporting any electric wire/conductors if found fallen on the ground; Report any incident regarding electricity at the local office –staff in charge of operating the power plant. <p><i>Public Health Impacts –HIV/AIDs</i></p> <ul style="list-style-type: none"> Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community Allowing migrant workers time to be with their families 				
		Fire hazards	<ul style="list-style-type: none"> ‘No smoking’ signs shall be posted within the power plant area A fire Assembly point should be identified and marked A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported; 	BEC-BAIDOA	<ul style="list-style-type: none"> Provision of serviced fire equipment, evacuation plan and safety signages Records of fire safety training 	Weekly	2,000

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			<ul style="list-style-type: none"> Detection/alarm systems that can detect fire should be and installed The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including diesel generators, fuel storage areas, BESS locations, etc. Workers especially operators of the plant must be trained on fire management 				
DECOMMISSIONING	Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Develop and implement a detailed site restoration plan to return the area to its original state or an agreed-upon condition. Safely and promptly, remove all construction materials, debris, and decommissioned equipment from the site. Perform decommissioning activities in phases to minimize abrupt changes to the landscape. Implement erosion control measures, such as terracing or planting cover crops, to prevent soil degradation. Involve local communities in planning and decision-making for landscape restoration to align with their preferences. Monitor the restored site periodically and carry out maintenance activities to ensure successful reestablishment of vegetation and landscape features. Ensure all materials are disposed of at authorized facilities to prevent visual clutter or contamination. Limit the use of temporary lighting to necessary areas to reduce visual disturbance during nighttime operations. Use locally sourced materials for restoration to ensure compatibility with the surrounding environment. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Photographic documentation: Vegetation health monitoring: Number of complaints: Soil erosion assessment: Public awareness programs participation. Community engagement metrics. 	One-off	As per the decommissioning budget
		Biological environment	<ul style="list-style-type: none"> Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Biodiversity surveys. Community engagement records. Erosion and sedimentation rates. 	Monthly	3,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> • Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. • Monitor and manage invasive species during and after decommissioning to prevent their spread into disturbed areas. • Plan for revegetation and habitat restoration using native plant species after decommissioning to promote biodiversity and ecosystem recovery. 		<ul style="list-style-type: none"> • Flora and fauna species lists. • Habitat quality assessments. • Invasive species monitoring. • Vegetation health monitoring. 		
		Solid Waste Generation	<ul style="list-style-type: none"> • Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal • Ensure adequate collection and storage of waste on site • Ensure safe transportation to the disposal sites / designated area • Hazardous waste must be disposed by approved waste handler • Provision of facilities for proper handling and storage of demolition materials to reduce the amount of waste caused by damage or exposure to the elements • Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Presence of well-maintained receptacles and centralized collection points 	Weekly	5,000
		Liquid Waste Generation	<ul style="list-style-type: none"> • Develop a detailed liquid waste management plan outlining procedures for the collection, storage, treatment, and disposal of liquid wastes. • Establish temporary storage facilities for liquid wastes to prevent leaks or spills and ensure safe handling until proper disposal. • Identify opportunities for the reuse or recycling of liquid waste materials, where feasible, to minimize waste generation. • Engage with the local community to inform them about liquid waste management practices and promote awareness of environmental protection. • Maintain an inventory of chemicals and 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Liquid waste generation quantities. • Soil contamination assessments. • Incidence of spills and leaks. • Liquid waste management plan compliance. • Public reporting and complaints. • Community engagement metrics. • Volume of recovered reusable liquids. 	Weekly	3,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			hazardous substances to prevent unnecessary waste generation and facilitate proper management.				
		Noise and vibration	<ul style="list-style-type: none"> Select and use machinery and tools designed to minimize noise generation during decommissioning activities. Schedule noisy activities, such as heavy equipment operation, during off-peak hours to minimize disturbance to local communities. Regularly maintain decommissioning equipment to ensure it operates efficiently and with minimal noise. Monitor noise and vibration levels continuously to ensure they remain within acceptable thresholds and mitigate any exceedances. Inform nearby communities about planned decommissioning activities, including expected noise and vibration levels, to manage expectations. Where possible, use quieter decommissioning methods, such as manual dismantling, instead of mechanical processes. Provide hearing protection for workers involved in noisy tasks and monitor exposure times to prevent hearing damage. Maintain open communication with local communities to address concerns related to noise and vibrations during the decommissioning process. Ensure that all decommissioning activities comply with national and international noise and vibration standards. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the project site 	Weekly	2,500
		Air quality (dust)	<ul style="list-style-type: none"> Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative dust impact assessment. Effectiveness of dust control measures. Health impact 	Weekly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term. Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. Engage with local communities to inform them about decommissioning activities and measures being taken to control dust emissions. Conduct regular inspections to identify potential sources of dust emissions and ensure that mitigation measures are effectively implemented. 		assessments. <ul style="list-style-type: none"> Long-term dust emission trends. Post-activity dust clean-up reports. Public awareness programs participation. Soil and vegetation dust monitoring. Traffic patterns and impact assessment. Visual assessment of dust levels. 		
		Air quality (vehicle & machinery fumes)	<i>Vehicle & machinery fumes</i> <ul style="list-style-type: none"> Use high-quality fuels with lower sulphur content to minimize emissions from vehicles and generators. Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use. Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. Establish an air quality-monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative emission impact assessment: Environmental compliance audits. Health impact assessment reports. Long-term emission trends. Maintenance records of vehicles. 	Weekly	1,800

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Establish a reporting system for emissions data to track progress and compliance with environmental standards. <p><i>Generators</i></p> <ul style="list-style-type: none"> Ensure proper removal and disposal of hazardous materials, such as oil, fuel, and coolant, in accordance with environmental regulations. Dismantle and dispose of the generators and components at authorized recycling or disposal facilities to avoid environmental contamination. Provide personal protective equipment (PPE) for workers and implement safety measures to minimize exposure to hazardous substances during the generator decommissioning process. Prevent soil and water contamination by ensuring that any fuel or oil leaks are immediately contained and cleaned up. Keep the local community informed of the decommissioning schedule, potential impacts, and mitigation measures to address concerns. Properly manage and dispose of any solid or liquid waste generated during the decommissioning process according to best environmental practices. Ensure all decommissioning activities comply with local environmental regulations and international standards for waste management and environmental protection. Conduct monitoring after decommissioning to ensure that the site is free of contamination and that restoration efforts are successful. 				
	Impacts on Infrastructure & Utilities	Water Consumption	<ul style="list-style-type: none"> Conduct a comprehensive assessment to evaluate water needs for decommissioning activities and identify opportunities for reduction. Develop a water management plan that 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Community feedback Compliance with water usage regulations: Impact on local water resources: 	Weekly	2,000

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>outlines strategies for minimizing water consumption throughout the decommissioning process.</p> <ul style="list-style-type: none"> • Implement systems to recycle and reuse water for various tasks, such as dust suppression, equipment washing, and site clean-up. • Provide training for personnel on water conservation practices and the importance of minimizing water use during decommissioning. • Engage with local communities to raise awareness about water conservation efforts and the importance of sustainable water management. • Use temporary storage solutions to manage water supplies efficiently and reduce waste. • Implement measures to prevent leaks and spills from water storage and distribution systems. • Provide periodic updates to stakeholders and the community on water management practices and progress in reducing consumption. 		<ul style="list-style-type: none"> • Mitigation measure implementation records. • Water consumption efficiency • Water recycling rates: • Water usage quantities and supply. 		
	Impacts on social environment	Occupational health and safety	<ul style="list-style-type: none"> • Create a comprehensive occupational health and safety management plan outlining procedures, responsibilities, and protocols to mitigate identified risks. • Ensure that all workers are equipped with appropriate PPE, such as helmets, gloves, goggles, and respiratory protection, to minimize exposure to hazards. • Establish clear emergency response procedures for incidents such as fires, chemical spills, and medical emergencies, and ensure all workers are trained in these procedures. • Develop and enforce safe work practices and standard operating procedures for decommissioning tasks, including equipment handling, dismantling, and waste disposal. • Provide first aid facilities and ensure that 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> • Incident reporting and tracking. • Health and safety training participation. • Personal protective equipment (PPE) compliance. • Safety audits and inspections. • First aid response records. • Compliance with safety regulations. • Incident investigation reports. 	Daily	2,250

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>trained personnel are available to respond to medical emergencies on-site.</p> <ul style="list-style-type: none"> Implement measures to control noise and vibration levels during decommissioning activities, such as using quieter equipment and scheduling high-noise activities appropriately. Ensure that all contractors and subcontractors adhere to the same occupational health and safety standards as the main contractor. 				
		Gender-based violence	<ul style="list-style-type: none"> Ensure that Code conducts are signed by all employers or incorporated in the employment contracts on issues associated with GBV. Establish Workers GRM with multiple channels including SEA/H channels. Implement a code of conduct signed by all those with physical presence on site. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. Grievances raised, aggrieved persons and status on resolution etc. 	Weekly	2,500
		Inadequate grievances management	<ul style="list-style-type: none"> Develop and communicate a transparent, accessible grievance mechanism for all stakeholders, including local communities, workers, and contractors. Ensure prompt acknowledgment and response to grievances, with clear timelines for resolution and regular updates to complainants. Raise awareness of the grievance mechanism through community meetings, posters, and local media to ensure stakeholders know how to lodge complaints. Provide an option for anonymous complaints to encourage individuals who may fear retaliation to raise concerns. Train project staff, contractors, and relevant 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national 	Weekly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>local authorities on the grievance management process to ensure consistent and effective handling of complaints.</p> <ul style="list-style-type: none"> Regularly assess the effectiveness of the grievance mechanism, adjusting procedures as needed to improve responsiveness and stakeholder satisfaction. 		courts and the World Bank Grievances Redress Service and Inspection Panel.		
		Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Frequency of stakeholder meetings. Documentation of stakeholder concerns. Follow-up actions on feedback. Community representation in decision-making. Collaboration with local organizations. Long-term engagement strategies. 	Weekly	3,000
		Labour disputes	<ul style="list-style-type: none"> Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. Ensure full compliance with national labour laws. Set up a monitoring system to track and evaluate labour relations, allowing for early detection of potential disputes and timely intervention. Conduct regular worker feedback surveys to gauge satisfaction and identify any emerging concerns that could lead to disputes. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Number of Labour Disputes Raised (disputes/month): Grievances Resolved Within Agreed Timeframe (percentage): Worker Turnover Rate (percentage). Number of Grievances Filed Regarding Wages or Compensation (grievances/month). Number of Labour Dispute Awareness Campaigns (number/year). 	Weekly	2,500
		Child and forced labour	<ul style="list-style-type: none"> Adhere to the ESS 2 provisions and FRS Employment Act, which outlaws any form of forced labour. Ensure compliance with the national labor laws and labour management practices. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Number of reported cases of forced labour. Updated employment register indicating locals employed, their ages, 	Weekly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<ul style="list-style-type: none"> Put visible signage on site "No Jobs for children" -Do not allow children at the project site. 		national identification numbers etc. <ul style="list-style-type: none"> Grievances raised, aggrieved persons and status on resolution etc. 		
		Security risks	<ul style="list-style-type: none"> Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. Establish partnerships with local law enforcement and security agencies to enhance overall security coordination and response. Engage with local communities to build trust and cooperation, encouraging them to report suspicious activities or security concerns. Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning. Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Incident reports. Access control measures. Response time to security incidents. Training of security personnel. Community security awareness programs. Stakeholder feedback on security. Analysis of security trends. Feedback from security personnel. 	Daily	2,000
		Community health and safety risks	<ul style="list-style-type: none"> Create a health and safety management plan that outlines strategies for minimizing risks and protecting community health during decommissioning activities. Develop and communicate an emergency response plan that includes protocols for medical emergencies, environmental incidents, and community evacuations if necessary. Engage with local communities regularly to gather feedback, address concerns, and provide updates on decommissioning activities and safety measures. Implement measures to minimize noise 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Health incident reports. Community health assessments. Feedback mechanisms for community concerns. Community satisfaction surveys. Communication of health risks. Injury rate monitoring. Environmental health audits. Documentation of community feedback. 	Weekly	2,500

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			<p>pollution during decommissioning.</p> <ul style="list-style-type: none"> Develop a traffic management plan to control vehicle movement to and from the site, reducing risks of accidents and ensuring safe access for the community. Implement dust suppression measures, such as regular watering of the site, to minimize dust emissions that can affect community health. Ensure proper waste management practices to prevent contamination of land and water resources, which could affect community health. Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process. 				
		Fire hazards	<ul style="list-style-type: none"> Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. Ensure the availability of adequate firefighting equipment, such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. Store flammable materials in designated, secure areas away from ignition sources, following appropriate storage guidelines. Use clear signage to indicate fire exits, assembly points, and locations of firefighting equipment throughout the site. Minimize the accumulation of combustible waste materials on-site and establish a 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Fire incident reports. Fire risk assessments. Documentation of fire hazards. Monitoring of flammable materials storage. Documentation of community feedback on fire safety. 	Daily	1,800

PROJECT PHASE	IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COSTS (US\$)
			routine waste removal process. <ul style="list-style-type: none"> Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary. 				
		Traffic risks	<ul style="list-style-type: none"> Develop and implement a Traffic Management Plan (TMP). Engage with local communities to raise awareness about increased construction traffic and safety measures. Erect temporary road signs warning local road users of construction activities and increased traffic. Install speed bumps or other traffic-calming measures on roads near the construction site. Use traffic signs, barriers, and cones to guide and direct both construction and local traffic. 	BEC-BAIDOA CONTRACTOR	<ul style="list-style-type: none"> Number of traffic incidents. Traffic management plan compliance. Speed limit violations. Traffic safety training attendance. Community complaints related to traffic. Emergency response time to traffic incidents. Community awareness programs on traffic safety. Use of alternative routes by construction vehicles. 	Daily	2,500
Total							218,200

9.0. Stakeholder Analysis, Public Consultations and Disclosure

9.1. OVERVIEW

This section summarizes the outcomes of the stakeholder consultation process for the proposed BEC Baidoa Hybrid Power Plant project in Baidoa, Somalia. The consultation process was designed to ensure that the concerns, expectations, and feedback of the stakeholders were gathered and addressed. Stakeholder engagement is an integral part of ESIA good practice and is a key requirement for the World Bank's environment and social standards (the ESS10). For this particular ESIA, the public consultation involved Informed Consultation and Participation (ICP) with potentially project affected people and is designed to be both fair and inclusive. In the context of this ESIA, a stakeholder was defined as any individual or group who is potentially affected by the proposed Project or can themselves affect/influence the proposed Project directly or indirectly. Stakeholder consultation was an inclusive process for sharing information that enables stakeholders to understand the risks, impacts, and opportunities of a development or project, allowing them to express their views and articulate their perceptions towards it. Several tools, including questionnaires, key informant interview guides and focused group discussion guides were used.

The two principal categories of stakeholders were as follows: (i) potentially affected Communities, defined as people and organizations directly affected by the Project and/or those likely to be most vulnerable. The potentially affected communities were identified based on a detailed understanding of the Project site location and its administrative setup. The Project is located within Baydhaba District, Bay Region. Stakeholders were identified on the basis of their interaction with the proposed project site. Stakeholders identified were:

- Business operators: Local business owners, particularly those in industries that may be affected by the project.
- Community-based organizations (CBOs): Local non-governmental organizations and community groups active in the area.
- City Administration: Deputy Mayor, Baidoa City
- Internally Displaced Persons
- Local communities: clan elders
- NGOs: GREDO, IMO, CSF
- Representatives of Relevant Ministries: Ministry of Energy and Water Resources, Ministry of Energy, Ministry of Environment and Climate Change, Ministry of Labour and Social Affairs, and Ministry of Health.
- Women Groups Representatives
- Youth Groups Representative: Baidoa Youth Hub
- People with Disability Representative

9.2. OBJECTIVES OF THE STAKEHOLDERS' CONSULTATIONS

The key objectives of the stakeholder consultation process were:

- To inform stakeholders about the proposed BEC Baidoa Hybrid Power Plant project, including its scope, potential adverse impacts, and benefits.
- To gather stakeholder concerns, opinions, and expectations regarding the project.
- To understand community dynamics, relations, and the broader social and economic context of the communities and the possible impacts of this Project.
- To build a constructive dialogue between the project developers and local communities, government entities, and other interested parties.
- To ensure that stakeholder input is incorporated into project planning and implementation, in compliance with best practices and regulatory requirements.

- To facilitate transparency and inclusive participation of community members in the project so they can voice their concerns and views regarding the project design and its project impacts, and to ask questions.

The consultation process was conducted through a combination of structured questionnaires, key informant interviews and focus group discussions. HD Expert teams in close collaboration with the BEC and local communities' representatives facilitated the consultations. Information about the proposed power plant was disseminated to ensure all participants had a clear understanding of the project's scope and objectives.

9.3. SUMMARY OF KEY FEEDBACKS FROM STAKEHOLDERS

Table 9.1 summarizes the key outcomes from the engagement with the stakeholders. Overall, the majority of stakeholders expressed their agreement and support for the proposed hybrid power plant, recognizing the potential benefits it will bring in terms of improved access to affordable and clean energy, job creation, and enhanced local economic development. However, there were variations of different strengths in the opinions when analysed across gender as there were feelings that the project will only directly benefit BEC from economic perspective.

There was a general consensus among stakeholders that the project will bring significant benefits, including access to sustainable energy and the creation of employment opportunities. A recurring request across all stakeholder groups was the need for continuous and transparent communication from BEC throughout both the construction and operational phases of the project. Stakeholders stressed the importance of receiving timely updates on construction activities, potential disruptions, and the environmental and social performance of the plant. Communities expect the ESP to establish clear and effective communication channels to keep them well-informed.

While the majority of stakeholders expressed support for the project, some concerns were raised about potential disruptions during construction, such as dust and noise. Stakeholders anticipate that BEC will implement appropriate mitigation measures and communicate any significant changes or delays effectively.

Local stakeholders, including the IDP Camp Leader, Gredo Education Coordinator, and a Clan Elder, highlighted the importance of equitable distribution of project benefits. They expressed concerns that vulnerable groups, particularly IDPs, might be excluded from employment opportunities and access to energy. Additionally, stakeholders called for measures to mitigate potential adverse environmental impacts associated with the project.

Table 9-1: Summary of feedbacks from stakeholders engaged during the ESIA study for the proposed BEC-BAIDOA Hybrid Power Plant, Baidoa

Stakeholder category	Summary of interests and concerns
Women Groups Representatives	Inclusion of women in decision making, create job opportunities for women, ensure fair wages and working conditions and address women specific issues in the Project Plans
Youth Groups	The project presents opportunity for youth skill development and employment opportunities. However, it could pose risks of construction related accidents. The Proponent should provide Protective Equipment to the workers and engage the youth in all phases of the project.
Business operators	Business operators in Baidoa support the proposed establishment of a hybrid power plant, recognizing its potential to provide reliable and affordable energy, essential for enhancing business productivity and reducing operational costs. However, their concerns center around potential disruptions during construction, such as noise, dust, and restricted access to commercial areas, which could temporarily affect their activities. They also emphasized the need for transparent stakeholder engagement to ensure fair energy pricing, equitable power distribution, and minimal environmental impact. Additionally, they seek assurances that local businesses will benefit from the project through job creation and the prioritization of local suppliers in procurement processes.
Ministry of Environment Water and Change -Director General	The project has potential for sustainable energy, improve livelihoods through creation of employment. However, it can pose potential environmental impacts such as water pollution, disruption of biodiversity, air and noise pollution. Mitigation measures should be put in place including grievance redress mechanism, restoration of degraded areas, environmental audit and adherence to regulations.

Stakeholder category	Summary of interests and concerns
Ministry of Energy and Water Resources -Senior Officer	The ministry supports the project as it is an initiative towards sustainable energy. The project could improve electricity access and boost economic activities. Th potential adverse impacts include: slight strain on local resources and occupational hazards. The Officer was concerned with minimal stakeholder engagement. He recommended more community involvement and addressing complaints and providing feedback.
Ministry of Health – Director General, Baidoa City	The project will provide steady supply of electricity consequently leading to improvement of heath care. However, the DG was concerned with health-related impacts as a result of dust and air pollution during construction. He recommended that the project should maintain access to clean water for nearby communities, provision of safety signages, partnering with health authorities in mitigation of risks and prioritizing public health in all phases of the project.
Ministry of Labour and Social Affairs- Director General	The project has potential for job creation and does not present direct environmental concerns. However, the could be risks of work place accidents. The Proponent should comply with safety standards, organize forums for community feedback and maintain transparency in work force related decisions in all phases of the project.
Baidoa Person with Disability Group- Chairperson	The project will provide access to reliable energy and does not present any concerns. However, eco-friendly as well as disability friendly designs should be adopted. Additionally, paths and facilities should be barrier free.
IDP Camp Leader	The project will enhance energy access for the local community. However, the IDPs might be neglected in both energy access and employment. The project should focus on equitable distribution of benefits
Gredo- Education Coordinator	The project will improve quality of life for vulnerable groups. However, it could cause disruptions during construction, cutting down of trees and noise and dust pollution. The Proponent should engage NGOs and ensure two-way communication and provide regular updates on the project.
Clan Elder	The project will improve local energy access and contribute to growth and development Baidoa City. However, it could generate minimal impacts such as air pollution and soil degradation. The Proponent should ensure soil rehabilitation after construction, provide adequate training to workers, ensure IDP inclusion, engage elders regularly and establish local grievance mechanism

9.4. EXPECTED COMMITMENTS BY BECO

In response to stakeholder feedback, the BECO has committed to the following actions:

- *Ongoing consultations*: Stakeholder consultations will continue throughout the project lifecycle, with periodic meetings held at key milestones of the construction and operation phases.
- *Public communication channels*: BECO will establish communication channels, such as social media platforms, local radio updates, and community notice boards, to ensure that information reaches all stakeholders in a timely and accessible manner.
- *Mitigation of disruptions*: Detailed plans will be implemented to minimize construction-related disruptions, including dust control, noise management, and traffic regulation measures. A grievance mechanism will also be put in place to address any concerns raised by the community during the project.

9.5. CONCLUSION

The stakeholder consultation process for the proposed hybrid power plant in Baido City has been positive, with stakeholders expressing broad support for the project. However, stakeholders have emphasized the importance of regular information sharing and engagement throughout the project's lifecycle. BECO team acknowledges this expectation and commits to maintaining transparent and consistent communication with all stakeholders, ensuring that their concerns are addressed and that the project contributes positively to the local community and environment.

10.0. Conclusion and Recommendations

10.1. CONCLUSION

The ESIA study revealed that the proposed hybrid power plant has positive impacts on residents and the environment. However, it also poses potential environmental and social risks. The project proponent, implementing entity, and contractor must adhere to the social and environmental management plan, obtain permit approvals from the SWS Government and FGS, and engage qualified technical personnel throughout the project. The full implementation of the Environmental and Social Management Plan (ESMP) will ensure the sustainability of project activities from construction to decommissioning, including a general outlay, associated impacts, mitigation action plans, monitorable indicators, implementation timeframes, responsibilities, and cost estimates. From the findings of this ESIA, the following specific conclusions can be drawn:

- The project will adhere to industry norms and standards, ensuring environmental sustainability through the implementation of the ESMP. Mitigation measures will be integrated to comply with state and FGS laws and procedures. The power plant and structures will be installed to the required international standards. Sustainable environmental management will be ensured during all phases of the project, including adherence with all the relevant World Bank's ESS.
- The proposed project will generate socio-economic benefits which would not be realized if the 'NO development option' is considered.
- The proposed project's potential adverse impacts can be successfully mitigated, with most impacts assessed as low to medium low before implementation, and risks are expected to reduce with mitigation measures. The impacts that will be adverse will be temporary during the construction phase and can be managed to acceptable levels with the implementation of the recommendation of the mitigation measures for the project.
- The relevant stakeholders have been consulted and the relevant project information shared and the views of the stakeholders is that the project is important.

10.2. RECOMMENDATION

It is strongly recommended that the MoEWR and BEC-BAIDOA make a concerted effort in particular, to implement the ESMP provided herein. Statutory EHS Audits shall be carried out in compliance with the national laws and WB requirements. The environmental performance of the site operations shall be evaluated against the recommended measures and targets laid out in this report. Based on the findings from this ESIA, the following specific recommendations can be made:

- The BEC-BAIDOA and the contractor shall adhere to relevant legal and regulatory framework to ensure compliance and success of the project
- Adherence to the mitigation measures as spelt out in the ESMP and monitoring of the same shall be mandatory to ensure environmental and social sustainability of the project.
- BEC-BAIDOA shall cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders, and ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable.
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Stakeholder engagement to be carried out throughout the construction and operation and decommissioning phases.
- Contractor to ensure grievance redress mechanism is established and operational before commencement of the operation.
- Diligence on the part of the contractor and proper supervision by the MoEWR and BEC-BAIDOA is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.

10.3. AUTHORIZATION OPINION

The HD believes the ESIA provides sufficient information for decision-making on the project's progress. They show the proponent's preferred alternatives are acceptable and identify essential mitigation measures. They

believe the applicant's proposal should be approved on environmental and social grounds, provided essential mitigation measures are implemented. The proposed project does not pose significant environmental and social threats. Additionally, the proponent (MoEWR/BEC-BAIDOA) shall own the entire implementation of this ESIA, ensure proper monitoring and reporting on the project in all the project phases.

11.0. Annexes

ANNEX 11.1. LAND OWNERSHIP DOCUMENT FOR THE PROPOSED PROJECT SITE

ANNEX 11.2. PUBLIC CONSULTATION QUESTIONNAIRES AND INTERVIEW GUIDES



01-Stakeholder
Engagement
Questionnaire



02-1 KII-DDC (1)



02-KIIs



03-GBV
Questionnaire



04-Attendance



05-Male group
FGD



06-Women
group fgd

ANNEX 11.3. FOCUS GROUP DISCUSSIONS

Environmental and Social Assessment Checklist

Project Name: BEC-Baidoa Hybrid Power Plant	District/City: Baidoa
Project Location: Baidoa City	Nature/Size: ESP
Type of activity: (Establishment of a hybrid power plant)	
Name & Signature of Evaluator: Saad Adan Aided	Date of Field Evaluation: 30 November 2024

Item	Appraisal Yes/No	Risk / Significance rating					
		None	Low	Moderate	Substantial	High	Unknown
1. Environmental Screening (ESS3 and ESS6)							
Will the project generate the following impacts?							
1.1	Loss of trees	Yes		√			
1.2	Soil erosion/siltation in the area	No					
1.3	Pollution to land by diesel, oils etc.	Yes	√				
1.4	Dust emissions	Yes		√			
1.5	Solid and liquid wastes	Yes	√				
1.5	Borrow pits and pools of stagnant water	No					
1.6	Rubble/heaps of excavated soils	No					
1.7	Emergence of wildfire	No					
1.8	Invasive tree species	No					
1.9	Long term depletion of water	No					
1.10	Exposure to hazardous chemicals including PCBs	No					
1.11	Nuisance from noise or smell	Yes	√				
1.12	Loss of soil fertility	No					
1.13	Generation of hazardous waste including solar batteries	Yes	√				
1.14	Cross through, located within or nearby environmentally sensitive areas (e.g., national parks, intact natural forests, wetlands, etc.)?	No					
1.15	Cause poor water drainage and increase the risk of water-related diseases such as malaria or bilharzias?	No					
1.16	Risk of exposing the workers to extremely hazardous working conditions.	No	√				
2. Social Screening (ESS5)							
Will the project generate the following negative social and economic impacts?							
2.1	Loss of land by households	No					
2.2	Loss of properties –houses, structures	No					
2.3	Loss of perennial trees, fruit trees by households	No					
2.4	Loss of crops by people	No					
3. ESS2, ESS4, ESS5, ESS7, ESS8							
3.1	Loss of access to river/forests/grazing area	No					
3.2	Impact heritage site, graveyard land	No					
3.3	Conflicts over use of local water resources	Yes	√				
3.4	Disruption of important pathways, footpath/roads	Yes	√				
3.5	Loss of communal facilities – mosques	No					
3.6	Loss of livelihood system	No					
3.7	Risk of encouraging child labour	No					
3.8	Risk of workers to extreme exposure for GBV	No					
3.9	Spread of HIV/AIDS and other STI's	No					
3.10	Risk of GBV/SEA/SH to the affected communities	Yes	√				
3.11	Risk associated with Security personnel	No					
4: Impacts on Historically underserved groups/Ethnic minorities							
		No					

Categorisation & Recommendations:

After compiling the above, determine which risk category the sub-project falls under based on the environmental risk categories: High, Substantial, Moderate and Low risk. If the sub-project falls under "Substantial, Moderate or low" risk categories, proceed to identify the category of the sub-project based on the National EIA guidelines issued.

World Bank ESF Categorisation

Place tick in applicable	Category	Details
	High Risk	Sub-project of the Somalia Electricity Sector Recovery Project (SESRP) likely to fall under “High Risk” rating. In the likely event that subproject falls under “High Risk” the Environmental and social Assessment should be conducted in accordance with the World Bank Environmental and Social Standards (ESSs) by preparing an ESIA study report.
	Substantial Risk	Sub-project of the Somalia Electricity Sector Recovery Project (SESRP) likely to fall under “Substantial Risk” rating. In the likely event that subproject falls under “Substantial Risk” the Environmental and Social Assessment of the subproject should be conducted in accordance with any requirements of the ESSs that the Bank deems relevant to such subprojects by preparing an ESIA study report.
	Moderate Risk	Environmental and Social Assessment of the subproject should be conducted in accordance with any requirements of the ESSs that the Bank deems relevant to such subprojects by preparing an ESMP.
	Low Risk	Sub-project is not subject to environmental assessment as no potential impacts are anticipated.

Focus Group Discussion Guide – Youths/Associations

FGD Youth /Association		
<p><i>Facilitator Instructions: The purpose of the meeting is to gather information on the socio-economic situation of the youth in terms of participation in decision making, employment, recreation and aspirations. There should be no more than 10 participants. Keep the discussion focused and please <u>probe</u> for explanations for responses (what, where, when, why, how). Take lots of pictures. The Federal Government of Somalia has secured a grant from the World Bank to implement the Somali Electricity Sector Recovery Project (SESRP). The SESRP is implemented by the Ministry of Energy and Water Resources (the MoEWR). The Project Development Objective is to increase access to lower-cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry. We are conducting an environmental and social impact study for Component 1 of the project, focusing on the sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa. The purpose of this study is to collect comprehensive information to comprehend the potential impacts of the project and solicit feedback from stakeholders.</i></p>		
Section A: General Information		Responses
1	Date and time of meeting	30 November 2024
2	Name of facilitators (inc note taker)	Saad Adan Aided
3	Region/District	Baidoa
4	Name of Village	
5	Number/gender of participants	Males:8 Females:6
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain) Do you feel that you understand the project?	Yes, but limited information has been shared by the proponent
2	What do you think could be the positive impacts of the project on youth, so that people benefit?	Create job opportunities and increase access to electricity
3	What other impacts do you think that the project could have on the youth and communities?	Potentials are high for the youth to engage in entrepreneurial activities that require reliable electricity. This would create job opportunities and support livelihoods.
4	How do you think that the project could minimize or avoid negative impacts?	Develop and implement a comprehensive environmental and social management plan.
5	Do you have any questions/comments regarding the project?	Will the project offer free electricity connections?
Section C: Overview		
1.	If a youth group- When was your youth group established? Why was it established?	The youth groups in the area are not formalized None
2.	What are the key priorities among the youth? What are the main issues faced? Why?	Employment and capacity building to establish and operate viable businesses.
3.	To what extent do the youth play a role in decision making? Do they feel that their voices are heard? What are the main areas where they would like their opinions to be heard?	Somali youth often feel excluded from decision-making processes due to traditional structures and political rewards, expressing a desire for better governance, policy making, and election input.

4.	What programmes are in place to help the youth? How successful have they been?	No known programmes established specifically focusing on youths.
Section D: Education		
1.	How many of the youth have completed secondary education?	Approximately 40% completed secondary education.
2.	How many of the youth have been to vocational school and have qualifications? What subjects do these apply?	No official records on numbers available
3.	What skills to the youth feel they have that enable them to work?	Technical and vocational skills, IT skills, entrepreneurial skills.
Section E: Unemployment		
1.	How many of the youth do not have a full-time salaried job?	Most youth in Baidoa are unemployed or unable to secure full-time work due to the limited job opportunities.
2.	Why do the unemployed youth not have a job? What are they doing to find a job? Are there any barriers to finding work? What are these?	No investments that create jobs have been established in Baidoa in recent years.
Section F: Employment		
1.	How many of the youth are working? How many are self-employed and how many work for an employer?	No official record
2.	What are the main jobs that the youth have?	Not described
Section G: Aspirations		
1.	What aspirations/goals do the youth have? How are they planning to achieve those goals? What, if any, are the main barriers to achieving their goals? How can they overcome these barriers?	The youths yearn for better technical training, better participation in national development, community development. These can be achieved under an environment of peace and stability devoid of corruption and insecurity.
Section H: Recreation		
1.	What do the youth do in their spare time? Where do they go?	They primarily play or perform various forms of entertainment, such as football.
2.	Do they feel that they have an active social life or is there more that needs to be done to encourage them to engage in recreational/social activities? Explain response	Helping families and maintaining social life through sports, but often blamed for addiction, despair, and isolation due to mobile phone addiction.
Section I: Please insert any observations/comments regarding the meeting here		
1.	Comments/observations (what went well/not so well, was everyone participating, were there any vulnerabilities, how motivated were the youth to participated during the meeting?)	They emphasized that youth voices should be valued equally and not overshadowed by preference for elder representation alone.
Section J: Insert photos here		
Please take some pictures of the meeting with a <u>description below each photo</u> :		

Focus Group Discussion Guide- Female

FGD Female
<p><i>Facilitator Instructions: The purpose of the meeting is to gather information on women's role in the household, livelihoods/jobs, health issues, challenges, perceptions on quality of life, education options for children, health care and project perceptions. Introduce yourselves, the project and explain the purpose of the meeting. Gather a representative sample of a maximum of 10 women that include a combination of youth, elderly and disabled where appropriate. Keep the discussion focused and please probe for explanations for responses (what, where, when, why, how). Take lots of pictures. <u>Ensure everyone participates in the discussion.</u> The Federal Government of Somalia has secured a grant from the World Bank to implement the Somali Electricity Sector Recovery Project (SESERP). The SESERP is implemented by the Ministry of Energy and Water Resources (the MoEWR). The Project Development Objective is to increase access to lower-cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry. We are conducting an environmental and social impact study for Component 1 of the project, focusing on the sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa.</i></p>

Section A: General Information		Responses
<i>The purpose of this study is to collect comprehensive information to comprehend the potential impacts of the project and solicit feedback from stakeholders.</i>		
<i>Show the participants the layouts/models</i>		
Section A: General Information		Responses
6	Date and time of meeting	30 November 2024
7	Name of facilitators (inc note taker)	Saad Adan Aided
8	Name of Region Region/District	Baidoa
9	Number of participants	6
10	Describe the demographics / composition of the group (age range, ethnicity and any vulnerabilities)	Between 20 – 40 and all Somali community and no disability or other type of vulnerability.
11	Number of female headed households in the group? What is the main reason for this?	Not provided The reasons are directly linked to cultural and societal norms among the communities.
Section B: The Project		
6	Have you heard of the project before? How/when/where Do you feel that you understand the project? (if not please provide an explanation and show the site map)	The participants had general knowledge of the project. In response, the stakeholder engagement team provided additional details to clarify these aspects for the participants.
7	What is your view on the project? How do you think that the project could impact women in the community positively and negatively?	The women unanimously agreed on the project's benefits for themselves and the wider community. They highlighted that access to electricity is essential for development, and the project promises affordable energy that will raise living standards.
8	How do you think that the project could minimize or avoid negative impacts on women and the community?	The project to implement environmental and social management plan and engaged in corporate social responsibility programmes
9	Do you have any questions/comments regarding the project?	No
Section C: Role of Women		
1	What roles do women typically undertake in the community? Please consider this in terms of the home and livelihoods. How many hours a day do women work? what time do they typically start and finish their daily activities?	Women fulfil a variety of roles within the household, such as child-rearing, household management, and contributing to the family's economic stability. Many women work long hours managing household responsibilities.
2	Do you think that men and women have equal opportunities in the community, workplace and education?	No - men and women do not have equal opportunities in the community, workplace, and education. Gender-based inequalities are significant and impact various aspects of daily life, from employment to social engagement and educational access. Men typically hold decision-making roles within families and communities, which restricts women's influence in local governance, public policy, and community planning.
3	What resources do women mainly have control of compared to men? (eg land, assets, equipment) Please explain response	Women traditionally have limited control over resources compared to men.
4	Do women feel safe in the community? Are there any particular crimes that are common in the community? Have you experienced any conflicts in the community? Explain responses	Yes. But they also raised concerns regarding GBV Yes, mostly brought about by insecurity.
5	How do women receive information about local issues and developments, news etc in the community?	Informally, and occasionally in formal manner through social media.
6	Do women rely on each other for support? What type of support? (eg childcare, someone to talk to, income generation etc).	Yes, women support one other by providing childcare, generating income, and voting for one another in elections.
Section D: Institutions / Community Development		
1	How are women represented in the community (eg is there a female head/leader who champions their interest)? Do women contribute in decision making within the community? Are women represented at important meetings? If not, do men discuss decisions with you?	Yes, there are female heads/leaders involved in championing gender and youth issues, although there are challenges associated with the societal norms of the Somali community.
2	Do you have any women's traditional/cultural groups? What are they called? What is the purpose of these groups?	Yes, there are traditional women's groups, often referred to using different names, and operate in several locations within Baidoa city and the surrounding areas.
3	Are there any other local associations in the area that they are aware of? If so, which ones.	No
4	Are any Non-Governmental Organisations working here? If yes – which ones and what do they do? How successful have the projects been?	Yes, there are many national and international organizations operate in the City and are engaged in different programmes.
Section E: Economy/Income Generation		

1	What could women do to have greater economic opportunities in this area?	Formation of socioeconomic groups that enhance their opportunities in societal development issues.				
2	Do you have access to a bank/credit/savings account? If so, is it your own personal account or a joint account? Do women have their own money at disposal? What do they spend it on most frequently?	Not all of the participants mentioned holding accounts with local banks, such as Dahabshil and Amal Bank. Some operate tiny enterprises and keep their own investments, but others do not and must rely on their husbands or relatives for support.				
3	Does your family receive support from remittance or other support from family members working elsewhere?	Yes, some receive remittances from relatives abroad.				
Section F: Land Use						
1	What are the main land based activities that women undertake?	Small stock rearing and small scale subsistence agriculture				
2	What are the main crops that you grow? What % are for household consumption and what % do you sell? If you sell crops, where do you sell them?	No official data available.				
3	What are the main animals that people keep in the community? Is this a subsistence activity or an income-generating activity?	Large stocks (camel, goats, sheep), and small stock comprising mainly of poultry.				
4	Do you collect natural resources (eg timber, herbs, firewood and roofing, fruits, etc) for subsistence and domestic use? Where do you get these from? Explain the uses. Explore issues related to charcoal production as well as commercial extraction of natural resources	No, but some rural inhabitants may rely on it because it is not possible in a big city.				
5	Where does the community buy and sell agricultural produce? How far is the nearest market? What is the name of the market?	Mostly in the markets and IDP camps.				
6	Have you experienced any conflicts in the community in relation to land? Who was involved? What was the issue? How was it resolved? Are conflicts frequent? (explain response)	Yes associated mainly with insecurity in Baidoa city and the surrounding areas.				
Section G: Education, Literacy and Training						
1	How would you describe accessibility and quality of education for children in your community? How far are they (KM)? what are the names/levels of schools accessed	The accessibility good but the cost is unaffordable for most households.				
2	Do most females in the community go to school? What level do they generally complete up to? Explain responses. Are there factors that prevent girls from continuing education? Has anyone in the community complete vocational training or university? What subjects? (explore issues of girl child work/labour verses education.	Few girls complete secondary school, and even fewer pursue vocational training or university education. Those who have usually study subjects related to education, healthcare, or business, as these fields are culturally seen as more "appropriate" for women.				
3	Can girls/women in the community generally read and write?	Literacy rates among women are low.				
Section H: Health						
1	How and where do you access healthcare?? Do the services available meet your needs?	The project area is home to several private and public healthcare facilities. Additionally, there are primary healthcare centers operated by NGOs, which offer limited services but fail to meet the full range of healthcare needs for the population.				
2	What are the top 3 health problems that girls and women face in the settlement? Please explain the reason for each of the health issues Are there any particular times of the year where these issues are more challenging than others?	Maternal health problems, including complications during pregnancy and childbirth, are among the leading health issues faced by women in Baidoa city and the surrounding areas.				
3	Are there any environmental issues that affect health in the community (e.g. water quality, sanitary conditions etc) Please explain	Poor potable water due to reliance mainly on ground hard water from boreholes that in most cases are of poor quality.				
4	If someone in the household is ill, how do you usually treat him/her? How do you treat sick elderly, children, men and women? Are there any disabled people in the community that require care?	Yes, they are treated and are always taken care of by families				
Section I: Access to Water						
1	Where do you get your water for drinking, cooking, bathing and for livestock?		Description of water source	Walking distance from dwelling (KM)	Collection method (if applicable)	Description of quality/colour/taste/smell
		Drinking:	Borehole	Out of the town	Piped	Hard water
		Cooking:	Borehole	Out of the town	Piped	Hard water

		Washing dishes:	Borehole	Out of the town	Piped	Hard water
		Bathing:	Borehole	Out of the town	Piped	Hard water
		Livestock:	Borehol	Out of the town	Piped	Hard water
		Irrigation:				
2	Do you have to treat drinking water? If so, how?		Yes, through boiling and use of aquatabs			
3	If the community has a borehole, do they know when it was installed? Who installed it? How deep it is? How is it operated?		No			
4	Is anyone in the community or a community water committee responsible for managing boreholes or other water sources in the community? Who? How well does this work?		No			
Section J: Sanitation and Hygiene						
1	What type of toilet facilities do households have? (eg community or private/household, ventilated pit latrine, un-ventilated pit latrine, hole in the ground, no latrine/use the bush etc)		Yes, there are pit latrines and septs of different types			
2	Do the toilet facilities have light?		Not many have lights			
Hygiene & Waste						
3	How / where do people dispose of household waste? (Burn, dump, put in the river or sea, other-specify)		It is collected by a company and some throw away to streets			
Section K: Access to Power						
1	What energy source do you use? Where are each of these sources these located (eg grid connection from the house, firewood, charcoal, kerosene, gas, solar etc?)	Type	Source of energy/power		Location	
		Lighting:	BEC-BAIDOA		In town	
		Keeping warm:				
		Cooking:	Gas, firewood, charcoal			
		Heating water:	none			
		Charging mobile phones:	Solar, BEC-BAIDOA			
		Cooling food:	BEC-BAIDOA			
2	Do you face any challenges regarding access to power? Please explain?		The current tarrifs are unaffordable to many residents.			
Section L: Transport and Communication						
1	What are the main forms of transportation used within the community? Please describe the quality/accessibility of transportation in the community		Vehicles, tuktuks.			
2	Is there telecommunication services in the area		Use golis telecom services			
Section M: Cultural heritage						
1	What are the sacred/ historical or religious sites in the area? Are these accessible to women? Where are they located?		There are no such places,			
2	What are the main festivals or rituals undertaken in the community by women? Give details		International women's day and eid festivals and some other days that people celebrate			

Section N: Insert photos here

ANNEX 11.4. STAKEHOLDERS' CONSULTATIONS ATTENDANCE LISTS



SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SES RP)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
FOR THE PROPOSED HYBRID POWER PLANT FOR :BEC-BAIDOA

STAKEHOLDERS' CONSULTATIONS SESSIONS ATTENDANCE SHEETS

Date : 22/11/2024

Venue : BAIDOA

#	Name	Organization/title	Signature
1	Aden Abdullahi Isack	M/BECC-SWS-DS	
2	Abdirahim Ali Mohamed	MOLSA	
3	Dr. Ibrahim Adam ALI	MOH - DG	
4	Leban Ahmed Abdullahi	MOE/UR-DS	
5	Fariyo Ibrahim	Bay Reg. Gov't	
6	Abdulrahman Adan	Youth Coordinator	
7	Alsan Hassan	Local Community	
8	Yussuf Muktar	local gov't.	
9	Fariyo Abdi Museen	Baidoa Municipality	
10	Saharo Mahid W/P	local community	
11	Abdow Ahmed	Business man	
12	Fartun Abdirashid	Business woman	
13	Ahmed Abdullahi	local NGO	
14	Abdirahman Ali	Grado	
15	Abdiyo Yussuf	CSF	
16	Farsal Iman	LOM	
17	Deeko Adan	Business woman	
18	Faduma Yussuf	women group leader	



SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SESRP)

ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT
 FOR THE PROPOSED HYBRID POWER PLANT FOR : BECO-BAIDOA

STAKEHOLDERS' CONSULTATIONS SESSIONS ATTENDANCE SHEETS

Date : 22/11/2024

Venue : BAIDOA

#	Name	Organization/title	Signature
1	Mussein Dufow	Clan Elder	<i>[Signature]</i>
2	Fadumo Yusuf	Klomen Group leader	<i>[Signature]</i>
3	Adan Dheere	IDP Camp leader	<i>[Signature]</i>
4	Adan Mektar	PKD Chairperson	<i>[Signature]</i>
5	Abdile Abdile	SRFD	<i>[Signature]</i>
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ANNEX 11.5. STAKEHOLDERS' ENGAGEMENT PHOTO LOGS

Photo 1: View of the enumerator and the male participants in Baidoa during the stakeholders engagement



Photo 2: View of the enumerator and the representative of women development groups in Baidoa during the stakeholders engagement



Photo 3: View of the enumerator and the Representative of Ministry of Energy and Water Resources in Baidoa during the stakeholders engagement



Photo 4: View of the enumerator and the Director General for the Ministry of Environment Water and Change in Baidoa during the stakeholders engagement



Photo 5: View of the enumerator with the Director General of the Ministry of Health in Baidoa during the stakeholders' consultations



Photo 6: View of the enumerator with women participants in Baidoa during the stakeholders' consultations

