ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED HYBRID POWER PLANT FOR NEPCO, GAALKACYO, SOMALIA

PROJECT
Somali Electricity Sector Recovery Project (SESRP) (P173088)

ELECTRICITY SERVICE PROVIDER
National Electric Power Corporation

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DRAFT ESIA REPORT

DISCLAIMER:

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Consultant	:	Horizon Developments https://horizondevelopments.com/

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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
CO2	:	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 Project
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
NEPCO	:	National Electric Power Corporation
NO2	:	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) Established in 2009, National Electric Power Corporation (NEPCO) is one of the electricity in services providers in the Puntland State Sector of Gaalkacyo City participating the SESRP project, especially in the implementation of component 2 on hybridization and battery storage systems for mini-grids. NEPCO currently has an installed capacity of 5.4432MW consisting of 4.9432MW (diesel genset) and 0.5MW (solar PV). Under the proposed arrangement, NEPCO 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 (NEPCO 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, their property and the environment particularly in the Project Area (Gaalkacyo 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.

(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, check lists, 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 site and surrounding area.

Project Description and Context

(i) The proposed Hybrid power plant ($6^{O}43'54.3''N$, $47^{O}26'10.8''E$) is in northern sector of Gaalkacyo City within the Puntland State, Somalia on approximately $2km^2$ land in the outskirts of northern sector of the City. The area is sparsely populated, relatively flat land with sparse vegetation comprising mainly of *acacia-commifora* bushes, and there are no

waterbodies near the site, but a settlement comprising of an IDP camp is approximately two kilometers from the proposed. Given the human population growth, there is a possibility of more public facilities, shopping centers, and residential houses emerging adjacent the proposed site in the future. The site is connected by a gravel road, but NEPCO plans to construct a proper access road during the project's construction and operation phases.

The feasibility study recommends scenario 2 of 50% REF for a 3.5MW hybrid power plant located some 9km in the northern outskirts of Gaalkacyo City with a transmission line connected to an existing NEPCO substation within the City. The proposed hybrid power plant will consist of PV modules and a lithium-ion battery storage system, with a battery lifetime of 6000 cycles. The plant is expected to operate for 25 years, and shall be decommissioned thereafter. Given the functionality of the BESS will expeire after 17 years, to ensure continued BESS functionality, a battery replacement plan will be implemented, including procuring and installing new batteries, recycling expired batteries, and allocating funds for replacement. This will be coordinated with routine maintenance to minimize downtime and allow for the adoption of newer, more efficient technologies.

Legal and Regulatory Framework

(i) The Federal Government of Somalia (FGS) has been struggling with lack of well-developed environmental laws due to political instability. However, the Provisional Constitution of Somalia is explicit on safe and clean environment for the citizens. Additionally, a new Environmental Protection and Management Act (2020) was enacted to spearhead environmental management in the Federal Republic of Somalia (FRS). For instance, the lower house of the parliament has approved the new environmental regulations, which is now under review by the upper house. Additionally, the FRS is in the process of developing several other regulations under the environmental protection law.

(ii) The World Bank's latest environmental and social standards (ESS) and guidance notes were analyzed to determine if a proposed project triggered any other ESS. The ESIA aimed to provide guidance for environmental and social assessment of WB-financed projects, improve decision-making, ensure sustainable options, and properly consult affected people. The ESIA revealed that the proposed project will have both negative and positive impacts on the environment and social spheres, highlighting the importance of sound and sustainable project options.

(iii) 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. For this ESIA, the following multilateral agreements to which FRS is a signatory were reviewed, and their relevance to the proposed project analyzed: The United Nations Convention on biological diversity (CBD); The UN Framework Convention on Climate Change (UNFCCC); The UN Convention to Combat Desertification (UNCCD). Convention on the Conservation of Migratory Species of Wild Animals (ratified 1985); Protocol concerning Regional cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency; Sustainable Development goals and Agenda 2063 in Africa; and International Labour Organization Agreements.

Analysis of Alternatives

(i) Two sites were under consideration – the existing power plant and the proposed new site, which is 9km away from the existing power plant. The analysis of alternatives compared the existing power plant location, which lacks adequate space for the new hybrid power infrastructure, with a new site located 9km away that offers sufficient space for expansion. While 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 new site provided ample room for investment, allowing for optimized layout and future scalability, though it would involve additional costs in terms of infrastructure development, and possibly increased transmission losses due to the distance. Careful consideration of long-term benefits, costs, and operational efficiency are crucial in determining the best option for sustainable power generation.

(ii) The proposed project's site was selected based on a number of factors, including geophysical factors including an open and expansive area with greatest solar irradiance, a location free of soil erosion and flooding, and an area with good drainage, among others; the land identified is free from any ownership disputes or other encumbrances; and there are no squatters, encroachers, or other claims to the property.

(iii) 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 Puntland State and FRS from meeting energy requirements, thereby affecting the overall socio-economic status of target communities.

Environmental and Social Baseline

(i) The northern sector of Gaalkacyo City and its surrounding areas are classified as arid to semi-arid, with long periods of drought and minimal rainfall. The Puntland State of FRS has a diverse topography, with calcareous soils and a long coastline. The city's foundation is based on ancient Precambrian basement rocks. The flora is dominated by species adapted to the arid climate and diverse landscape, with thorny shrubs, and bushes being the dominant vegetation characteristics providing shade and grazing for livestock. Some herbaceous plants and grasses thrive during short rainy seasons, providing fodder for livestock.

(ii) The Puntland State's socioeconomic environment is shaped by historical background, cultural diversity, economic activities, infrastructure development, and governance dynamics. The state invests in road infrastructure, improves access to clean water and sanitation, and provides education and healthcare services.

Assessment of Impacts

The project aims to positively impact the Puntland State 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Landscape and visuals	• Erect a fence around the power plant.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
Impacts on biophysical environment	Soil, groundwater and surface water contamination	• Scoop and correctly dispose contaminated soil. • Care must be exercised not to spill any fossil fuels • Construction vehicles must be maintained in good state. • Contractor to develop an oil-spill containment plan. • Ensure waste water generated is discharged or drained into approved drainage facilities • No vehicle maintenance and service shall be done at project site	Construction
	Flood risk	• Ensure drainage channels are free of any obstruction at all times. • Create flood diversions/spill ways to divert water from the construction site,	Construction
	Air quality (Dust)	• Suppress dust during dry periods by use of water sprays; • Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions. • Burning of woody debris & construction waste to be prohibited • Ensure all the personnel use PPEs. • Restrict speed on loose surface roads during dry or dusty conditions • Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. • Construction trucks moving materials to site should be covered to prevent material dust emissions.	Construction
	Air quality (Vehicle exhaust emissions)	• Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. • Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter.	Construction
	Noise & vibration	• Employ modern construction equipment fitted with noise-reduction technologies • Ensure regular maintenance of machinery to reduce noise emissions. • Establish a GRM for community to report noise or vibration disturbances. • Establish a monitoring program to regularly measure noise and vibration levels. • Inform nearby communities in advance about scheduled high-noise activities. • Provide appropriate PPEs to workers during construction activities. • Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). • Train workers on the importance of noise control and best practices on noise.	Construction
	Biodiversity (Fauna)	• Site clearing work/earthwork shall be carried out 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. • Site preparation shall minimize clearing of vegetation and topsoil. • Ensure wildlife-friendly designs for infrastructures. • Temporary-use areas shall be restored and revegetated • An ecologist shall be hired to coordinate the fauna monitoring.	Construction
	Biodiversity (Flora)	• Ensure proper demarcation and delineation of the project area to be affected by construction works. • Designate access routes and parking areas	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• Re-vegetation including planting of trees around the plant/facility	
	Soil erosion	• Avoid ground-breaking during the seasons of high rainfall to avoid erosion. • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials • Use silt traps where necessary • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last	Construction
	Wastes (Solid wastes)	• All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through a approved waste handler • Segregate waste • Provide litter collection facilities such as bins • Contractor to put in place and comply with a site waste management plan • Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time • Recovery of materials remains and return to stores • Re-use of materials where possible • Proper budgeting to avoid waste generation • Proper disposal of waste in line with solid waste regulation • Construction wastes to be managed in accordance with internationally accepted construction standards of a hybrid power plant	Construction
	Wastes (Liquid wastes)	• All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. • Create awareness for the employees on site on procedures of dealing with spills and leaks • Develop and implement a detailed Spill Prevention Plan (SPP) • Disposal of waste through septic tanks • Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. • 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 stormwater. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. • Proper training for the handling and use of fuels for the operators of the power plant. • Provide sanitary waste facilities for both genders clearly marked • Refuelling and maintenance of vehicles will not take place at the construction site.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• The waste oil or used oil must be disposed-off appropriately. • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks.	
Impacts on infrastructure and utilities	Water consumption	• Ensure prudent use of available water • Consultations with the project local committee on water use to avoid conflicts with the community • Source and utilize a sustainable and reliable water supply for both construction and operation phase.	Construction
	Energy Consumption	• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity. • Proper planning of transportation of materials will ensure that fossil fuels are not consumed in excessive amounts. • Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.	Construction
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Coordinate with the local herders on establishing alternative grazing routes or areas. • Engage regularly with affected herders/community leaders to identify their concerns and collaboratively design grazing solutions. • Conduct regular environmental monitoring to assess the availability and quality of alternative grazing areas and adjust mitigation measures. • Provide alternative water points for livestock near the construction area. • Establish a grievance redress mechanism to address any conflicts or complaints from herders regarding grazing land access.	Construction
	Archaeology and cultural heritage	• 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 archaeological artifacts or sites are discovered, establish temporary buffer zones around these areas to protect them from further disturbance. • If chance finds are made, ensure proper documentation, including detailed records, photography, and GPS coordinates, before any further action is taken.	Construction
	Trespassing of unauthorized personnel	• Controlled access to the site only with prior approval • Fencing off the construction site to keep of unauthorized personnel • Hazard communication • Maintain records of any person who comes to site • Ensure proper barricading	Construction
	Worker influx – Incoming Workforce	• 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	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		raised on time. • Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms.	
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts.	Construction
	Labour disputes	• Ensure full compliance with local labor laws. • Ensure that all workers receive clear, written contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. • Establish mechanisms to guarantee fair and timely payment of wages and benefits. • Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues. • Implement and enforce non-discrimination policies to ensure equal treatment of all workers regardless of gender and clan. • Set up a formal, transparent grievance redress mechanism to handle worker complaints and disputes in a timely manner.	Construction
	Child and forced labour	• Implement and monitor the employment register regularly. • 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.	Construction
	Security risks	• Conduct a comprehensive risk assessment to identify specific 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. • Provide workers with ID badges and restrict entry to authorized personnel only. • 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.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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 impacts	• Use skilled personnel for activities which demand skills/technical tasks • Workers coming to the site should be knowledgeable on safety precautions to take • Provide appropriate PPE to all workers. • Undertake risk assessment by contractor of the construction activities and implement mitigation measures appropriately • Availability of equipped first aid box on site • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees	Construction
	Community health and safety risks	• Allowing migrant workers time to be with their families • Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases • Ensure equal treatment of workers • Informing workers on local cultural values and health matters. • The contractor is impressed upon not to set a construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures.	Construction
	Fire Hazards	• '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. • Create awareness to the construction workers on potential fire hazards • Designate an assembly point • No smoking shall be done on construction site • Provision of firefighting equipment on site during construction.	Construction
	Traffic risk	• Develop and implement a Traffic Management Plan (TMP). • Use traffic signs, barriers, and cones to guide and direct both construction and local traffic. • Enforce strict speed limits for construction vehicles within the construction site and along designated transport routes. • Install speed bumps or other traffic-calming measures on roads near the construction site. • 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. • Designate safe parking and loading zones for construction vehicles away from main roads and community spaces.	Construction
	Risks related to Inadequate stakeholder engagement	• Update the existing SEP to make it more relevant and proportionate 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.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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	• 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.	Construction
Impacts on biophysical environment	Landscape and visual	• Fence off the power plant.	Operation
	Soil, groundwater and surface water contamination	• Infrastructure shall be designed to ensure that contaminated run-off does not reach water source i.e., earth dam. • Contractor to develop an oil-spill containment plan as part of the emergency response plan. • No vehicle maintenance and service shall be done at project site • Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.	Operation
	Flood risks	• Ensure drainage channels are free of any obstruction at all times i.e., not blocked • Construct more channels and or expand existing ones • Raise foundations of the solar panels and ensure a proper and from concrete base • Create flooding diversions and or spill ways to divert water from getting into the solar power facility	Operation
	Air quality (Dust)	• Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution • Ensure planting of grass around and within the facility compound	Operation
	Air quality (Vehicle exhaust emissions)	• Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter.	Operation
	Noise & vibration	• 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	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Biodiversity (Fauna)	• Ensure wildlife-friendly designs for infrastructures. • An ecologist shall be hired to coordinate the fauna monitoring. • Bird deterrents will be installed to prevent collisions with solar panels. • Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies.	Operation
	Biodiversity (Flora)	• Re-vegetation including planting of trees around the plant/facility	Operation
	Soil erosion	• Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Landscaping with grass on areas without electrical installation (lower areas) • Construct the drainage system in a way to follow natural drain of the water • Concrete only the required area and leave the rest of the land with vegetation like grass • Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use	Operation
	Wastes (Solid)	• Provide waste handling facilities such as labelled waste bins • Emphasis on prudent waste generation and give priority to reduction at source • Undertake solid waste management awareness to operators • Operator to contract a licensed waste handler to collect and dispose solid waste *Damaged solar panels and hazardous wastes* • 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 a approved waste handler	Operation
	Wastes (Liquid)	*Sanitary wastes* • Provide sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks *Oils from vehicles* • 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. *Chemicals* • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. *Accidental fuel and oil spill* • Ensure quick clean-up of spills by designated response teams trained in handling hazardous materials. • Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. • Establish proper waste management protocols for the	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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. • Ensure secure storage of all hazardous materials in compliance with local regulations.	
Impacts on infrastructure and utilities	Water consumption	• Ensure prudent use of water. • Install water-conserving automatic taps. • Any water leaks through damaged pipes and faulty taps should be fixed promptly.	Operation
	Energy consumption	*Lightings* • Install an energy-efficient lighting system • 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. • Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. • Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement.	Operation
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Continue consultations with local communities to assess their needs on grazing access alternatives. • Support the development of pasture improvement projects • Provide alternative livelihood opportunities for pastoralists • Install livestock water points at strategic locations near alternative grazing areas. • Establish and maintain a grievance redress mechanism • Conduct regular monitoring of the livelihoods of affected pastoralists.	Operation
	Trespassing of unauthorized personnel	• Fencing off the facility to keep of community members, children and livestock from entering into the facility • Controlled access to the site only with prior approval • Maintain records of any person who comes to site	Operation
	Worker influx – Incoming Workforce	• Prioritize the hiring of local workers to reduce the need for an incoming workforce. • Establish and enforce a strict code of conduct for incoming workers. • Implement awareness programs to sensitize both the incoming workforce and local communities on cultural differences. • Design worker accommodations that are separate from local residential areas but ensure they meet adequate living standards. • Encourage the use of local suppliers for food, materials, and other needs of the workforce to support the local economy. • Implement comprehensive waste management systems in worker accommodation areas. • Ensure both the workforce and the local community have access to a grievance redress mechanism. • Continuously monitor the behavior of the incoming workforce, addressing issues promptly to prevent tensions with the local population. • Maintain ongoing dialogue with local communities to	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		understand and address their concerns about the worker influx.	
	Gender-based violence	*GBV- SEA and SH* • Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts. *Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges* • Consult VMGs and Vulnerable individuals and households on charges for sub project services and put in place specific interventions to ensure the vulnerable equally access project benefits.	Operation
	Labour disputes	• Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. • Maintain open communication between management and workers. • Ensure full compliance with national labor laws. • Implement fair and transparent disciplinary procedures. • Promote equal opportunities and non-discriminatory practices in hiring, promotion, and compensation to avoid conflicts. • Set up a monitoring system to track and evaluate labor 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.	Operation
	Child and forced labour	• 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.	Operation
	Risks related to poor or inadequate stakeholder engagement (Conflict)	*Risks related to Inadequate stakeholder engagement* • Update the existing SEP to make it more relevant and proportionate to the subproject and the identified stakeholders. • 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. • In line with the SEP, undertake adequate consultations	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		prior to construction and throughout the project cycle with all segments of the community and other relevant stakeholders. • Prepare and implement a grievance redress mechanism to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. *Inadequate grievances management* • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Work closely with the GRM committee members in solving the conflicts • Solve all conflicts/grievances at the earliest time possible • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures	
	Occupational health and Safety	• Ensure only qualified staff are employed to work in the facility • All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. • Operators must be skilled on firefighting management • Annual EHS audits should be done	Operation
	Community health and safety risks	*Public Health Impacts* • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. *Shocks and electrocutions* • Inspect the wiring of the houses before connecting power • Safety awareness campaigns to the community before connection of power on safety precautions such as: • 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. *Public Health Impacts –HIV/AIDs* • 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	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Fire hazards	• The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including fuel storage areas, BESS locations, etc. • Detection/alarm systems that can detect fire should be and installed • A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. • Workers especially operators of the plant must be trained on fire management • 'No smoking' signs shall be posted within the power plant area • A fire Assembly point should be identified and marked	Operation
	Security risks	• Monitor local security developments and adjust security protocols accordingly. • Maintain a secure perimeter with robust fencing of the site • Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response. • Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. • Deploy trained security personnel to guard the site 24/7. • Continue engaging local communities to foster positive relationships and minimize hostility. • Maintain and regularly update a comprehensive security incident response plan • Maintain close coordination with local law enforcement and security agencies • Implement a rigorous vetting process for all employees to minimize the risk of insider threats. • Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters.	Operation
Impacts on biophysical environment	Impacts on landscape and visual	• Create a comprehensive decommissioning plan that includes strategies for minimizing visual impacts on the landscape. • Implement a revegetation plan using native plants and vegetation to restore the natural landscape and improve visual aesthetics. • Ensure proper management and disposal of all debris and waste materials to prevent visual pollution in the surrounding landscape. • Conduct regular clean-up and maintenance of the site to remove any debris or unsightly materials, ensuring a tidy landscape. • Install informational signs explaining the decommissioning process and future land use plans, promoting transparency and community understanding. • Provide regular updates to stakeholders on decommissioning progress and visual impacts, ensuring ongoing communication and involvement.	Decommissioning
	Impacts on biological environment	• Develop habitat protection plans that outline specific measures to protect sensitive habitats, such as wetlands, flora, and fauna during decommissioning. • Implement erosion and sediment control measures to protect soil and water quality, preventing sediment runoff into adjacent habitats. • Plan for revegetation and habitat restoration using native plant species after decommissioning to promote	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		biodiversity and ecosystem recovery. • Monitor and manage invasive species during and after decommissioning to prevent their spread into disturbed areas. • Implement measures to control noise and vibration during decommissioning to minimize disturbance to local wildlife. • Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. • Engage with local communities to raise awareness about the importance of protecting the biological environment during decommissioning. • Work with environmental specialists and conservation organizations to develop and implement effective mitigation measures. • Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning.	
	Solid Waste Generation	• Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal • Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste • 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 • Adequate collection and storage of waste on site • Safe transportation to the disposal sites / designated area • Hazardous waste must be disposed by approved waste handler	Decommissioning
	Wastes (liquid)	• Conduct a comprehensive assessment to identify and categorize all sources of liquid waste generated during decommissioning. • 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. • Whenever possible, use environmentally friendly materials and products that generate less hazardous liquid waste during decommissioning. • Ensure that all liquid wastes are disposed of in accordance with local regulations and environmental standards, using licensed waste disposal facilities. • Provide training for staff on liquid waste handling, storage, and emergency response procedures to minimize risks. • 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 accurate records of liquid waste management activities, including quantities generated, treatment methods, and disposal locations. • Prepare for emergencies related to liquid waste, including establishing an emergency contact list and response	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		procedures. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.	
	Noise and Vibration	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Use quiet equipment (i.e., equipment designed with noise control elements). • Co-ordinate with relevant agencies in case the noise produced will require a license. • Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. • Demolish mainly during the day when most of the neighbours are out working.	Decommissioning
	Air quality (dust)	• Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. • Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. • Enforce speed limits for vehicles operating on-site and on access roads to reduce dust emissions from vehicle traffic. • Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. • 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. • Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term.	Decommissioning
	Air quality (vehicle fumes)	• Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. • 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.	Decommissioning
Impacts on Infrastructure & Utilities	Water Resources	• 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 cleanup. • 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.	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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	Impacts on Occupational health and safety	• Conduct a thorough occupational health and safety risk assessment to identify hazards associated with decommissioning activities. • 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. • Conduct regular safety inspections of the worksite to identify and address potential hazards promptly. • 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.	Decommissioning
	Impact to livelihoods from grazing land access restrictions	• Identify and develop alternative grazing areas for affected livestock herders to ensure • Engage with local communities to discuss the decommissioning process and gather feedback on their concerns and suggestions regarding grazing land access. • Invest in community development programs that provide alternative income-generating opportunities, such as skills training or support for small businesses. • Establish a conflict resolution mechanism to address disputes arising from grazing land access restrictions, ensuring fair and timely resolutions. • Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation.	Decommissioning
	Trespassing of unauthorized personnel	• Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. • Conduct regular patrols of the perimeter by security staff to identify and address any instances of trespassing quickly. • Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. • Establish a visitor management system that requires all	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		authorized visitors to sign in and out, ensuring that their presence is monitored. • Define and communicate restricted access hours during which the site is closed to unauthorized personnel. • Hold regular community engagement meetings to discuss security concerns and gather feedback on improving site safety.	
	Worker influx – Incoming Workforce	• 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. • Consult with and involve local community in the decommissioning activities. • Sensitize workers regarding engagement with local community. • Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water. • Establish and operationalize an effective Grievance Redress Mechanism accessible to community members. • Include gender considerations in employment opportunities. • Provide appropriate compensation for work done. • Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms.	Decommissioning
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts.	Decommissioning
	Inadequate grievances management	• 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. • 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.	Decommissioning
	Risks related to Inadequate stakeholder engagement	• Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. • Develop a stakeholder engagement strategy that outlines the objectives, methods, and timelines for engaging with different stakeholders throughout the decommissioning process. • Organize public consultations and forums to solicit	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		feedback from stakeholders, ensuring their voices are heard and concerns are addressed. • Invest in building the capacity of local communities and stakeholders to engage in the decommissioning process effectively, providing training and resources as needed. • Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. • Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. • Ensure that women and vulnerable groups are actively involved in stakeholder engagement processes, addressing any barriers they may face in participation.	
	Child and forced labour	• 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. • 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.	Decommissioning
	Security risks	• Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities. • Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning. • Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. • 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. • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Develop and communicate an emergency response plan that outlines procedures for handling security incidents, including evacuation protocols. • Develop a crisis communication plan to inform stakeholders and the community about security incidents promptly and transparently. • Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities.	Decommissioning
	Community health and safety risks	• Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the decommissioning process. • 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.	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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 impact community health. • Implement sustainable decommissioning practices that prioritize community health and safety while minimizing environmental impacts. • Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process.	
	Fire hazards	• 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. • Establish fire breaks or cleared areas around the site to help prevent the spread of fire. • 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. • Establish communication and coordination with local fire services to ensure a rapid response in case of a fire emergency. • Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary.	Decommissioning

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 278,600. 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

- *General support for the project:* Most 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 NEPCO from economic perspective (See Annex 10.3).
- *Land activity of the project site:* 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. Additionally, there are no formal agreements between NEPCO and the local harders on use of the site as a grazing area by the local herders. They further expressed no objections to any development activities proposed by the property owner as there were similar alternative sites for occasional grazing across Gaalkacyo District. Based on these assessments, no compensatory measures are anticipated by NEPCO during all project phases.
- *Existence of cultural sites:* There are no sacred sites or cultural heritage sites in the vicinity of the project area.
- *Existence of wildlife:* Due to its expansive nature and existence of pockets of vegetation dominated mainly by *Acacia tortilis* and *Salvadora persica*, the project site on regular basis hosts a variety of wildlife species, including Salt's Dik-dik (*Madoqua saltiana*), Abyssinian Hare (*Lepus habessinicus*), Leopard Tortoise (*Stigmochelys pardalis*), and a variety of resident bird species.
- *Land use conflicts:* No conflicts over land/land ownership was expressed.
- *Expectations for regular information sharing:* A common request across all stakeholder groups was the need for ongoing, transparent communication from the NEPCO throughout the construction and operation phases of the project. Stakeholders emphasized the importance of timely updates on construction activities, any potential disruptions, and the environmental and social performance of the plant. Communities expect the ESP to establish clear channels of communication to keep them informed.
- *Expectations on social responsibility programmes (SRP):* implementation of SRP by NEPCO that focuses on community development projects (that addresses women groups as well) as well community needs (health, education, sanitation, water supply, transport, etc.).
- *Concerns about potential disruptions*: While stakeholders support the project, some concerns were raised about possible disruptions during construction, including dust, noise, and increased traffic. They expect that NEPCO will implement mitigation measures and keep them informed of any significant changes or delays.
- *Employment opportunities*: Local stakeholders, particularly youth and women's groups, emphasized the need for job creation as a significant benefit of the project. They expressed an interest in local recruitment, training, and skills development opportunities provided by the project during both the construction and operational phases.
- *Environmental and social performance*: Some stakeholders expressed concern about the long-term environmental and social impacts of the project. They called for regular monitoring and reporting on the plant's environmental footprint, including any impacts on water resources, air quality, and land use.

Overall, the stakeholder consultation process for the proposed hybrid power plant was positive, with stakeholders expressing broad support for the project. However, stakeholders emphasized the importance of regular information sharing and engagement throughout the project's lifecycle. NEPCO 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.

Conclusion and recommendations

Conclusion

(i) During the preparation of this report for the proposed development, it was observed and established that most of the negative social and environmental impacts can be mitigated and have potentially short term low significant effects. The positive impacts are highly rated and will benefit the community in the project area and Puntland State at large. The project proponent (MoEWR), the implementing entity (NEPCO) and the contractor must adhere to prudent implementation of the social and environmental and social management plan. The contractor shall commit to obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. The ESIA has proposed adequate environmental, health and safety mitigation measures as part of the relevant statutory requirements.

(ii) The analysis of the ESIA has demonstrated that the construction and operation of the proposed power plant will have positive impacts to the FGS, Puntland State governments, and residents of Puntland State at large. The positive impacts will include; increase in reliable and sustainable clean energy, employment to local community members, increase in the national/local investment, increase in government revenue, improvement of standards of living for Gaalkacyo residents. However, despite the outlined positive impacts, the proposed development may cause some negative impacts such as; noise, dust generation, soil erosion, oil spills, fire hazards, electrocution, shocks, solid waste generation, occupational health hazards, social risks such as labour influx, demand for resources, gender-based violence, among others that need to be avoided, reduced and mitigated against.

(iii) An Environmental and Social Management Plan (ESMP) has been developed to ensure sustainability of the project area activities from construction through operation to decommissioning. The ESMP plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitorable indicators. Implementation timeframes and responsibilities are defined, and where practicable, the cost estimates for recommended measures are also provided.

(iv) A monitoring plan that highlights some of the environmental performance indicators that should be monitored has been developed. Monitoring creates possibilities to call to attention changes and problems in environmental quality. It involves the continuous or periodic review of operational and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established, and previously unforeseen impacts can be identified, or pre-empted and mitigation measures proposed.

(v) From the findings of this ESIA, the following specific conclusions can be drawn:

- The proposed project will generate socio-economic benefits which would not be realized if the 'NO development option'' is considered.
- The relevant stakeholders have been consulted and the relevant project information shared and the views of the stakeholders is that the project is long overdue.
- The potential adverse impacts associated with the proposed project are possible to be successfully mitigated. Most impacts before implementation of mitigation measures are assessed as very low to medium low and the ratings are expected to improve further with the implementation of the proposed 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 project will be designed, constructed, and operated according to the acceptable industry norms and standards. Successful implementation of the proposed ESMP will ensure environmental sustainability.
- The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The proposed power plant and associated structures will be installed to the required planning/architectural/structural designs and standards. During project implementation, operation and decommissioning stages sustainable environmental management would be ensured; avoiding inadequate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, general public at the vicinity and the expected PAPs of the project.
- In relation to the proposed mitigation measures that will be incorporated during construction, operational and decommissioning phases; the development's input to the society and environment; the project is considered beneficial and important.

Recommendations

(i) It is strongly recommended that a concerted effort is made by the MoEWR and NEPCO in particular, to implement the ESMP provided herein. Following the commissioning of the project, 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.

(ii) On the basis of the findings from this ESIA, the following specific recommendations can be made:

- The NEPCO 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 is mandatory to ensure environmental and social sustainability of the project.
- Cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders.
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt out
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Stakeholder engagement to the 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.
- EHS Audits shall be carried annually or as prescribed by the FGS Authority during the operational phase.
- Diligence on the part of the contractor and proper supervision by the MoEWR and NEPCO is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.

Authorization opinion

The Horizon Development (HD) believes that the present Environmental and Social Impact Statement (ESIA) provides enough information for decision-making on the project. They have shown that the proponent's preferred alternatives and technological alternatives are generally acceptable. The ESIA has also identified essential mitigation measures to limit project impacts. The HD believes that the applicant's proposal should be approved on environmental grounds, provided essential mitigation measures are implemented. The HD believes that the anticipated negative impacts can be effectively mitigated, and that the proposed project does not pose a significant threat to environment and social aspects, and that the proponent (MoEWR and NEPCO) will own the entire implementation and reporting on this ESIA. The project should therefore be allowed to proceed.

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 inefficient[1]. 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 SESRP is coordinated by the Ministry of Energy and Water Resources (MoEWR) with a designated Project Implementation Unit (PIU). 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	• **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]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

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

This component supports the enhancement of the capacities of electricity services providers (ESPs) to supply clean and affordable electricity to the consumers in the targeted load centres spread across the FGS. NEPCO is one of the key ESPs participating in Component 2 of the project and has made progress towards meeting the general requirements for enhanced production of clean and affordable electricity. For instance, NEPCO has already undertaken relevant feasibility studies and acquired adequate space to set up a hybrid power plant in the outskirts of Gaalkacyo City. Under the proposed arrangement, the MoEWR will provide overall coordination of the project and oversight during planning and implementation of the project. This will include overall coordination and oversight for safeguards due diligence, and implementation. NEPCO will be responsible for the implementation of the project 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 labor conditions and community health and safety. Given the World 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, labour 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 (Gaalkacyo 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 EHSG 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.
- 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.
- 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 neighbourhood.
- Evaluation of the activities around the site and the environmental setting of the wider area.
- Report writing and submission.

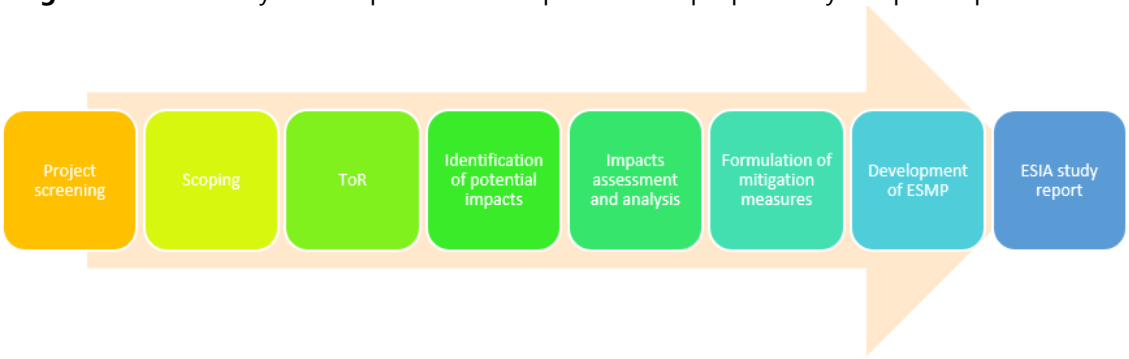
The initial stage of this assessment was project screening. Other considerations made during this stage included a preliminary assessment of the environmental sensitivity of the proposed project area/site. This screening indicated that the proposed hybrid power plant falls under Category B (Moderate 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 NEPCO 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 NEPCO 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 it's surrounding the ESIA team needed to gather primary data. This entailed collection of the data using various tools and methods. Interviews, discussions, photography and 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 Gaalkacyo as gathered during the desktop studies for soil[4], air[5,6] noise[7,8] and water quality[9,10]. The most recent topographic and geotechnical study commissioned by NEPCO 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 Puntland State Government ministries and agencies.
- Funding agencies
- Project affected persons and other stakeholders

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 NEPCO and the Contractor will implement the measures in the proposed ESMP

[4]Farah, M. I., & Hassan, S. K. (2020). Soil degradation and land-use changes in semi-arid regions: A case study from Gaalkacyo, Somalia. African Journal of Soil Science, 8(2), 97-110. https://doi.org/10.1000/ajss.2020.12345

[5]Ali, F. Y., & Ibrahim, R. H. (2019). Air quality monitoring in urban centers of Somalia: Case study of Gaalkacyo city. Environmental Research and Policy Review, 22(4), 112-125. https://doi.org/10.1080/xxxx

[6]Mahmoud, A. S. (2018). Air pollution levels and public health implications in northern Somalia: Evidence from Gaalkacyo. International Journal of Environmental Science, 13(5), 77-89. https://doi.org/10.1111/ijes.2018.00099

Noise Quality Studies

[7]Omar, N. M., & Farah, A. H. (2021). Noise pollution and its effects on the urban environment: A study in Gaalkacyo, Somalia. Journal of Urban Environmental Studies, 14(2), 65-78. https://doi.org/10.1007/surbes.2021.01422

[8]Abdullahi, I. J. (2017). Noise levels and their impact on public health in Gaalkacyo city, Somalia. Environmental Health Perspectives, 19(3), 101-115. https://doi.org/10.1097/ehp.2017.10109

[9]Yusuf, H. A., & Ahmed, B. H. (2016). Evaluation of groundwater quality in Gaalkacyo, Puntland, Somalia. Water Resources and Hydrology, 27(3), 245-260. https://doi.org/10.1002/wrh.2016.12321

[10]Mohamed, S. I., & Warsame, H. A. (2015). Impact of human activities on water quality in the Nugaal Valley: Case of Gaalkacyo, Somalia. Journal of Water Quality Management, 9(1), 33-47. https://doi.org/10.1007/wqm.2015.01017

- The NEPCO 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 NEPCO Hybrid Power Plant in the northern outskirts of Gaalkacyo 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 NEPCO and MoEWR.

2.2. LOCATION OF THE SITE

The proposed Hybrid power plant (6^{O}43'54.3''N, 47^{O}26'10.8''E) shall be located in the outskirts of Gaalkacyo City, Puntland State within the north-eastern Somalia (Figure 2.1). The project site is in an open area with sparse settlements in the immediate vicinity with 2km^2 piece of land acquired by NEPCO for the project. Gaalkacyo is traversed by a 750 km north-south highway, which connects it with major cities in the northern parts of the country, including Bossaso and Garowe. The Project Site is located approximately 9 km to the north of the current NEPCO Power Plant. The project site is in an open area without settlements in the immediate vicinity within 2km^2 piece of land acquired by NEPCO for the project. The proposed hybrid power plant will have both direct and indirect impacts on the environment and communities. 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.

Photo 1. View of the access road under construction at the project site

Figure 2-1(a): Location of the project NEPCO hybrid power plant site in the northern outskirts of Gaalkacyo City, Somalia

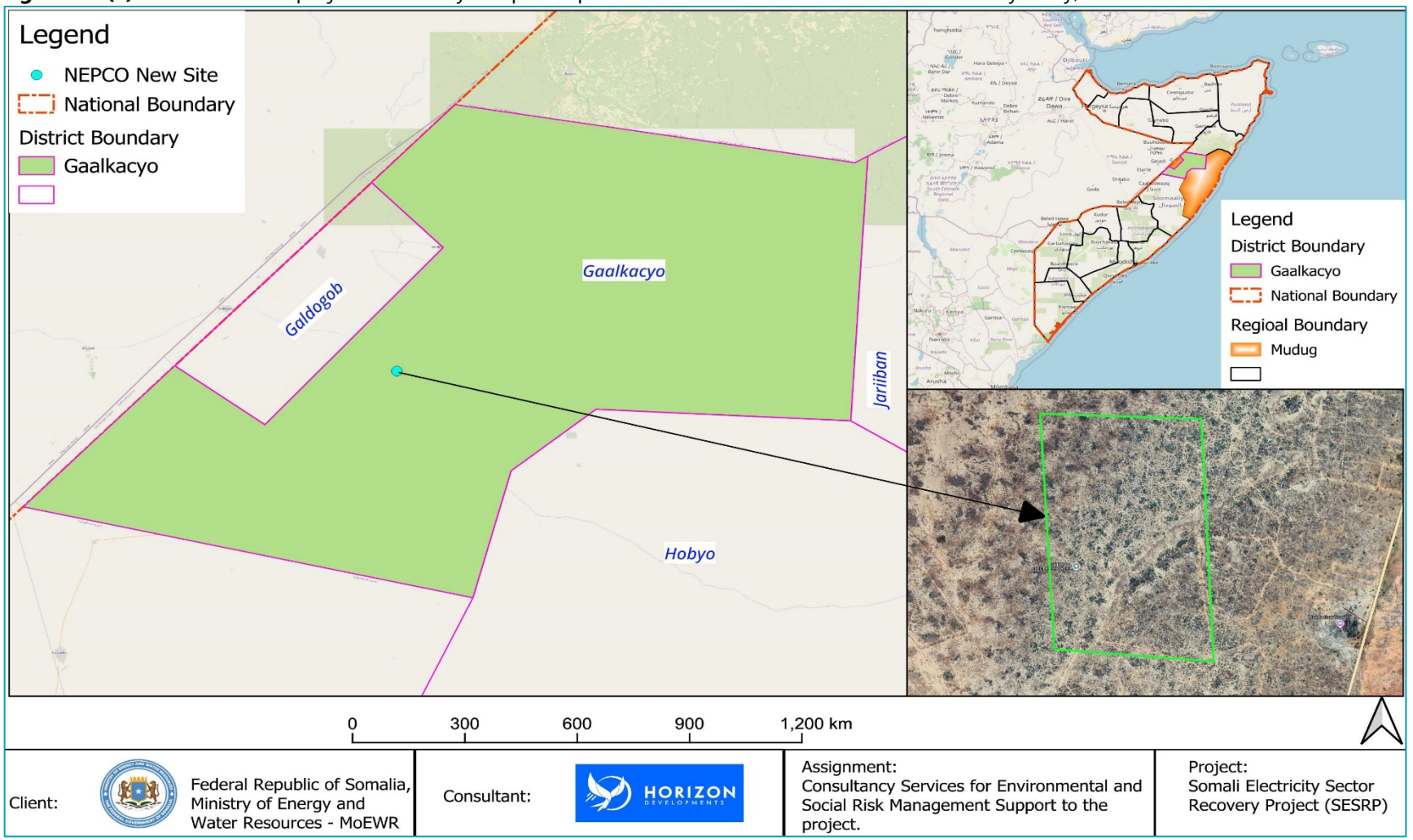
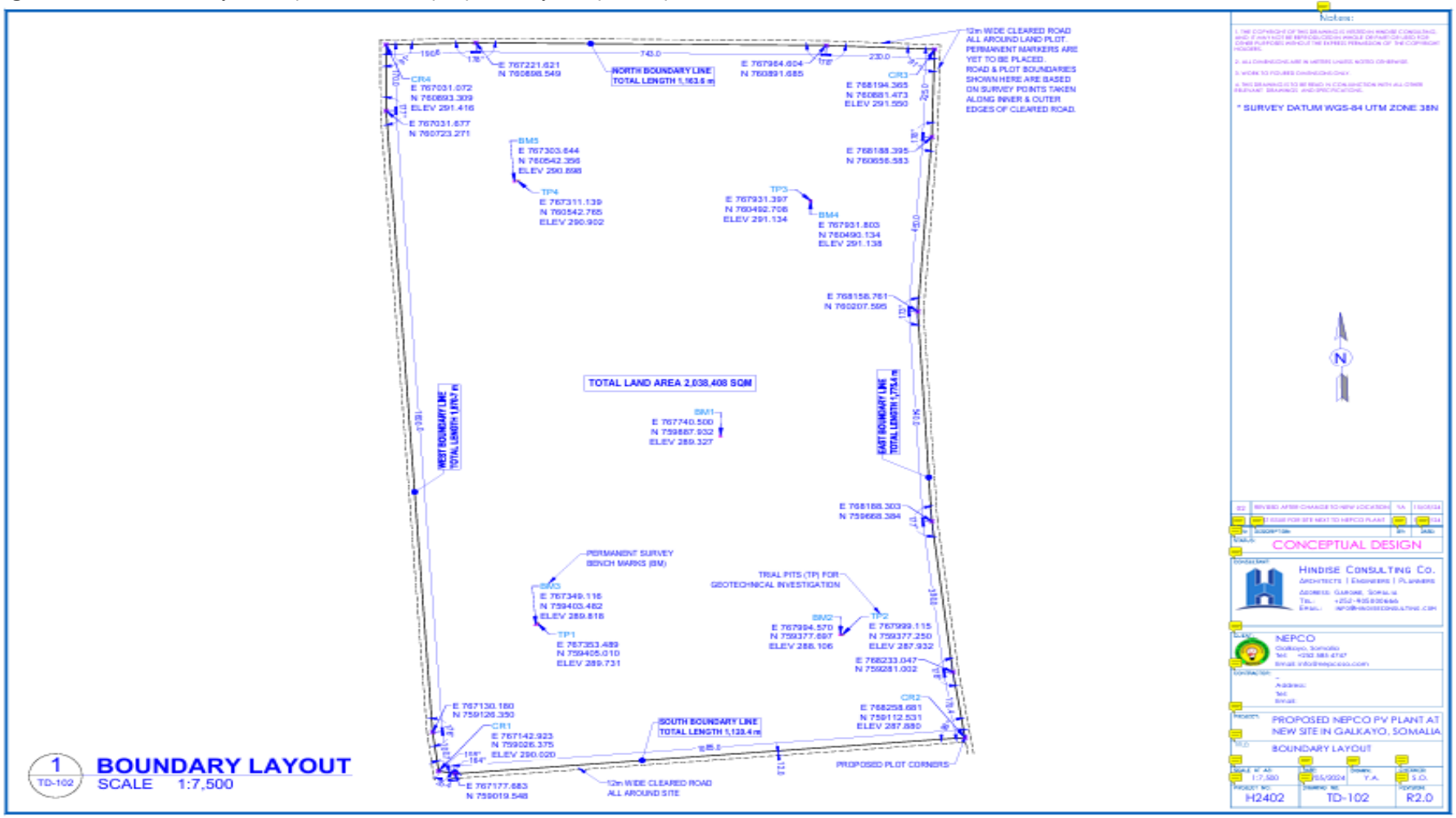


Figure 2-2(b): Boundary descriptions for the proposed hybrid power plant



2.3. PROJECT SITE AND SURROUNDINGS DESCRIPTIONS

Consultations with the local community indicated that the land is solely owned by NEPCO 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 NEPCO 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.

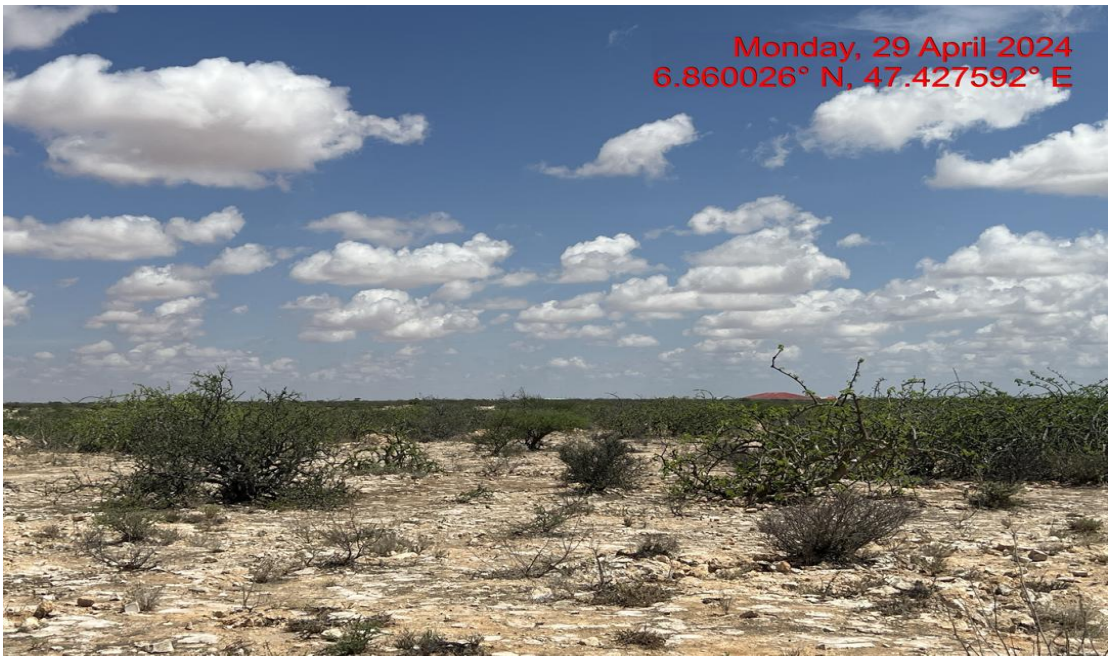


Plate 2. View of pockets of *Acacia-commifora* bushes observed during field visit at the project site

The proposed site for the hybrid power plant will be located in a sparsely populated area characterized by vast open spaces. The landscape is largely undeveloped, offering an ideal setting for the project's infrastructure with no relocations and displacement risks. However, NEPCO plans to construct a new road through the area, and this is expected to transform the land use dynamics by improving accessibility, potentially attracting new settlements, schools, and other social amenities. This development could promote local socio-economic opportunities, and will necessitate careful planning to balance community needs, land use priorities, and environmental management.

2.4. DESCRIPTION OF THE PROPOSED POWER PLANT

2.4.1. Overview

The feasibility study for the proposed project undertaken by MoEWR showed that NEPCO is a leading electricity service provider, especially in the northern sector of Gaalkacyo City with a customer base of 12,500 comprising mainly households (92.80%), small and medium sized businesses (6.88%), commercial and industrial (0.32%). There is an increasing number of large-scale consumers whose demand levels are determined after a comprehensive survey is done. Given the increasing electricity demand in the northern sector of Gaalkacyo City and the

surrounding areas, NEPCO needs to increase its capacity to generate and supply electricity in Gaalkacyo and surrounding areas.

Under the proposed new hybrid power plant, NEPCO 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) and batteries (second priority). Our analysis indicates that ESS5, ESS6 and ESS7 will not be triggered by the proposed investment in the new site. However, ESS8 may be relevant to the project, especially if there is a chance find particularly during construction phase of the project. In the event of a chance find triggering the WB-ESS8, especially during the construction phase, immediate measures should be implemented to ensure the protection of cultural heritage. First, construction activities should be halted near the find to prevent further disturbance. A qualified heritage specialist should be engaged to assess the significance of the find and determine the necessary steps for its protection, documentation, and preservation. The project team must notify relevant authorities and local communities about the discovery to facilitate transparent communication and compliance with legal obligations. A protocol should be established for future chance finds, including training for construction personnel to recognize potential artifacts or heritage sites. This proactive approach ensures that cultural heritage is respected and safeguarded, aligning with the objectives of ESS8 and promoting responsible development practices.

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 Puntland 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

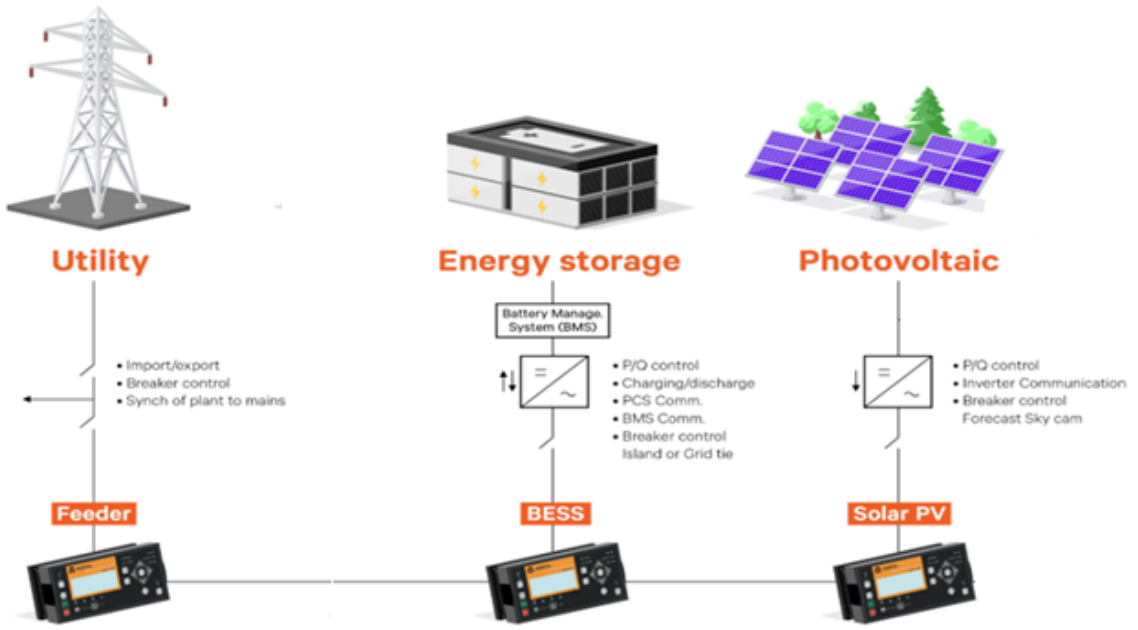
From the feasibility study analysis, scenario 2 of 50% REF (i.e., 3.5MWp (Solar Photovoltaic); 5MWh (Battery energy storage systems (BESS) - the lithium ion storage systems) has been recommended for detailed design. Given this scenario selection, the proposed location will be adequate to accommodate the proposed installation. Based on this analysis and from the environmental and social impacts perspectives, HD concluded and recommended that the proposed new site would be ideal for the planned investment to meet the required expectations of boosting production capacity.

From the feasibility study analysis, scenario 2 of 50% REF has been recommended for detailed design. Given this scenario selection, the current location cannot accommodate the expectation, and a new location that is about 9 km away from the current location has been proposed. The coordinates for this location are $6^0$43’54.3’’N, $47^0$26’10.8’’E. Based on this analysis and from the environmental and social impacts perspectives, HD concluded and recommended that the proposed new site 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. Figure 2.3 shows the schematic presentation of the proposed generation mix comprising of solar. The total proposed capacity, which the SESRP will invest, are as follows: 3.5MWp (Solar Photovoltaic); 5MWh (Battery energy storage systems (BESS) - the lithium ion storage systems); and 9 km of 33kv distribution network system from the power plant to the an existing substation

at the current NEPCO power (9km away). The existing sub-station will be upgraded to accommodate the additional 33kV from the proposed plant. The project financing will not be focusing on any kind of diesel generators as a source of power generation. 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 power plant has been completed.

Figure 2-3: Schematic presentation of the proposed hybrid power plant for NEPCO in Gaalkacyo City, Somalia



Modified from: https://www.vertiv.com/

2.4.3. Architecture and Basic Design Specifications

NEPCO has experienced annual load growth of 16% per annum for the last 6 years (between the years 2018 to 2023). This growth is expected to increase at a rate of 20% per annum considering the loads that NEPCO is targeting to connect in the next 2 years. Table 2.1 summarizes the customer base of NEPCO earmarked for connection in the next two (2) years.

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 power will be distributed to the customers by overhead lines. 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 guardhouse. 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 inverters are also connected.

Table 2-1: Patterns of NEPCO customer base growth over the last five years (from 2019)

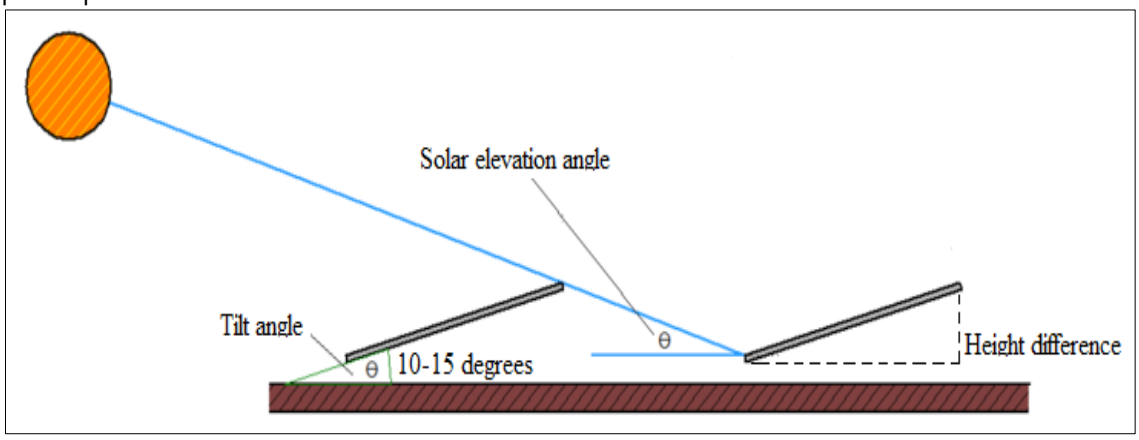
Year	Total of Customers	Customer Attrition	New customers connected	New Households Connected	New SMES connected	New C&Is connected	Overall % increase
2019	7,367	43	800	750	50	-	
2020	9,870	213	2,503	2,350	86	67	33.98%
2021	10,920	274	1,050	1,040	6	4	10.64%
2022	11,820	213	900	870	27	3	8.24%
2023	12,470	119	650	632	26	1	5.50%
Apr-2024	12,500	172	1,181	1,128	39	15	14.59%

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

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°-15° 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 solar PV 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 installed indoors with adequate air ventilation according to the manufacturer's recommendations. Thus, a powerhouse or a containerized solution, considering the equipment manufacturer's recommendations shall be installed. All electrical boards and LV protections will also 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. 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 25^0C 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).

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 transmission line (TL) that will be linked to the current NEPCO Hybrid Power Plant located in Gaalkacyo City before eventually being distributed to the consumers. All lines shall be over-head mounted on concrete poles or eco poles. NEPCO will seek way leaves for the TL lines which will run along road reserves and boundaries from the new power plant to the existing NEPCO sub-station. A right of way (RoW) of between 3 and 5m would be appropriate. 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 10-15 meters from the center of the transmission line to the nearest structure or vegetation. Every possible measures will be taken to ensure that the TL from the new power plant does 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 approximately 2km^2 piece of land located approximately 9km to the northern sector of Gaalkacyo City. The proposed project site is under the legal ownership of NEPCO (see Annex 11.1). 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. NEPCO also plans to construct a proper access road to the site during the construction and operation phases of the project. Additionally, NEPCO shall undertake to maintain the road during the entire project period.

2.6. PROJECT ACTIVITIES

A contractor selected through a bidding process shall undertake the final design and construction of the power plant. Construction will be supervised by NEPCO and MoEWR to ensure works are undertaken in accordance with specifications. This is to ensure quality work is achieved. It is anticipated that the proposed site will undergo alteration during construction to install the power plant and the associated structures. Some of the activities envisaged in this project include site clearance and levelling, civil works and construction of utilities and structures for the facilities, and installation and connection of the power plant.

2.6.1. Construction Phase Activities

All construction activities including ground preparation, earth moving, materials delivery, building, walling, roofing and the installation of amenities (power, water, communication equipment, etc.), fittings (doors, windows, safety provisions, etc.) will be carried out by competent personnel

obtained through contractors to ensure consistent high standard of finish and providing superb 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
- 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:

- building stones
- bus bars, switch gears, circuit breakers
- concrete mixers
- conductors
- electrical equipment
- excavators
- glass
- hardcore
- labour force (of both skilled and unskilled workers).
- lightning arrestors and steel structure members
- lorries
- meters

- paints, solvents, whitewash, etc.,
- plumbing equipment
- poles
- raw construction materials (sand, cement, natural building stone blocks, hard core, gravel, concrete among others).
- sand
- solar panels
- timber (e.g., doors and frames, fixed furniture, etc.),
- water
- welding machines, wheelbarrows

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 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.
- *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 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 both during construction and operation. The contractor will have to have portable diesel generators during construction for fabrication and welding where necessary but NEPCO will provide electricity for operations.

2.6.1.5. Construction supervision and safety

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

2.6.3. Decommissioning Phase Activities

NEPCO shall submit a decommissioning plan to relevant authorities in the 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 their associated switching equipment's
- Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power plan 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
- 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 finalized[11]. 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 the official on the grounds of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, handicap, religion, political opinion, occupation, or wealth shall subject no one to discrimination and that this prohibition applies to all official programs.

[11]Ministry 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.

- "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 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 NEPCO, 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 EHSG 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 and 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 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 approved by the Cabinet but not yet passed by Parliament. 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.

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

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 are 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 girls[13]. For example, a recent study on GBV in Somalia[14] found out that 18.5% of the women and girls in the IDP camps had experienced gender-based violence in the last 12 months. 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 Puntland State, considerable progress has been made by the Puntland State in addressing the GBV. For example, a 'Report of the Independent Expert on the Situation of human rights in Somalia', dated 6 September 2017, submitted to the United Nations Human Rights Council, stated: The Puntland Minister of Women and Human Rights Development explained that the Government had taken measures to protect women against sexual and gender-based violence, and described the progress made in their protection…In 2015, Puntland adopted the Puntland Rape Act, which facilitated the trial of rape cases in formal courts. Chapter 19 of the Rape Act, on the special duties of the prosecution authorities where the accused

[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.

is charged with a sexual offence, provides that the decision to prosecute the perpetrator of a sexual offence or any other offence under that law will be made by the Attorney General, not the complainant, and that the Somali Penal Code shall not apply to rape cases. It also provides that the prosecution authorities may establish specialized units with specialized[15]

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 cases[16]. 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, 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,

[15] https://land.igad.int/index.php/documents-1/countries/somalia/gender-4/897-women-fearing-gender-based-violence-2018/file

[16] 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%202.pdf for a review of the Penal Code (1962) provisions relevant to GBV.

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 it operations to the Somalia's Power Masterplan[17] 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 NEPCO 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 (NEPCO) has identified and designated a site for the proposed project, and the proposed project is aligned 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/m^2/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 tolerated[18]. Numerous cultural and institutional barriers limit women's access to justice, including fear of punishment, reprisals and harassment for reporting GBV incidents, and social stigma[19].

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 handline their relationships with all the stakeholders they engage in their areas of operation.*

[17] https://moewr.gov.so/wp-content/uploads/2020/07/Master_plan1.pdf
[18] 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.
[19] UNDP, UN Women, and UNFPA, 2018.

- *The land proposed for the project has been legally acquired by NEPCO under willing buyer-willing seller. Additionally, the land's tenure falls under customary land rights. NEPCO 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.*

3.2. Puntland State Laws and Regulatory Framework

3.2.1. Overview

Puntland 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 Puntland 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 Puntland State shall be applicable to the proposed project:

3.2.2. Puntland State Rangeland Management Policy (2016-2025)

The Puntland Rangeland Management Policy 2nd Edition (2016-2025) outlines a strategic framework to sustainably manage and rehabilitate rangelands in Puntland, Somalia. The policy emphasizes the protection of natural resources, restoration of degraded lands, and sustainable pastoral livelihoods. It promotes community participation, equitable resource access, and collaboration among stakeholders, including government, local communities, and development partners. The policy also addresses climate change adaptation, drought resilience, and the importance of environmental conservation for the long-term productivity of rangelands, aiming to balance ecological integrity with socio-economic needs.

Relevance

The Puntland State Rangeland Management Policy is crucial for the proposed hybrid power plant in Gaalkacyo, as it emphasizes sustainable land use and natural resource management. Aligning the project with the policy's objectives, such as minimizing land degradation and ensuring local pastoralist communities' protection, supports sustainable development goals.

3.2.3. Puntland State Waste Management Policy (2006)

The Puntland Waste Management Policy (2016) provides a comprehensive framework aimed at addressing waste management challenges in Puntland, Somalia. It emphasizes the need for effective waste collection, transportation, and disposal systems, with a focus on minimizing environmental pollution and health hazards. The policy promotes waste reduction, recycling, and the safe handling of hazardous materials, while encouraging community participation and private sector involvement in waste management initiatives. It also seeks to strengthen institutional capacity, legal frameworks, and public awareness to foster sustainable waste management practices that protect both human health and the environment.

Relevance

The policy emphasizes waste reduction, proper handling, and disposal of hazardous materials, and the importance of minimizing pollution. By adhering to these guidelines, the power plant can manage its waste streams responsibly, prevent environmental contamination, and align with best practices for waste management. This alignment not only helps in complying with regulatory requirements but also supports broader environmental protection goals and contributes to sustainable development in the region.

3.2.4. Puntland State ESIA Act and Regulation (2016)

The Puntland 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 Puntland, Somalia. The act mandates that all significant projects undergo an ESIA process to identify potential adverse effects on the environment and communities before they are approved. It sets guidelines for public participation, environmental protection, and social safeguards, ensuring that projects align with sustainable development goals. The act also strengthens the role of regulatory authorities in monitoring compliance and enforcing mitigation measures to minimize negative impacts on natural resources and local populations.

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 Puntland.

3.2.5. Puntland State Climate Change Strategy (2016)

The Puntland Climate Change Strategy (2016) outlines a comprehensive plan to address the impacts of climate change in Puntland, Somalia, by focusing on adaptation and mitigation measures. The strategy emphasizes strengthening the resilience of communities, particularly those dependent on pastoralism and agriculture, by promoting sustainable land and water management practices. It prioritizes climate-smart approaches, such as reforestation, renewable energy, and disaster risk reduction, while enhancing institutional capacity and policy coordination. The strategy also highlights the importance of research, data collection, and public awareness to better understand climate risks and implement effective responses, contributing to long-term environmental sustainability and socio-economic stability.

Relevance

The strategy emphasizes the need for integrating climate resilience into development projects, promoting renewable energy, and reducing greenhouse gas emissions. By aligning the power plant with these strategic goals, the project can enhance its climate resilience, contribute to reducing carbon footprints, and support sustainable energy solutions. This alignment not only complies with regional climate goals but also strengthens the project's overall sustainability and environmental stewardship.

3.2.6. Puntland State Ministry of Environment and Climate Change Strategic Plan (2016-2020)

The Puntland Ministry of Environment and Climate Change Strategic Plan (2016-2020) sets a roadmap for safeguarding the region's environment and addressing climate change through sustainable resource management and policy implementation. The plan focuses on enhancing institutional capacity, strengthening environmental governance, and promoting climate adaptation and mitigation strategies. Key priorities include biodiversity conservation, combating land degradation, and advancing renewable energy and waste management solutions. The strategy also emphasizes community involvement, stakeholder collaboration, and raising public

awareness to foster sustainable development while improving resilience to climate change and environmental challenges across Puntland.

Relevance

The plan focuses on enhancing environmental governance, promoting sustainable resource management, and improving climate resilience, which are essential for ensuring that the power plant's development aligns with these objectives. By integrating the strategic priorities of the plan, such as effective environmental monitoring and stakeholder engagement, the project can better manage its environmental impacts, adhere to regulatory requirements, and contribute positively to regional sustainability and climate goals.

3.2.7: Puntland State Environmental Policy (2014)

Puntland's Environmental Policy (2014), approved by the Cabinet and Parliament, establishes a foundational framework for the protection, conservation, and sustainable use of natural resources in Puntland, Somalia. The policy focuses on addressing environmental degradation, promoting biodiversity conservation, and ensuring the sustainable management of land, water, and forests. It advocates for integrating environmental considerations into all development plans and projects while enhancing institutional capacities to enforce environmental regulations. The policy also encourages community participation, public awareness, and partnerships with various stakeholders to foster sustainable development and resilience to environmental challenges, such as desertification and climate change.

Relevance

The policy emphasizes the need for balancing economic growth with environmental protection, particularly in the energy sector. It outlines guidelines for minimizing environmental impacts, promoting renewable energy, and ensuring community participation in decision-making processes.

3.2.8: Puntland State Environmental Management Act (2016)

Puntland's Environmental Management Act (2016), approved by the Cabinet, provides a legal framework for the protection, conservation, and sustainable management of the environment in Puntland, 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 Puntland'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 prokect 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

ESS	Triggered?	Relevance
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

The World Bank and the Federal Government of Somalia share a common objective of ensuring sustainable development through environmental and social governance in power energy projects. However, their frameworks differ in scope and enforcement mechanisms. The World Bank's Environmental and Social Framework (ESF) provides comprehensive guidelines, such as Environmental and Social Standard 1 (ESS1), which mandates detailed environmental and social assessments (ESIAs) to identify, evaluate, and mitigate risks. It emphasizes stakeholder engagement, biodiversity protection, and community well-being. Conversely, Somalia's environmental legislation, while aligned with similar principles, is relatively nascent and focuses

on national priorities under frameworks such as the Puntland Environmental Policy and Environmental Management Acts. Overall, Somalia's regulatory enforcement capacity may face challenges due to limited institutional infrastructure and resources. The World Bank's standards often act as a complement, setting higher benchmarks and providing funding-linked compliance incentives, fostering alignment between global best practices and local regulatory requirements. 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	• 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	• 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	• 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 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. (5) The Federal Government, in	• **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
	consultation with the Federal Member States and other stakeholders, shall regulate land policy, and land control and use measures (Art. 43).		
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 The policy requires these groups to be consulted separately to enhance their participation	• 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.	• **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	WB policy more elaborate and the two are being used to compliment
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	• 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.	• Both are similar	Consultation has been done and will be progressed in line with the two WB policy and FRS legislations.

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 assessment[20].

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 UNCCD[21].

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.

[20]The Somalia National Adaptation Programme of Action: https://www.wiomsa.org/download/national-adaptation-programme-of-action-somalianapa/

[21]The 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

3.4.4. 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.

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 Puntland 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.

Relocation option to a different site is an option available before the project implementation. However, at present NEPCO does not have alternative sites in the general direction of the proposed sites. Looking for alternative land to accommodate the scale and size of the proposed project and completing transaction may take a long time with no guarantee that the land would be available. The proposed project is meant to improve electrification and accessibility to an already established customers/consumers in Gaalkacyo City, and the surrounding areas. Several alternatives to supply reliable electricity were considered but the proposed project was selected because it met the electrification needs of the City and surrounding areas. In consideration of the above concerns and assessment, relocation of the proposed project to a different area is NOT a viable option.

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 both to NEPCO and the increasing customers in Gaalkacyo 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 partly 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 Puntland 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 NEPCO to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to Gaalkacyo City and surrounding areas.

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 Gaalkacyo 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 NEPCO electricity generation sites. 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 Puntland State. Wind energy is more variable and unpredictable because wind speeds tend to fluctuate significantly within short time frames, leading to inconsistent power generation[22,23,24,25]. 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[26,27,28]. 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.

[22]Archer, C. L., & Jacobson, M. Z. (2005). Evaluation of global wind power. Journal of Geophysical Research: Atmospheres, 110(D12). https://doi.org/10.1029/2004JD005462
[23]Rawn, 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
[24]Holttinen, H. (2005). Hourly wind power variations in the Nordic countries. Wind Energy, 8(2), 173-195. https://doi.org/10.1002/we.144
[25]Sorensen, P., & Cutululis, N. A. (2004). Variability and predictability of large-scale wind energy production. Risø National Laboratory.
[26]Kaldellis, 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
[27]Hansen, 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
[28]López, 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

4.5. ANALYSIS OF ALTERNATIVE CONSTRUCTION MATERIALS AND TECHNOLOGY

The proposed Hybrid Power Plant will be constructed using modern, locally and internationally accepted materials to achieve public health, safety, security and environmental aesthetic requirements. Because of its durability and strength, steel is the best choice and all support structures will be steel for the solar panels.

4.6. SOLID WASTE MANAGEMENT ALTERNATIVES

A lot of solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent (NEPCO) will give priority to reduction at source of the materials. This option will demand a solid waste management awareness program in the management and the staff. Recycling and reuse options of the waste will be the second alternative in priority. This will call for a source separation program to be implemented. The third priority in the hierarchy of options is combustion of the waste that is not recyclable. Finally, the NEPCO will need to establish partnership with waste handlers in Gaalkacyo City for regular waste removal and disposal in an environmentally friendly manner. This is the most practical and feasible option for solid waste management.

4.7. SELECTED ALTERNATIVES

The analysis compared the existing power plant location for a new hybrid power infrastructure with a new site 9km away, which offers sufficient space for expansion. The current location would minimize relocation costs and leverage existing infrastructure, but space constraints could limit future growth and operational efficiency. The new site offers optimized layout and future scalability, but may involve additional costs and increased transmission losses. The transmission line has been selected based on factors like distance, cost, grid stability, capacity needs, terrain, geographical constraints, and technical complexity. A hybrid energy system was chosen over a purely solar power plant for reliable and stable energy supply. The Battery Energy Storage System (BESS) maximizes renewable energy use while ensuring grid stability and reliability, leveraging existing infrastructure.

Conclusion

A hybrid power plant was located approximately 9km from the existing NEPCO Hybrid Power Plant was selected for consideration. It is therefore imperative for NEPCO to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to Gaalkacyo 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 (6^{O}43'54.3''N, 47^{O}26'10.8''E) shall be located in the outskirts of Gaalkacyo City, Puntland State within the north-eastern Somalia. The project site is in an open area with sparse settlements in the immediate vicinity with 2km^2 piece of land acquired by NEPCO 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 Puntland 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 highlands[29]. North-easterly and south-easterly air masses meet in the

[29] 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

Intertropical Front (ITF) and raise air upwards to produce rain. The annual movements of the ITCZ from north to south across Africa and back again, give rise to four different seasons in the State like rest of Somalia, comprising two distinguishable rainy seasons alternating with two marked dry seasons[30], 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 Puntland 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 Puntland 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).

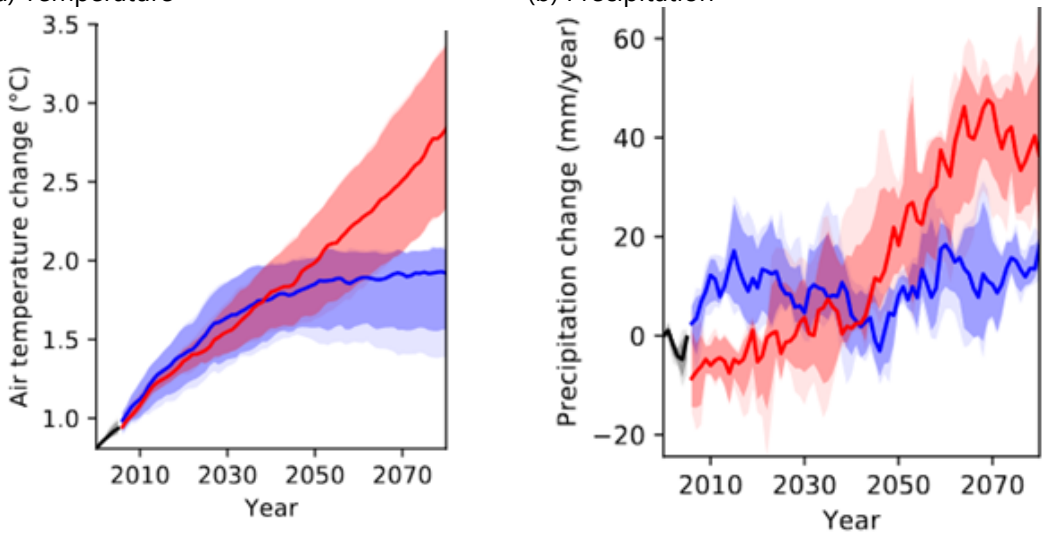
5.2.1.2. Temperature

The climatic conditions of Galkayo, Puntland State in Somalia are influenced by its geographic location and topography, resulting in a semi-arid to arid climate. Galkayo 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 day[31]. 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 Puntland 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 scenario[32] (Figure 5-1a).

[30] 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
[31] 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].
[32] 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

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

(a) Temperature (b) Precipitation



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

5.2.1.3. Air Quality

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

5.2.1.4. Topography and Features

The topography of the Galkayo area of Puntland State in Somalia is diverse and varied, consisting of plains, plateaus, hills, and low mountains[33]. Large expanses of flat or gently rolling plains characterize much of the area. These plains are often arid or semi-arid, supporting sparse vegetation such as thorny shrubs and grasslands. Plains are important for pastoralism and some limited agricultural activities where water sources are available. Scattered hills and low mountains occur, particularly in the northern and eastern parts of the Galkayo area. These hills and mountains are often rocky and rugged, influencing local weather patterns and providing habitats for wildlife. Although water sources are generally scarce, there are some seasonal river valleys in Puntland State that provide vital water resources and support vegetation along their banks, especially during wet seasons. In some parts of Puntland State, particularly towards the south and west, the landscape transitions into more desert-like conditions with sand dunes and sparse vegetation.

5.2.1.5. Geology and Soils

The geology and soils of the Gaalkacyo area of Puntland State in Somalia are influenced by its location within the East African Rift System and its semi-arid to arid climate. The area lies within the broader East African Rift, which is a tectonic plate boundary characterized by volcanic activity, faulting, and rift valleys[34]. This geological setting has influenced the area's landscape and the types of rocks found there. The soils in Galkayo area are generally sandy, sandy-loam, or loamy in texture, reflecting the arid to semi-arid climate. These soils are often low in organic matter and nutrients, making agricultural productivity challenging without proper management and irrigation. Along river valleys and floodplains, there are alluvial soils that are more fertile and suitable for agriculture, and are periodically replenished by sediment deposits during floods. The Gaalkacyo area and the entire Puntland State is believed to have potential

[33]Central Intelligence Unit (CIA), "Somalia," CIA World Factbook, 2024. [Online]. Available: https://www.cia.gov/the-world-factbook/countries/somalia/. [Accessed May 5, 2024].
[34] https://www.faoswalim.org/resources/Land/Geology_Mineral_Resources_Somalia/Geology.pdf

mineral resources such as gypsum, limestone, and possibly oil and gas deposits. However, exploration and extraction activities have been limited due to the challenging security situation and infrastructure constraints.

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

5.2.1.6. Water Resources and Hydrology

Galkayo relies heavily on groundwater sources due to limited surface water availability. The area has significant groundwater potential, with aquifers varying in depth and quality[35]. Deep aquifers can provide relatively stable water resources, but accessing them often requires drilling boreholes. Many communities rely on shallow wells for their water needs that are in many occasions susceptible to fluctuations in water levels and quality, especially during dry seasons. Several seasonal rivers and streams flow in Gaalkacyo area during the rainy seasons (Gu and Deyr). These seasonal rivers form tributaries of the Shebelle River, and provide water for irrigation and domestic use when flowing[36]. Rainwater harvesting is practiced with traditional methods such as surface water catchments and small reservoirs, which are used to capture and store rainwater for domestic and agricultural purposes. Overall, water scarcity is a pervasive issue in Gaalkacyo, and this is exacerbated by erratic rainfall patterns and prolonged droughts. Water quality is often poor due to contamination from human and livestock activities, as well as limited sanitation infrastructure. Local communities often rely on traditional water management practices and community-led initiatives to conserve water resources, and various international organizations and NGOs support water infrastructure projects, including drilling

[35]Federal Republic of Somalia, "National Adaptation Programme of Action on Climate Change (NAPA)," Federal Republic of Somalia, 2013.
[36] [2] Somalia Water and Land Information Management, "The Juba and Shabelle rivers and their importance to Somalia," Food and Agriculture Organization (FAO), 2024. [Online]. Available: https://www.faoswalim.org/article/juba-and-shabelle-rivers-and-their-importance-somalia. [Accessed 23 May 2024].

boreholes, rehabilitating wells, and promoting sustainable water management practices in Gaalkacyo area.

5.2.2. Biophysical Environment

5.2.2.1. Flora and fauna

The northern outskirts of Gaalkacyo City, Somalia, is characterized by sparse vegetation adapted to the region's semi-arid climate. Dominant plant species include hardy shrubs such as Acacia and Commiphora, which are well-suited to the dry environment with deep roots to access groundwater and small leaves to minimize water loss. These shrubs provide essential cover and forage for local wildlife. Grasses, such as *Cenchrus ciliaris* (buffel grass), are also common, particularly after seasonal rains. Other notable flora includes drought-resistant plants like Aloe and Euphorbia, which have adapted to store water in their thick, fleshy leaves. These succulent species are often found in rocky areas and can survive long dry spells. The vegetation in this region plays a crucial role in preventing soil erosion and supporting the local ecosystem, though overgrazing and human activity can threaten the delicate balance of this semi-arid landscape. Despite its sparse appearance, the flora in Gaalkacyo's outskirts provides essential ecological functions, supporting both wildlife and livestock.

Varieties of wild fauna adapted to the region's semi-arid climate are found in the northern outskirts of Gaalkacyo City. Notable mammals include Salt's Dik-dik (*Madoqua saltiana*), Abyssinian Hare (*Lepus habessinicus*), Leopard Tortoise (*Stigmochelys pardalis*), and a variety of resident bird species, including the Somali ostrich (*Struthio molybdophanes*), various bustards (*Otis spp.*); and hornbills, which are commonly found in dry, open environments. Reptiles are well-represented in the region, with species such as the desert monitor (*Varanus griseus*) and spiny-tailed lizard (*Uromastyx spp.*) well-adapted to the harsh desert climate. Venomous snakes, including the horned viper (*Cerastes cerastes*) and saw-scaled viper (*Echis spp.*) are also common in these arid habitats. Additionally, a variety of invertebrates, such as scorpions and desert beetles, thrive in this environment. Overall, the fauna in the northern outskirts of Gaalkacyo has evolved to withstand the challenges of a semi-arid landscape, relying on limited water sources and sparse vegetation for survival.

5.2.2.3. Vulnerability to Climate Change

Gaalkacyo 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 floods pose significant threats to water availability, agriculture, and livestock, crucial for pastoralist communities. Droughts are increasing, leading to water scarcity, crop failure, 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 400C is likely to increase in South Central Somalia including Puntland

State. Each year, by the 2030s, the region could experience between 4 and 30 days of temperatures exceeding this threshold, predominantly during February-April[37,38].

5.2.2.4. Waste Management

Waste management in Gaalkacyo City, Somalia, is characterized by informal and underdeveloped systems, reflecting broader challenges in infrastructure and governance. The city lacks a comprehensive and organized waste collection and disposal service, with most solid waste being managed at the household or community level. Informal waste collectors play a key role, though they operate without regulation or proper facilities. Much of the waste, including plastic, organic matter, and hazardous materials, is disposed of in open dumpsites or burned, contributing to environmental degradation and public health risks. Recycling efforts are minimal, and there is little public awareness or institutional support for sustainable waste management practices. Additionally, the lack of designated landfill sites and proper waste treatment facilities further exacerbates the issue, and potentially leading to the contamination of soil and water resources, and increasing the city's vulnerability to diseases and pollution. Addressing these challenges requires improved infrastructure, policy enforcement, and community engagement.

5.2.2.5. Water Scarcity and Flood Risk

The northern outskirts of Gaalkacyo City, Somalia, face a dual challenge of water scarcity and flood risks, both exacerbated by the region's semi-arid climate and irregular rainfall patterns. Prolonged droughts are common, leading to depleted groundwater resources, reduced access to safe drinking water, and the drying up of seasonal rivers and water catchments. This water scarcity severely affects agriculture, livestock, and the livelihoods of local communities. However, when rains do occur, they are often intense and erratic, causing flash floods that the area's limited drainage infrastructure cannot handle. These floods damage roads, homes, and farmland, while also contaminating water supplies and increasing the spread of waterborne diseases. The combination of droughts and flash floods creates a precarious water management situation, highlighting the need for resilient infrastructure, improved water harvesting techniques, and flood preparedness strategies to mitigate these risks.

5.2.2.6. Agricultural Land Soil Contamination

Agricultural land contamination in the northern outskirts of Gaalkacyo City, Somalia, is a growing concern due to a combination of factors including improper waste disposal, use of chemical fertilizers, and industrial activities related to infrastructure development. The area, traditionally reliant on pastoralism and small-scale farming, faces the threat of soil degradation, which affects crop yields and food security. Contamination from construction projects, particularly dust and potential chemical spills, can impact soil health and water sources. While large-scale studies are limited, anecdotal evidence from local farmers indicates a gradual decline in soil fertility, prompting calls for better environmental management and monitoring.

5.2.2.7. Land Use and Land Cover Characterization

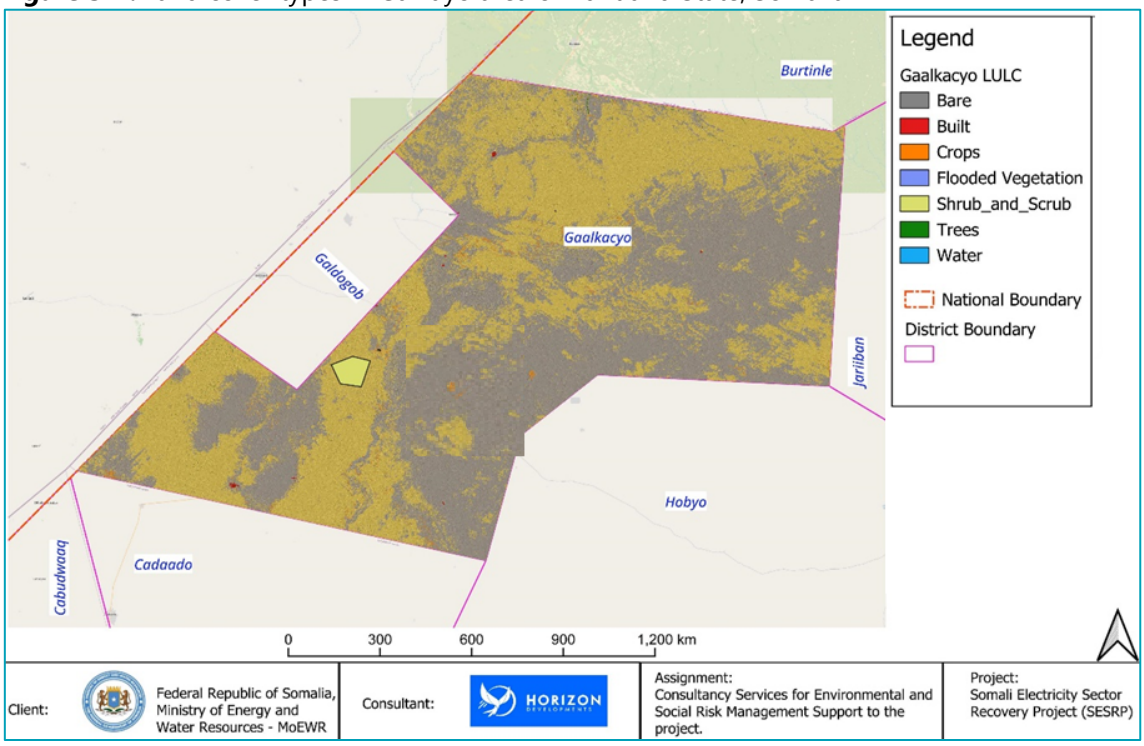
Land use and land cover in the Galkayo area of Puntland State of Somalia (Figure 5-2) are influenced by factors such as climate, geography, and human activities. The dominant land use in Galkayo area like much of Puntland State is pastoralism, where nomadic or semi-nomadic

[37]Gutiérrez, 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/.

[38]World Bank. (2024). Health and Climate Change. https://www.worldbank.org/en/topic/health/brief/health-and-climate-change

communities rely on livestock (such as camels, cattle, goats, and sheep) for their livelihoods. Grazing lands are essential for these communities, and they often move seasonally in search of water and pasture. Agriculture is practiced in some areas where water is available, primarily along river valleys and floodplains[39]. Crops such as sorghum, maize, and vegetables are grown, though productivity is often limited by water scarcity and soil fertility. Galkayo as an urban area has more concentrated infrastructure and population compared to the rural areas. Many rural communities are dispersed across the landscape, often organized around traditional clan structures. Settlement patterns are influenced by access to water sources and grazing lands.

Figure 5-2: Land cover types in Galkayo area of Puntland State, Somalia



5.2.2.8. 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 Galkayo area of Puntland State experiences environmental management challenges. Soil erosion is a significant issue in Galkayo, 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 Galkayo, 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 Puntland State governments are working towards better environmental governance through the enactment of environmental legislation and regulations and enforcement mechanisms.

[39] UNOCHA, "Humanitarian Needs Overview of Somalia,". Available: https://reliefweb.int/sites/reliefweb.int/files/resources/20200903_HNO_Somalia.pdf. [Accessed 22 May 2024].

5.3. SOCIO-ECONOMIC SETTING

5.3.1. Overview

Puntland State like all other regions in Somalia that face socioeconomic challenges. Puntland 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

Puntland State, with an estimated population of 2.5 million people[40]. The northern sector of Gaalkacyo City within Puntland State, is a dynamic and diverse area with a rapidly growing population due to urbanization and migration from rural areas. The population is predominantly composed of ethnic Somali clans, with a mix of pastoralists, small-scale farmers, traders, and laborers. This part of the city has seen a rise in informal settlements, largely driven by displaced persons seeking refuge from conflict and climate-related challenges. The demographic profile is youthful, with a high proportion of individuals under the age of 30, and there are increasing demands for services such as education, healthcare, and employment. Social structures are clan-based, influencing local governance and community organization. Like in the rest of Puntland State, the households in Gaalkacyo City are predominantly male headed at 58 per cent with 42 per cent of the households being female headed with average size of households being six (6) people[41].

5.3.2. Women and Human Rights

Inequality and human rights issues persist in Somali society, with women, minority groups, and caste groups excluded from politics and the economy. Despite progress in women's political representation, socioeconomic barriers still hinder their participation in the economic sector. Gender-based violence remains a significant concern, with high levels of domestic violence and rape. Women and children are particularly vulnerable to climate change consequences, and Somalia is a source, transit, and destination country for human trafficking. Women in Puntland State face numerous challenges, including domestic violence, vulnerability to shocks, insecurity, and limited access to education and skills.

5.3.3. Administration and Ethnic Groups

The northern sector of Gaalkacyo City, Somalia, is characterized by a complex administrative structure influenced by local clan dynamics and historical governance challenges. The area falls under the jurisdiction of the Mudug region of Puntland State, and is overseen by local authorities that often operate in collaboration with clan leaders to maintain order and address community needs[42]. Overall, today, Puntland's clan structures shape the social and political systems of the state. These systems are based on power-sharing between eleven clans: the ten clans of Salebaan, Sacad, Cayr, Duduble, Mareexaan, Mururšade, Dir, Suruur, Wacaysle, Sheekhaal plus several smaller clans, such as the Madhibaan, Tumaal, and Haskul that together are considered as one group. This eleven-clan arrangement is a bit controversial and some argue that it only serves the interest of a few powerful clans. However, this clan-based system shapes political representation,

[40] file:///C:/Users/pc/Downloads/Puntland%20State%20Development%20Plan%20(GSDP-3)%20-%202023-2025.pdf
[41] Somalia National Bureau of Statistics (Formerly Directorate of National Statistics, Federal Government of Somalia), Somali Health and Demographic survey - Puntland Report 2021.
[42] Safeworld. (June, 2020). Clans, consensus and contention: Federalism and inclusion in Puntland. Accessed, https://www.saferworld-global.org/resources/publications/1257-clans-consensus-and-contention-inclusion-and-federalism-in-Puntland.

resource allocation, and conflict resolution, often leading to a blend of traditional and formal administrative practices. The interaction between these clans contributes to the region's vibrant cultural identity, while also presenting challenges in terms of unity and stability.

5.3.4. Economy and Poverty

5.3.4.1. Local Economy

The local economy of the northern sector of Gaalkacyo 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 Gaalkacyo 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.

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

Puntland 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 Puntland State.

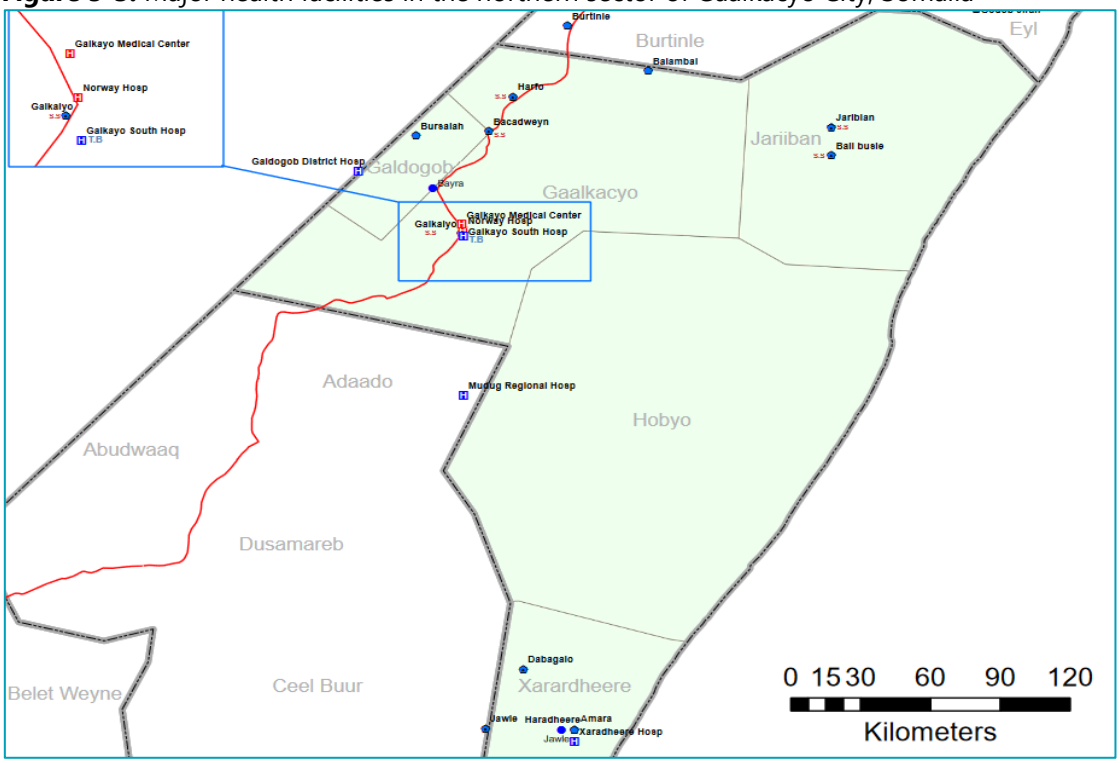
5.3.4.2. Health Sector

The health sector in Puntland State is in a recovery and rehabilitation phase, with limited public health service delivery and a large private sector delivering an estimated 60% of health services. Humanitarian health services are provided by numerous NGOs with funding from various sources. The revised Essential Package of Health Services (EPHS) focuses on six key areas, including access to care, reproductive, maternal and new-born health, and non-communicable diseases. Childhood malnutrition remains a challenge, and immunization coverage is very low, indicating the need for urgent steps to expand immunization services. The limited fiscal space of the government budget

is a challenge, and the FMoH has proposed a stepwise rollout of the EPHS in Somalia. Urbanization is happening at a rapid pace, and private providers have responded to the demand by establishing service delivery outlets.

Several hospitals and health facilities exist in the northern sector of Gaalkacyo City – the proposed project location. Some of the major health facilities include Gaalkacyo Hospital, Norway Hospital and Gaalkacyo South Hospital (Figure 5-3).

Figure 5-3: Major health facilities in the northern sector of Gaalkacyo City, Somalia



5.3.4.2. Transport Sector

Puntland State's transportation infrastructure is facing several challenges, including poor road conditions, lack of maintenance and restoration, shortage of qualified personnel, inadequate aviation equipment, absence of legislation and policy frameworks, insufficient capacity of line ministries, privately owned airports, a unified system for transport-linked registration, and inadequate investment. The paved roads in the state make transportation difficult and time-consuming, while the absence of legislation and policy frameworks hinders the development of infrastructure. The absence of a unified system for transport-linked registration and the presence of privately-owned airports in some districts further exacerbate the situation.

5.3.4.2. Housing Sector

Access to adequate housing is a growing challenge in Gaalkacyo City, and in the entire Puntland State, where many urban dwellers, including IDPs, women-headed households, refugee returnees, persons with disabilities, and youth, live in precarious conditions. The region shares Somalia's public and private housing stock, which has been largely destroyed after over three decades of conflict. Adequate housing is not affordable, especially for IDPs and the urban poor, and they often settle in informal, unplanned settlements with inadequate housing. These settlements are often controlled by gatekeepers, and many have turned into urban slums. Overall, IDPs are not

homogenous in their displacement history, with many having been displaced during different phases of conflict, clan conflict, drought, famine, or natural disasters. Forced evictions and repeated displacements further exacerbate the situation.

5.3.4.2. Information, Communication and Technology

The ICT sector in the Puntland State is primarily driven by private sector investment from Somali entrepreneurs and international expertise. This has resulted in a flourishing telecommunication industry, with mobile banking and wireless internet access easily available to customers. ICT is the third-largest industry in Somalia, contributing significantly to job creation and income generation. Broadband wireless services are offered in major cities, with unlimited internet access priced cheap. Satellite internet has also experienced steady growth, particularly in remote areas where other online services are not available. Overall, Puntland State faces challenges in establishing and expanding ICT services due to lack of basic infrastructure, limited access to finance, weak legal and regulatory framework, limited investment in research and development, and low literacy and ICT skill levels among the population, which hinders innovation and the development of new products and services.

5.3.4.2. Education

The education sector in Puntland has faced severe challenges due to the civil war, with most of public schools destroyed or closed. However, school enrolment has increased, and there have been efforts to rebuild the education system with the support of the global partnership on Education (GPE). The lack of national sector policies and weak institutional frameworks have led to private sector financing of educational institutions, resulting in different curriculums and standards. The conflict has also had a severe effect on access to education, with low adult literacy rates and low enrolment rates for primary and secondary schools, particularly for girls. Despite the challenges, significant progress has been made, especially in school enrolments with a general increase in trends over the period 2020-2023 (Table 5-1). However, despite the progress, significant geographical and gender disparities still remain, with urban residents having the best education indicators and nomadic populations being the worst.

Table 5-1: Gross enrolment rates by educational level in Puntland State

Educational levels	Year			
	2020	2021	2022	2023
Primary students	20,409	30,130	37,650	80,626
Secondary students	7,921	9,351	9,001	11, 657
School-age population	113,275	116,312	122,010	125,076

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

5.3.4.2. Water, Sanitation and Hygiene

Puntland 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 people[43] currently face an acute water crisis in Puntland, and the delayed onset of rains has worsened drought conditions. The government has made efforts in financing

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

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 Puntland 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 entities using diesel generators becoming primary energy sources. 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 NEPCO Hybrid Power Plant is a hybrid power plant generating electricity from both thermal and solar power. Overall, it is currently generating over 10 megawatts mainly from thermal source serving mainly the northern sector of the Gaalkacyo City. The NEPCO Hybrid Power Plant is connected to the grid system to supply Galkayo and surrounding areas through high-voltage transmission lines. The NEPCO Hybrid Power Plant has launched solar electricity generation in an effort to address the growing demand for clean, dependable energy in Galkayo and the surrounding areas. Presently the facility has no appointed independent consultant for the monitoring and supervision of quality, environment and safety-related aspects. Presently, all supervision and monitoring of environmental and safety-related matters are handled mainly by the NEPCO management.

5.3.6. Proposed Project Impact on the Local Economy

The proposed project aims to boost the energy sector in the FRS and Puntland State, promoting economic growth and investment. It will benefit SMEs, local manufacturing, and provide temporary jobs for local residents, IDPs, urban poor, and migrant workers. The infrastructure will also benefit women's micro, small to medium-scale trading through better availability, quality, and lower costs. Family members engaged in the project's construction work can use income for trading activities, and remittances can be easily brought into the local market. More investment and trade facilitated by affordable and reliable electricity supply will generate tax revenues for the Puntland Regional Authority, which can use it for operations and basic service delivery.

5.3.7. Security and Conflict Environment.

Security and conflict management in the northern sector of Gaalkacyo City, Somalia, are complex and influenced by a history of clan rivalries and socio-political tensions. The region has experienced intermittent violence, often related to disputes over resources, land, and political representation, making safety a pressing concern for residents. Another issue related to conflict is the status of the city of Gaalkacyo. Tension between the two sides of Gaalkacyo has precipitated violent conflicts and the scars of the war are still visible. While Gaalkacyo is still divided and has two different mayors, appointed by Puntland and Puntland, the city has formed joint committees from both sides. These include a youth committee, a committee of the elderly (both men and women), security forces known as *iskudhafka ciidamada nabadgelyada* (integrated, joint security forces), a committee of businesses, and peace pioneers. Each committee is comprised of members from the Puntland and Puntland sides of the city[44]. These committees were formed to advance reconciliation processes and social harmony in the city and beyond. The root causes of the conflict have not been addressed properly and tensions could reignite if the underlying issues are not

[44]Omar, Y. (November 2, 2022). My reflections on Gaalkacyo city as an emerging peace hub. Accessed, https://www.hiiraan.com/op4/2022/nov/188518/my_reflections_on_gaalkacyo_city_as_an_emerging_peace_hub.aspx.

resolved[45]. Lack of genuine reconciliation from both administrations, less effective governance, and negative social media have further complicated the situation[46].

Despite the security challenges, the Puntland State has made significant progress in various areas since its establishment, including the security sector. However, security remains a critical concern within the state. While efforts have been made to reduce security incidents such as clan clashes and assassinations, and criminal activities related to clan disputes continue to pose significant threats. The local police force faces limitations in terms of personnel and resources, impeding their ability to effectively enhance security throughout the state. The establishment of regional administrations in the FRS presents both challenges and opportunities. Efforts are underway to restructure and reform security institutions within Puntland State. This process aims to enhance the effectiveness and capacity of security forces to address various security issues. The collaboration between different levels of government, including local, state, and federal authorities, is essential for the successful implementation of these reforms.

[45]Interpeace. (2021). Puntland reconciliation: Processes, challenges, and opportunities ahead. Accessed, https://www.interpeace.org/wp-content/uploads/2021/02/2021-Puntland_Report.pdf, p.16.
[46]Heritage Institute for Policy Studies. (December 29, 2016). Gaalkacyo conflict: Drivers, contributors and potential solutions. Accessed, https://heritageinstitute.org/gaalkacyo-conflict-drivers-contributors-and-potential-solutions/.

6.0. Assessment of Impacts

6.1. OVERVIEW

This section examines how the solar plant will interact with parts of the physical, biological, and social environments, as well as infrastructure and utilities, to produce effects on resources and receptors. It has been grouped according to the phases of the project life cycle in order to better understand the risks and implications connected with each one. The following definitions are applied:

- *Project Site*: is the area where the solar PV field and BESS will be constructed and will be fenced.
- *Project Area:* is the project site and its nearest surroundings where indirect, and combined, and cumulative effects are likely to occur on the surrounding areas and communities; and
- *Study Area*: is the wider area of influence where indirect, combined, and cumulative effects are likely to occur at the scale of the Gaalkacyo City and the surrounding areas, and the entire Puntland State.

Criteria for assessing the significance of impacts stemed 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 water	Aquatic ecosystem	Public health and safety
Ground water	Terrestrial wildlife	Occupational health and safety
Air quality and climate	Woodlands	Labor related issues
Geology and soils	Agriculture and livestock	Land use and land ownership
Noise and vibration	Aquatic ecosystem	Household Income
Energy	Terrestrial wildlife	Landscape and aesthetics
	Forests and vegetation	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 Project will positively influence the Puntland State FRS economy during construction from the direct procurement and supply of materials and services from companies based in the Puntland State and elsewhere in FRS. This includes for example, companies providing earth-moving equipment, workers to complete general civil works, logistics services to transport the solar panels

to the Project area, and construction of the worker accommodation camp. Other companies located outside of FRS will be responsible for the supply of the solar panel components, such as the panels and supporting structures and cables. The impact is positive because construction activities will generate economic growth at a local, regional and national level through the procurement of services and materials. The increased demand for business-to-business services to small-to-medium enterprises (SMEs) will generate increased revenue across Gaalkacyo District, resulting in higher turnover for the SMEs involved. The impact is reversible as it will be only limited to the construction phase.

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 as it will be only limited to the construction phase.
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

Construction projects will offer both skilled and unskilled employment opportunities, with the majority of unskilled and semi-skilled jobs being filled by local communities. This will increase skill transfer from contractors and alleviate unemployment in the area. The project will also provide new income revenues and services, resulting in a trickledown effect on the economy. Enhancements include NEPCO prioritizing local communities in job allocation, ensuring non-discriminatory employment, and providing equal opportunities for both men and women. The exact number of workers employed is unknown.

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

Site preparation will include the installation of project components such as transmission lines, access roads, storage buildings, and other auxiliary facilities. Land clearing, ground leveling, excavation, and grading are all required. Modified ground surfaces, as well as construction equipment and machinery, will cause visual alterations on the project site.

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	Low – 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 project site in an arid region is susceptible to water accumulation during wet seasons, and construction machinery can degrade soil and alter local drainage flows, causing turbidity in surface water receptors. Potential sources of soil contamination include oil/fuel leaks or spills from site preparation machinery and transporting materials. Petroleum hydrocarbons may remain mobile for extended periods, contaminating the soil. The soil impact is minor due to the nature of the works and the limited scope of construction activities.

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

Project area in general intersects with temporary streams. Such streams could be subject to local flood hazards especially during the rainy season and during flash flood events. Such flood risks could entail impacts on the Project components (resulting in damage and destruction of equipment and machinery onsite) and could entail health and safety impacts on workers onsite.

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 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	Minor

Significance of the impact with mitigation	Minor.

6.2.2.1.4. Air Quality

Dust

Construction equipment can generate dust and fumes on the project site, affecting surrounding areas. The main effects include dust generation from earthworks, vehicle traffic, topsoil, and excavated soil management. Dust formation and dispersion are weather-dependent, with dry conditions producing abundant dust and wet conditions producing none. Dust is generated from earthworks, transportation activities, and aggregate mixing. Due to weather variability, it's impossible to predict specific construction activities, making the assessment of dust impacts typically qualitative.

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

Vehicle exhaust emissions

Exhaust emissions, mostly from vehicles and construction machinery, are anticipated to add to SO2, NO2, CO, and CO2. There are few Receptors (settlements) within 500 m of the project site and the impact magnitude will be medium and sensitivity medium hence the impact significance will be moderate. Emission factors, which estimate pollutant release per unit of fuel consumed, vary based on fuel quality, engine efficiency, and operational load. Compliance with international air quality standards will therefore be essential, and implementing monitoring systems and emission control technologies can help mitigate adverse environmental impacts. Addressing these parameters is critical for minimizing the machineries' footprint and protecting air quality in the project area.

Impact	Air quality (Vehicle exhaust 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, especially during operation phase of the project
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.5. Noise and vibrations

The usage of construction machines and vehicles will cause Noise and vibrations on the project

site and in the project area. Off-site Noise and vibrations impacts may cause a nuisance to the other adjacent land users. Vehicles used to carry staff and materials can add to the Noise and vibrations during construction.

Impact	Noise and vibrations
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that Noise and vibrations 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 and vibrations 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 foreseeable impacts related to the construction phase were identified. Site preparation activities are to take place onsite for the installation of PV arrays and the various project components, including inverters, transmission cables, internal road networks, buildings, etc. The installation of these project components is expected to include land clearing activities, excavation, grading, etc. Such construction activities could result in the alteration of the site's habitat and thus potentially disturb existing habitats for fauna and result in the displacement of fauna species.

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	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* and *Salvadora persica.* However, 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 involve soil exposure, which results in soil erosion due to wind and surface runoff due to rains. This is bound to happen because the soil characteristic in the project site is loose. Additionally, the site is generally flat with gentle slopes in some sections. It is therefore prone to soil erosion, especially during rain seasons. The impact significance will be minor because construction activities will be confined within particular locations within 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: 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 – 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

Solid waste is expected to be generated during the construction phase of a project, including site preparation, civil works, and excavation spoil. It includes materials like mortar, wood, paper, waste paper wrappings, conductor off cuts, masonry chips, and leftover foodstuffs. Mismanaged solid waste can cause public nuisance, soil contamination, and vermin breeding grounds. Hazardous waste, such as spent oil, lubricants, paint cans, and solvents, will be recovered by authorized companies. The significance of solid waste during construction is expected to be minor due to the majority of materials used in construction activities.

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 during construction.
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	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Liquid waste generation

Wastewater, including black and grey water from toilets and sanitation facilities, is expected to be generated because of workers' sanitation facilities. Sealed septic tanks will be installed at the site and will be evacuated to a wastewater treatment plant for Gaalkacyo City. 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
Significance of the impact without mitigation	**Minor**
Significance of the impact without mitigation	**Negligible**

6.2.2.2. Impacts on Infrastructure and Utilities

6.2.2.2.1. Water Consumption

During the construction of the project there will be increased demand for water by the construction workers and the construction works. Water will be mostly used in the construction works and for wetting surfaces or cleaning completed structures. It will also be used by the construction workers to wash themselves and even drink. Although the sensitivity of the receptor (surface water) in the project area is high owing to unavailability of feasible alternative source of water for the local community, the overall significance of impacts is assessed to be negligible due to negligible 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, NEPCO 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**

6.2.2.2.2. Energy Consumption

The construction works will consume fossil fuels to run transport vehicles and construction machinery. Fossil energy is non-renewable and its excessive use may have serious environmental implications on its availability, price and sustainability. This impact will be negligible owing to the size of the project that will require very few trucks during the construction phase.

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 NEPCO 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 solar power facility will be built on 2km^2 of private land. This will project will result in a decrease in potential grazing land, as the property will be permanently secured, affecting pastoralists' ability to use the site for grazing. This will increase competition for remaining grazing lands in Gaalkacyo and surrounding areas, leading to land degradation and potential loss of grazing livelihoods. Women may be affected, and the quality of the household's economy from livestock production and marketing is likely to decline.

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

According to the site survey and consultations with the stakeholders and local communities around the project site indicated that the project site contains no traces or signs of historical and/or prehistoric habitation. However, site preparation and earthwork activities for the installation of PV arrays and other Project components, such as central inverters, underground transmission cables, internal road network, buildings, and so on, may result in fortuitous discoveries of prehistoric or historical vestiges.

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

Construction 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 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

The anticipated impacts that could be generated by the influx of workers and the construction of the living camp are similar in nature to the impacts assessed during the construction phase. In particular, the influx of workers may create a strain on existing infrastructure, mainly water and sanitation systems, as well as road accidents and other adverse consequences of the increased traffic generated by the project (dust, Noise and vibrations and pollution). 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 200 workers are expected to engaged directly or indirectly during the construction phase with over 60% being locals.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.5. Gender-based Violence

The influx of workers during the construction phase of a hybrid power plant in Gaalkacyo could lead to an increased risk of gender-based violence (GBV) in the local community. This is often associated with power imbalances, increased interaction between workers and local populations, and a lack of effective safeguards. Potential negative impacts include physical, emotional, and sexual abuse, which could disproportionately affect women and girls, leading to long-term social and psychological harm. Furthermore, GBV incidents can strain community relations, disrupt local social structures, and undermine the project's social sustainability if not properly addressed with preventive measures and community engagement.

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 the construction phase can have significant impacts on both the project and the local community. Such disputes may arise due to wage disagreements, poor working conditions, unequal employment opportunities, or conflicts between local workers and external laborers. These disputes can lead to work stoppages, delays in project timelines, increased costs, and potential damage to relationships between the project developers and local communities. Additionally, labor unrest can escalate tensions within the workforce, negatively impacting morale and productivity. If not properly managed, labor disputes can also contribute to broader social issues, including security risks and disruption of local livelihoods. Effective communication, fair labor practices, and dispute resolution mechanisms are crucial to minimizing 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	High 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

During the construction phase, the use of child and forced labor can have severe negative impacts on both the project and the local community. Child labor exposes children to hazardous working conditions, deprives them of education, and causes long-term physical and psychological harm, while forced labor exploits vulnerable individuals under coercion or threat. These unethical labor practices not only violate human rights but also create unsafe work environments, undermine workers' dignity, and contribute to social inequality. The presence of such practices can damage the project's reputation, resulting in legal and regulatory repercussions, loss of investor confidence, and community opposition. Additionally, it can lead to operational disruptions, as labor exploitation often fosters resentment and low productivity among the workforce. Preventing child and forced labor through strict enforcement of labor standards, regular monitoring, and collaboration with local stakeholders is essential to ensure ethical and sustainable project development.

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 Gaalkacyo City, Somalia, while relatively stable compared to other regions of the country, still faces challenges such as sporadic threats from insurgent groups, local conflicts, and crime. These security risks can significantly impact the construction phase of the proposed hybrid solar power plant. Threats to worker safety, equipment theft, and disruptions from localized violence could lead to delays, increased project costs, and potential harm to personnel. Moreover, heightened security measures, such as hiring security personnel and securing the site, may be necessary to mitigate these risks, further increasing operational expenses. It is essential for project developers to collaborate with local authorities, implement robust security protocols, and engage with the community to ensure the project progresses smoothly without major disruptions.

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 face occupational health and safety risks during the construction phase. Such risks include slips and falls, tool use, being struck by objects, moving machinery, working in confined spaces, exposure to chemicals, hazardous materials, sunny conditions, high temperatures, and electric shocks and burns when touching live components. These risks enhance the likelihood of injury or death because of an accident. The influence on occupational health and safety during the construction phase is estimated to be moderately significant. All construction operations will be limited to the project site, resulting in high sensitivity and low magnitude.

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

During the construction phase, community health and safety risks shall include exposure to dust, Noise and vibrations, and air emissions from heavy machinery, which can impact respiratory health and overall well-being. There is also potential for increased traffic accidents due to higher vehicle movement, posing risks to both workers and nearby residents. Construction activities may also increase the risk of accidents or injuries in communities, particularly if safety protocols are not adequately enforced or communicated

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	Medium as safety is the Project's highest priority.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.11. Fire Hazards

During construction of the project, fire hazards are likely to occur especially when precaution measures are not taken to account. Smoking is one of causes of fires and this can happen if cigarette butts are left carelessly. Additionally, keeping of fuels onsite during construction can be a potential cause of fire. This impact is evaluated to be of moderate significance. All the construction activities will be confined at the project site hence high sensitivity and low magnitude.

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; NEPCO 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

NEPCO 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) 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. 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 Puntland 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 Gaalkacyo, Puntland 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

The project, visible on site and near amenities, will create visual impacts through solar panels, varying in aesthetic perception from perceived burdens to visually appealing changes.

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	Low 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 of the proposed power plant, soil, ground, and surface water contamination risks will typically be low. However, the contamination will arise from specific issues such as improper handling or disposal of hazardous materials, like cleaning chemicals or transformer oils. Leaks or spills from equipment, including inverters and transformers, and accidental fuel/oil spills may introduce harmful substances like heavy metals, which can infiltrate the soil and potentially reach groundwater. Additionally, inadequate stormwater management could lead to runoff that carries pollutants into nearby surface water bodies, potentially affecting water quality and aquatic ecosystems downstream. Effective containment, waste management, and pollution prevention practices are essential to mitigate these risks.

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	Minor
Significance of the impact with mitigation	Minor

6.3.2.1.3. Flood Risks

While Gaalkacyo and surrounding areas generally experiences low annual rainfall, flash floods can occur during the rainy seasons, particularly when the land is dry, compacted soil is unable to absorb water quickly. This can result in localized flooding, potentially threatening the plant's infrastructure, such as damage to electrical systems and solar panels. Poor drainage systems or inadequate site preparation could exacerbate flooding risks, making it essential to implement robust stormwater management strategies, including proper grading, and drainage channels to minimize operational disruptions and protect equipment. The impact is assessed to be low-to-medium magnitude of the impact.

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	Low – nearby land users that could be impacted from changes in drainage flows.
Magnitude	Low 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

Direct dust emissions from the project site is not anticipated because the solar panels will cover a significant portion of the Project Site. However, exterior dust will be of notable concern due to the Study Area's dry and arid climate. Frequent winds combined with minimal vegetation cover can stir up dust, which can accumulate on solar panels, reducing their efficiency and increasing maintenance demands. Additionally, dust emissions can affect air quality, potentially impacting the health of workers and nearby communities. Regular cleaning of panels, dust suppression measures, and careful site design, such as graveling access roads or maintaining buffer zones with vegetation, can help mitigate dust generation and its adverse effects on both the plant's performance and the surrounding environment. The impact is assessed to be low-to- medium magnitude of the impact.

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 construction phase when appropriate mitigation measures are implemented.
Receptor sensitivity	Low

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	Negligible

Vehicle and exhaust emissions

During the operation phase of a hybrid power plant, exhaust and fumes from vehicles. Maintenance vehicles, such as those used for cleaning solar panels, inspecting equipment, and transporting personnel, emit pollutants such as nitrogen oxides, carbon monoxide, and particulate matter, which can degrade local air quality. These emissions can lead to respiratory problems, particularly in vulnerable populations like children and the elderly. Nitrogen oxides and sulfur oxides also contribute to acid rain and ground-level ozone, further degrading air quality and harming local ecosystems.

Impact	Air quality (Vehicles and 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	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.1.5. Noise and vibrations

Noise and vibrations pollution during the operation phase will generally be minimal. However, some Noise and vibrations sources can still affect the surrounding environment. These include the hum of electrical equipment like transformers and inverters, as well as occasional Noise and vibrations from maintenance activities, such as vehicle movement or cleaning processes. Due to the Project Area's typically quiet, even low-level Noise and vibrations may be noticeable to nearby communities or wildlife. While the Noise and vibrations levels are unlikely to exceed harmful thresholds, implementing sound-dampening measures, scheduling maintenance during daytime hours, and maintaining equipment in good condition can help mitigate any potential disturbances, ensuring the plant operates with minimal impact on local Noise and vibrations levels.

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 and vibrations 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	Low given that the generation of Noise and vibrations is likely to be limited to the project site
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

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"[47,48,49] 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 Gaalkacyo, 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.
Receptor Sensitivity	Low - No 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	Moderate
Significance of the impact with mitigation	Minor

Flora

The effects of the hybrid power plant on local flora can be significant but manageable. The primary impact will be associated with the alteration of land use due to the installation of solar panels, which typically requires clearing vegetation to create space for the solar arrays. This reduction in vegetation cover can lead to soil erosion and loss of habitat for local plant species. Additionally, the shading effect of the panels can limit sunlight availability to the ground, potentially affecting the growth of understory plants. However, the long-term impact can be mitigated through measures such as implementing ground cover plants or grasses that are resilient to the local climate and can help stabilize soil and maintain some level of habitat. Proper planning and management practices, such as maintaining buffer zones and conducting regular vegetation

[47]Barros, 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

[48]Wiggins, 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

[49]Zeppel, 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

assessments, are essential to minimize adverse effects on the local flora and promote ecological balance.

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 such as *Prosopis juliflora*, *Solanum incanum* and *Datura stramonium* that occur in the Study Area.
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	Minor
Significance of the impact with mitigation	Minor

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 Gaalkacyo 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. To mitigate erosion, it will be crucial to implement effective ground cover strategies, such as planting drought-resistant vegetation or using erosion control mats around the site. Additionally, proper design of drainage systems will help manage runoff and reduce erosion potential, ensuring the long-term stability of the soil.

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	Minor

6.3.2.1.8. Wastes

Solid waste generation

It is expected that solid waste will be generated during operation phase of the project. However, solid waste generation will generally be modest but will require management to minimize environmental impact. The wastes will typically arise from routine maintenance activities, such as the replacement of faulty components like inverters or transformers, and the cleaning of solar panels, which may generate discarded materials or packaging. Additionally, occasional repairs or upgrades to equipment will produce metal, plastic, and electronic waste. To address these waste management challenges, it will be essential to implement a robust waste management plan that

includes recycling and proper disposal practices through a waste management plan. Establishing procedures for handling and recycling materials, reducing the use of single-use items, and ensuring regular waste audits will help minimize the impact of solid waste and promote sustainability at the hybrid power plant. Solid waste, including construction and general municipal waste, is expected to be handled by the nearest approved disposal facility.

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 during construction.
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 – the project site is located in an area with no adjacent settlements.
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

Liquid waste generation

Liquid waste generation during the operation phase is expected to be minimal, but it still requires careful management. Potential sources include runoff from solar panel cleaning processes and small amounts of wastewater from maintenance facilities or sanitary systems. Improper handling can lead to soil or water contamination. To mitigate risks, best practices for wastewater management, including using environmentally friendly cleaning agents, proper containment and treatment, and regular inspection of drainage systems, are essential. Sealed septic tanks will be installed at the site and evacuated to a wastewater treatment plant for Gaalkacyo City. Seepage from spilled fuels and oils and leaking machinery can negatively impact groundwater water, potentially leading to contamination. The overall significance of related impacts, especially on water quality, is considered minor, provided necessary mitigation and management measures are implemented.

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.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is expected to be 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.

In arid regions like Gaalkacyo, 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, NEPCO 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

Energy consumption will be relatively low, especially for ancillary systems such as inverters, control systems, and monitoring equipment, as well as maintaining the infrastructure, including lighting and security systems. However, the hybrid power plant, while integrating renewable energy sources such as solar with Battery Energy Storage Systems (BESS).

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 NEPCO 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

6.3.2.3. Impacts on Social Environment

6.3.2.3.1. Impact to Livelihoods from Grazing Land Access Restrictions

During the operation phase of a proposed Hybrid Power Plant, access restrictions to grazing land will impact local livelihoods, particularly for communities dependent on livestock. The installation of solar panels and associated infrastructure may limit the availability of traditional grazing areas, reducing the space available for livestock feeding and potentially impacting animal health and productivity. The impact significance of trespassing and unauthorised 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 risk of trespassing by unauthorized personnel into the Project Site can pose several challenges, but is expected to be minimal during the operation phase of the Project. Unauthorized access to the site can lead to safety hazards, including potential accidents or injuries due to unfamiliarity with the equipment and operational protocols. Additionally, there is a risk of vandalism, theft, or damage to valuable components such as solar panels and electrical systems.

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of Effect	Direct
Duration	Short term depending on security measures at the 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 and their accommodation needs can have several effects on the local community and infrastructure. Given that there will be a reliable and enhanced power supply in the city and surrounding areas, investments in other sectors is likely to increase leading to influx of workers that may not be directly in the power plant project but other sectors. This influx can place additional demand on local housing and amenities, potentially leading to increased competition for accommodation and services. To mitigate these impacts, it will be crucial for NEPCO to plan for appropriate workforce accommodation, such as establishing on-site housing or providing temporary lodging solutions. Engaging with the local community and incorporating local residents into the workforce can also help balance the demands and benefits, fostering positive relations and ensuring that the influx of workers contributes to the local economy without straining existing resources. The impact significance of worker influx is expected to be minor to negligible.

Impact	Worker influx – Incoming Workforce
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

During the operation phase of a hybrid power plant in Gaalkacyo, the risk of gender-based violence (GBV) may persist, albeit at a potentially reduced scale compared to the construction phase. Operational staff may still interact with the local community, leading to possible power dynamics that could result in harassment, exploitation, or other forms of GBV. These impacts may be exacerbated if there is inadequate monitoring, weak enforcement of workplace policies, or insufficient community awareness programs. The presence of long-term employees could perpetuate unequal gender relations and create environments where GBV might occur, impacting the community's social fabric and the well-being of vulnerable groups. Effective operational protocols and ongoing community engagement are essential 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	Moderate
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

During the operation phase, the risks of child and forced labor can have profound negative impacts on both the workforce and the community. The exploitation of vulnerable populations, including children, undermines local socio-economic structures and perpetuates cycles of poverty and inequality. Child labor not only deprives children of their right to education and a healthy childhood but also exposes them to hazardous working conditions, leading to long-term physical and psychological harm. Forced labor can occur in various forms, often involving coercion or deception, which not only violates human rights but also creates an atmosphere of fear and mistrust among workers. These practices can lead to significant reputational damage for the power plant and its stakeholders, deterring potential investors and partners. Moreover, labor violations can result in legal consequences and increased scrutiny from regulatory bodies, further complicating operations and impacting the overall sustainability of the project. Addressing child and forced labor issues through strict adherence to 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)

Poor or inadequate stakeholder engagement during the operation phase can lead to significant negative impacts, including strained relationships between the plant operators, local communities, government agencies, and other key stakeholders. Without effective communication and consultation, local concerns such as environmental impacts, land use, and employment opportunities may be overlooked, fueling dissatisfaction and potential opposition to the project. This can result in protests, operational delays, or even legal challenges that disrupt power supply and increase operational costs. Additionally, failure to engage stakeholders can erode trust, damage the plant's reputation, and hinder opportunities for collaboration on future projects. Inadequate engagement may also prevent the identification of risks and grievances early on, allowing them to escalate into more severe conflicts. To mitigate these risks, continuous, transparent, and inclusive stakeholder engagement is essential 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 NEPCO 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

During the operation phase of the proposed solar PV, workers are likely to face occupational health and safety risks such as slips and falls, working at heights, using powered and hand-held tools, trench work, working in sunny conditions and high temperatures, and exposure to electric shocks and burns.

The contractor will be required to create a comprehensive health and safety plan for construction workers, addressing potential occupational health and safety issues. This shall include addressing electrical hazards, fall hazards, environmental and ergonomic risks, and adverse weather conditions. Electrical hazards shall require strict protocols, while fall hazards will require proper measures on the use of fall arrest systems and safe working heights. The expected environmental risks during construction phase for workers shall include heat stress, exposure to UV radiation, chemical exposure, and ergonomic risks. Overall, the plan shall also include provisions for shaded rest areas, hydration schedules, protective clothing, and education on heat-related illnesses.

Adverse weather conditions shall be addressed through weather monitoring systems and implementing appropriate contingency plans.

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

The impacts on community health and safety during operation phase are generally expected to be minimal but should be carefully managed. The primary health and safety concerns would include potential accidents related to plant operations, such as exposure to electrical-related hazards. Additionally, while the plant's operation itself is low in emissions and pollutants, there may be occasional Noise and vibrations from maintenance activities and vehicle movement. Ensuring that safety protocols are followed, such as providing appropriate training for plant staff and implementing strict operational procedures, can help minimize these risks. Regular safety inspections and clear communication with the local community about emergency procedures and potential hazards are also essential to ensure the well-being of both workers and nearby residents. With the implementation of these mitigation measures the impact significance will be minor to negligible.

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 substantial when compared to the existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.10. Fire Hazards

Fire risks pose a significant threat to the Project Site due to the presence of electrical equipment and dry, arid conditions. Factors such as poor ventilation, inadequate fire suppression systems, and exposure to heat or electrical sparks exacerbate these risks. To mitigate these risks, NEPCO must implement stringent safety protocols, including proper fuel storage procedures, regular inspections, and well-maintained firefighting equipment. Other measures include regular inspections of electrical systems, installation of fire detection and suppression systems, and clear access for emergency services. Implementing firebreaks and managing vegetation around the plant can further reduce fire risks.

The integration of a Battery Energy Storage System (BESS) in NEPCO's proposed hybrid power plant introduces specific safety risks, particularly the possibility of "thermal runaway," a scenario in which a battery experiences a rapid release of energy due to internal or external faults, resulting

in a fire or explosion. To mitigate these hazards, the contractor must do a detailed safety analysis to establish the best site for the BESS, with adequate separation from essential infrastructure and personnel. To control overheating, the study should take into account ventilation, fire suppression systems, and thermal management technology. The strategy should also include regular maintenance methods, monitoring systems for early detection of failures, and emergency response techniques to address incidents quickly.

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 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	Moderate
Significance of the impact with mitigation	Minor

6.4. KEY IMPACTS DURING THE DECOMMISSIONING

In the case of the complete decommissioning of the PV farm, decommissioning activities could include the disconnection of the various Project components (PV array, central inverter stations, substation, etc.) for Re-use, recycling and then, if these options are not available, final disposal. In addition, the internal road network will be restored, and gates and fences will be removed. Generally, the anticipated impacts throughout the decommissioning phase are similar in nature to impacts assessed during the construction phase. Therefore, the assessment of impacts for those receptors and mitigation identified during the construction phase is assumed to apply to this phase. this includes impacts related to the following: landscape and visual, biological environment, infrastructure & utilities, waste management; and occupational health and safety

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

Site activities will include the decommissioning of arrays and the various Project components, including transmission cables, access roads and internal road network, storage buildings, etc. From the start of decommissioning activities, visual changes will occur from the modified ground surface and the presence of construction equipment and machinery (excavators, trucks, front end loaders,

compactors, and others).

Impact	Landscape and visual
Type of impact	Negative
Type of Effect	Direct
Duration	Short-term: The effects will commence from the start of decommissioning and thereafter permanent restauration in visual character will occur.
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

The decommissioning phase involve the dismantling and removal of security perimeter fencing, buildings and access tracks required for operation, electrical infrastructure (transformers, the on-site substation and transmission lines connected to the power grid), and solar panel arrays and their associated structural components. Many of the same procedures and equipment used during construction is employing in decommissioning phase. Generally, the anticipated impacts throughout the decommissioning phase are similar in nature to impacts assessed during the construction phase (alteration and disturb of existing habitats, improper management of the site, collision risk and roadkill, etc.).

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. Fauna could move away to similar habitats in the surrounding activities also.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.1.3. Solid Waste Generation

The decommissioning phase will generate various solid wastes. The waste will contain the materials used in construction including concrete, metal, wood, glass, paints, adhesives, sealants and fasteners, conductors, poles solar panels and batteries. Although demolition waste is generally considered as less harmful to the environment since they are composed of inert materials, there is growing evidence that large quantities of such waste may lead to release of certain hazardous chemicals into the environment. The impact will be of major significance due to high magnitude and medium receptor sensitivity. The batteries and panels need to be disposed in a specific way, in accordance to the manufacturer's guidelines and relevant national and EHSG regulations.

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: Proper mitigation measures will ensure the impact is minimized.

Receptor sensitivity	Low
Magnitude	Low-medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.1.4. Noise and Vibration

The demolition works will lead to significant deterioration of the acoustic environment within the project site and the surrounding areas. This will be because of the Noise and vibrations from demolition works. The impact significance has been assessed minor because the impact magnitude is low and the receptor sensitivity is medium.

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.
Reversibility	Reversible given that Noise and vibrations levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low
Magnitude	Low given that the generation of Noise and vibrations is likely to be limited to the use of decommissioning 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 requirements for the decommissioning phase are low and are limited to sanitary use by site personnel (drinking, showering, etc.) and the decommissioning activities such as cleaning of machinery and equipment, dust control, etc. The source of water for the decommissioning phase is likely to be the same as that used for the construction stage.

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

During the decommissioning phase, workers face occupational health and safety risks due to onsite work. These risks include slips, falls, heights, using tools, being struck, moving machines, working in confined spaces, exposure to chemicals, hazardous materials, sunny conditions, high temperatures, and electric shocks when touching live components.

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 s the Project's highest priority.
Magnitude	Low given that it is generally controlled through best practices
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

Livestock herders may face severe economic hardships if access to traditional grazing lands is limited or obstructed by decommissioning activities. This can result in reduced livestock productivity, higher costs for feed, and potential conflicts over land use, especially in a region where pastoralism is a key source of income and sustenance. The restrictions can also lead to overgrazing in other areas, degrading the environment and reducing long-term land fertility. To minimize these impacts, it is essential to engage local communities early, provide alternative grazing solutions, and ensure that decommissioning plans include measures to restore and rehabilitate the land for future use.

Impact	Impact to livelihoods from grazing land access restrictions
Type of impact	Negative
Type of effect	Direct
Duration	Short term because the decommissioning activities will take a shorter period.
Reversibility	Reversible as land area will be changed into other land use activites, including grazing.
Receptor Sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.4.2.3.4. 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	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.5. Worker Influx – Incoming Workforce

The decommissioning phase of workforce accommodation can have negative impacts on the local community and environment. The sudden 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. 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

6.4.2.3.6. 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	Indirect
Duration	Short term as it is expected during the decommissioning period 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

6.4.2.3.7. Labour Disputes

Labor disputes during the decommissioning phase can significantly impact the project's completion and the local economy. Workers may face uncertainty about job security, severance pay, or contract termination, leading to disputes over wages, benefits, and working conditions. These disputes can cause delays in decommissioning activities, increase project costs, and disrupt the community. Unresolved disputes can escalate tensions between the workforce, management, and local stakeholders, 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	Indirect
Duration	Short term during the decommissioning phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High 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

6.4.2.3.8. Child and Forced Labour

The decommissioning phase of a project can lead to child and forced labor if improper practices are not enforced. This can increase vulnerability for marginalized groups, such as children, who may be subjected to coercion, exploitation, or unsafe working conditions. 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 and ethical standards are crucial

to prevent these issues and ensure a fair and safe working environment.

Impact	Child and forced labour
Type of impact	Negative
Type of Effect	Indirect
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

6.4.2.3.9. Security

Gaalkacyo City, Somalia, faces security challenges such as sporadic threats from insurgent groups, local conflicts, and crime. The decommissioning phase can pose security risks, potentially causing theft, vandalism, or sabotage. The influx of temporary workers and job loss can lead to social unrest. A reduction in on-site security staff during this phase could expose the project to unauthorized access, increasing the risk of accidents or sabotage. These security challenges may result in delays, financial losses, and disruptions to the decommissioning process. To mitigate these risks, it is crucial to maintain robust security protocols, ensure proper site management, and engage with local stakeholders to minimize potential conflicts.

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
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.10. Community Health and Safety Risks

The decommissioning phase can negatively impact community health and safety due to increased risks associated with dismantling activities. Dust, Noise and vibrations, and air pollution from demolition work, transportation of materials, and waste handling can harm the health of nearby residents, particularly children, the elderly, and those with pre-existing conditions. Improper disposal of hazardous materials, such as oils or chemicals, may also contaminate soil and water resources, posing long-term environmental and health risks. Additionally, the movement of heavy machinery and vehicles around the project site can increase the risk of accidents and injuries for both workers and the surrounding community. Inadequate safety protocols or a lack of communication with local residents about the potential dangers could further exacerbate these risks. To safeguard community health and safety, it is crucial to implement strict environmental and safety measures, proper waste management practices, and maintain transparent communication with local stakeholders.

Impact	Community health and safety risks
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	Medium

Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.11. Fire Hazards

During the decommissioning phase, fire hazards can pose significant risks to both the facility and the surrounding community. The dismantling of equipment and the presence of combustible materials, such as fuel residues, lubricants, and construction debris, increase the likelihood of accidental fires. Inadequate fire prevention measures, such as insufficient fire suppression systems or poor site management, can exacerbate these risks, leading to potential injuries, loss of property, and environmental damage. Furthermore, a fire outbreak could disrupt decommissioning activities, delay project timelines, and strain local emergency response resources. The smoke and pollutants released during a fire can also negatively impact air quality, posing health risks to nearby residents. To mitigate these hazards, it is essential to implement robust fire safety protocols, conduct regular risk assessments, and ensure that all personnel are trained in fire prevention and emergency response procedures.

Impact	Fire hazards
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
Magnitude	Low
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	Low	Minor
	Air quality (Dust)	Direct	Short term	Reversible	Low	Medium	Moderate	Minor
	Air quality (vehicle exhaust 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	Minor	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	Moderate	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	Medium	Low	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	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	Low	Minor	Negligible
	Soil, groundwater and surface water contamination	Direct	Short-term	Reversible	Low	Low	Minor	Minor
	Flood risks	Direct	Long term	Reversible	Low	Low	Minor	Minor
	Air quality (Dust)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Air quality (Vehicle exhaust emissions)	Direct	Short-term	Reversible	Low	Low	Minor	Minor
	Noise and vibrations	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Biodiversity (Fauna)	Direct/indirect	Long-term	Irreversible	Low	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	Minor
	Wastes (Solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
	Wastes (Liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on infrastructure and utilities	Water consumption	Direct	Short/long-term	Reversible	Medium	Low	Minor	Minor
	Energy consumption	Direct	Short/long-term	Reversible	Low	Low	Minor	Minor
Impacts on social environment	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	Minor	Negligible
	Worker influx-Incoming Workforce	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/long-term	Reversible	Low	Low-medium	Moderate	Minor
	Labour disputes	Direct	Short-term	Reversible	High	Medium	Moderate	Minor
	Child and forced labour	Direct	Short-term	Reversible	Medium	Medium	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Risks related to poor or inadequate stakeholder engagement (conflicts)	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	Low	Moderate	Minor
	Fire hazards	Direct	Short-term	Irreversible	High	Low	Moderate	Minor

6.5.3. Decommissioning

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
	Noise and vibration	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
Impacts on infrastructure and utilities	Water utilities	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
Impacts on social environment	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Moderate	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	Indirect	Short term	Irreversible	High	Low	Moderate	Minor
	Labour disputes	Indirect	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	Environmentally, the installation of the hybrid power plant and the associated infrastructure could alter the natural topography and aesthetics of the area, especially in the predominantly flat and open grazing lands. The introduction of such large-scale infrastructure may create visual contrasts with the surrounding natural and rural settings, potentially impacting the scenic value of the landscape. Socially, the development could influence community perceptions of the area, with some residents viewing it as a symbol of progress and modernity, while others may see it as a disruption to traditional land use practices such as grazing. Over time, the project's visibility may also encourage secondary developments, such as roads and settlements, further changing the landscape and visual character.
Land Use	The project's footprint, encompassing solar panels, battery storage, and auxiliary infrastructure, may reduce land available for traditional uses such as livestock grazing, which is a key livelihood activity in the region. Over time, improved infrastructure and accessibility could attract additional developments, including roads, settlements, and social amenities, altering the land use dynamics and potentially leading to land tenure conflicts or displacement of grazing activities. These changes could generate economic opportunities, such as employment and business growth, while also necessitating careful management to mitigate impacts on livelihoods and ensure equitable access to emerging opportunities. Proactive land use planning and stakeholder engagement are essential to balance development objectives with the preservation of traditional land use practices.
Biodiversity	Impacts are mainly related to construction phase. The project may lead to habitat loss or fragmentation due to land clearing for infrastructure, particularly in areas used for grazing and natural vegetation. Disturbances from construction activities, such as noise, dust, and increased human activity, could displace wildlife and reduce biodiversity. Over time, the development of roads and settlements associated with the plant may further encroach on natural habitats, intensifying these impacts. Socially, changes in biodiversity could affect livelihoods reliant on natural resources, such as pastoralism, and alter community relationships with the local environment.
Archaeology and cultural heritage	Impacts mainly related to construction phase at the project site. While the region may not have known archaeological or cultural landmarks, construction activities such as excavation and land clearing could uncover chance finds, leading to the risk of damage or loss. The introduction of roads and infrastructure may also increase accessibility, raising the possibility of unregulated exploration or vandalism of cultural assets. Socially, any damage to cultural heritage could affect community identity and values, potentially leading to dissatisfaction or resistance to the project. Implementing chance-find procedures, consulting local communities, and involving cultural heritage experts during project planning and execution are essential to mitigate these risks and safeguard the region's archaeological and cultural integrity.
Air quality and noise	The cumulative environmental and social impacts of the hybrid solar power plant on air quality and noise are primarily associated with the construction and operation phases. During construction, dust emissions from land

Attribute	Cumulative Impacts
	clearing, vehicular movement, and material handling, combined with emissions from diesel-powered machinery, could temporarily degrade air quality. Noise pollution from equipment and transport activities may disturb nearby communities and livestock, particularly if construction occurs near grazing areas. Cumulatively, these impacts could affect respiratory health, reduce the quality of life for local residents, and disturb wildlife. Implementing dust suppression measures, using low-emission equipment, enforcing noise control measures, and prioritizing renewable energy over diesel generation can significantly reduce these cumulative impacts.
Infrastructure and utilities	The cumulative environmental and social impacts of the proposed hybrid power plant are expected to be transformative, with both positive and potentially challenging outcomes. The development is likely to catalyze improvements in local infrastructure, such as roads and power distribution networks, enhancing accessibility and electricity availability for communities. This can stimulate economic growth and facilitate the provision of social services, such as schools and healthcare facilities. However, the increased demand for utilities during construction and operation, including water and energy, could strain existing resources and services, potentially impacting local households and businesses. Additionally, the influx of workers and secondary developments may put pressure on transportation networks and sanitation systems. Proactive planning, including investments in utility upgrades and equitable resource allocation, is essential to ensure the project's benefits are maximized while mitigating adverse cumulative impacts on infrastructure and utilities.
Socio-economic conditions	The cumulative environmental and social impacts of the hybrid power plant on socioeconomic conditions are both substantial and multifaceted. The project will boost local economic development by creating jobs during construction and operation, stimulating businesses, and improving access to reliable electricity, which can enhance productivity and quality of life. It may also attract further investments in infrastructure, education, and healthcare, contributing to long-term socioeconomic advancement. However, the influx of workers and new developments may strain local resources, increase the cost of living, and potentially lead to land use conflicts or social tensions. Traditional livelihoods such as pastoralism may also face disruptions due to changes in land use. Effective community engagement, equitable resource distribution, and targeted social programs are critical to ensure that the socioeconomic benefits are inclusive and sustainable while minimizing adverse impacts.
Occupational health and safety	The cumulative environmental and social impacts of the hybrid power plant on occupational health and safety are significant, particularly during the construction and operation phases. Construction activities involving heavy machinery, elevated work, and potential exposure to dust, noise, and hazardous materials pose risks of accidents, injuries, and health issues for workers. During operation, risks may arise from handling battery systems, and electrical equipment, requiring strict safety protocols. The presence of a large workforce over time may strain local healthcare services and create challenges in maintaining consistent safety standards. Cumulatively, these factors underscore the importance of robust occupational health and safety management systems, including regular training, provision of personal protective equipment, health surveillance, and emergency response preparedness to safeguard worker well-being and ensure compliance with international and local labor standards.
Community health, safety, and security	The construction and operation phases could introduce health risks related to air and water pollution, noise, and traffic accidents, potentially affecting nearby communities. Increased population due to the influx of workers could strain local healthcare services and housing, while also raising concerns over the spread of infectious diseases. Social tensions may arise

Attribute	Cumulative Impacts
	if safety and security are not adequately managed, with risks of crime, labor disputes, or community conflicts. Additionally, the establishment of infrastructure such as roads and powerlines could expose local communities to greater security risks, including the unauthorized access to project areas. Proactive community engagement, robust health and safety measures, and enhanced security protocols are essential to mitigate these cumulative impacts and ensure that the benefits of the project are equitably shared while protecting the well-being of local populations.

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

The proposed hybrid power plant by NEPCO in Gaalkacyo, which will integrate solar PV and Battery Energy Storage Systems (BESS), is vulnerable to various natural and climate-related hazards. One of the primary risks is extreme heat and prolonged drought conditions, which are common in Somalia's arid climate. High temperatures can reduce the efficiency of solar panels, potentially affecting energy generation, while excessive heat may accelerate the degradation of battery components, affecting storage capacity and lifespan. Additionally, prolonged droughts can exacerbate dust accumulation on solar panels, leading to efficiency losses and increased maintenance requirements.

Another significant vulnerability is extreme weather events, particularly strong winds and sandstorms, which are frequent in Gaalkacyo. High winds can damage solar panel mounting structures, cause debris accumulation, while sandstorms can erode panel surfaces, and reduce energy conversion efficiency. Without proper mitigation measures, such as wind-resistant structural designs and automated cleaning systems, these hazards could lead to frequent operational disruptions. Moreover, climate variability may bring unexpected shifts in cloud cover patterns, potentially reducing solar energy generation and increasing reliance on stored energy within the BESS.

The project site's vulnerability to flash floods, though relatively low in the semi-arid region, cannot be ruled out. Poor drainage infrastructure and intense, short-duration rainfall events could lead to localized flooding, which might damage electrical components, inverters, and battery storage units if not adequately protected. The risk of soil erosion around the plant site could also undermine the stability of infrastructure. To enhance resilience, the hybrid power plant should incorporate climate-adaptive measures such as elevated equipment placement, robust waterproof enclosures for electrical components, and enhanced monitoring systems to anticipate and respond to extreme weather conditions.

Proposed mitigation measures	
Flooding	• Elevate critical infrastructure such as control rooms, generators, and battery storage systems to above-expected flood levels. • Construct a robust drainage system around the facility to divert surface runoff and prevent waterlogging. • Install flood barriers or levees to protect the site from flash floods. • Develop emergency procedures including evacuation plans to address flood-related risks.
Landslides/Erosion	• Stabilize slopes and loose soils near the site through re-vegetation. • Minimize soil disturbance during construction by avoiding unnecessary vegetation clearing. • Design drainage channels/sediment traps to prevent erosion/sedimentation during rains. • Use ground cover, such as grass or gravel, to reduce surface erosion and soil displacement. • Regularly inspect and maintain erosion control structures to ensure effectiveness over time.

Earthquakes	• Design infrastructure to meet international seismic design standards. • Secure solar panels and other equipment with vibration-resistant mounts. • Provide training for workers on earthquake safety protocols and emergency response measures.
General Measures	• Conduct regular risk assessments to update mitigation measures accordingly. • Engage with local communities to share hazard coordinated responses. • Use climate-resilient materials in construction to reduce risks to environmental stressors.
Climate Variability Risks	• Incorporate backup options to ensure reliable power supply during prolonged low solar generation periods. • Monitor and analyze climate trends to adjust operational strategies and enhance system resilience.
Sandstorms and Strong Winds	• Use tempered glass panels with anti-erosion coatings to reduce damage from sand abrasion. • Implement a scheduled manual maintenance to clear sand deposits from solar panels and BESS enclosures.
Extreme Heat and Drought Impacts	• Utilize high-temperature-resistant solar panels and BESS components designed for arid environments. • Conduct regular panel cleaning using water-efficient techniques, such as dry brushing

7.0. Mitigation, Monitoring and Reporting

This section examines the mitigation measures for the outlined impacts as assessed for the project (Section 6). 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 Puntland 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 NEPCO Hybrid Power Plant

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
Impacts on biophysical environment	Landscape and visuals	• Erect a fence around the power plant.	Construction	• Presence of a perimeter fence
	Soil, groundwater and surface water contamination	• Scoop and correctly dispose contaminated soil. • Care must be exercised not to spill any fossil fuels • Construction vehicles must be maintained in good state. • Contractor to develop an oil-spill containment plan. • Ensure waste water generated is discharged or drained into approved drainage facilities • No vehicle maintenance and service shall be done at project site	Construction	• Records of any leakages from construction equipment/ vehicles. • Oil spill containment plan. • Provision of fuel/oil drip and spill trays
	Air quality (Dust)	• Suppress dust during dry periods by use of water sprays; • Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions. • Burning of woody debris & construction waste to be prohibited • Ensure all the personnel use PPEs. • Restrict speed on loose surface roads during dry or dusty conditions • Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. • Construction trucks moving materials to site should be covered to prevent material dust emissions.	Construction	• Visual Observation of dust Provision of PPEs especially masks
	Air quality (Vehicle exhaust emissions)	• Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered. • Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter.	Construction	• Engine maintenance records • Inspection of stacks
	Noise & vibration	• Employ modern construction equipment fitted with noise-reduction technologies	Construction	• Noise levels-Records of noise

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Ensure regular maintenance of machinery to reduce noise emissions. • Establish a GRM for community to report noise or vibration disturbances. • Establish a monitoring program to regularly measure noise and vibration levels. • Inform nearby communities in advance about scheduled high-noise activities. • Provide appropriate PPEs to workers during construction activities. • Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). • Train workers on the importance of noise control and best practices on noise.		measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant
	Biodiversity (Fauna)	• Site clearing work/earthwork shall be carried out 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. • Site preparation shall minimize clearing of vegetation and topsoil. • Ensure wildlife-friendly designs for infrastructures. • Temporary-use areas shall be restored and revegetated • An ecologist shall be hired to coordinate the fauna monitoring.	Construction	• Full implementation of biodiversity management plan for the project • Regular biodiversity monitoring and reporting
	Biodiversity (Flora)	• Ensure proper demarcation and delineation of the project area to be affected by construction works. • Designate access routes and parking areas • Re-vegetation including planting of trees around the plant/facility	Construction	• Number of trees cleared • Planted trees
	Soil erosion	• Avoid ground-breaking during the seasons of high rainfall to avoid erosion. • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials • Use silt traps where necessary • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last	Construction	• Assess size of rills or Gulleys forming from accelerated run off from compacted areas
	Wastes (Solid wastes)	• All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through a approved waste handler • Segregate waste • Provide litter collection facilities such as bins • Contractor to put in place and comply with a site waste management plan • Use of durable, long-lasting materials that will not need to be replaced as often,	Construction	• Presence of well-maintained receptacles and centralized collection points.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		thereby reducing the amount of waste generated over time • Recovery of materials remains and return to stores • Re-use of materials where possible • Proper budgeting to avoid waste generation • Proper disposal of waste in line with solid waste regulation • Construction wastes to be managed in accordance with internationally accepted construction standards of a hybrid power plant		
	Wastes (Liquid wastes)	• All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. • Create awareness for the employees on site on procedures of dealing with spills and leaks • Develop and implement a detailed Spill Prevention Plan (SPP) • Disposal of waste through septic tanks • 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 stormwater. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. • Proper training for the handling and use of fuels for the operators of the power plant. • Provide sanitary waste facilities for both genders clearly marked • Refuelling and maintenance of vehicles will not take place at the construction site. • The waste oil or used oil must be disposed-off appropriately. • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks.	Construction	• Engine maintenance records • Oil spill containment plan • Presence of separate and clean washrooms for both the gents and ladies
Impacts on infrastructure and utilities	Water consumption	• Ensure prudent use of available water • Consultations with the project local committee on water use to avoid conflicts with the community • Source and utilize a sustainable and reliable water supply for both construction and operation phase.	Construction	• Water usage records

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	Energy Consumption	• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity. • Proper planning of transportation of materials will ensure that fossil fuels are not consumed in excessive amounts. • Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.	Construction	• Energy consumption records
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Coordinate with the local herders on establishing alternative grazing routes or areas. • Engage regularly with affected herders/community leaders to identify their concerns and collaboratively design grazing solutions. • Conduct regular environmental monitoring to assess the availability and quality of alternative grazing areas and adjust mitigation measures. • Provide alternative water points for livestock near the construction area. • Establish a grievance redress mechanism to address any conflicts or complaints from herders regarding grazing land access.	Construction	• Number of Alternative Grazing Routes/Areas Established. • Frequency of Community Consultations. • Grazing Land Access Complaints. • Usage of Alternative Grazing Areas. • Incidence of Conflict Over Grazing Access. • Changes in Grazing Patterns.
	Archaeology and cultural heritage	• 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 archaeological artifacts or sites are discovered, establish temporary buffer zones around these areas to protect them from further disturbance. • If chance finds are made, ensure proper documentation, including detailed records, photography, and GPS coordinates, before any further action is taken.	Construction	• 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	• Controlled access to the site only with prior approval • Fencing off the construction site to keep of unauthorized personnel • Hazard communication • Maintain records of any person who comes to site • Ensure proper barricading	Construction	• Presence of a controlled access and records of every person accessing the site

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Worker influx – Incoming Workforce	• 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.	Construction	• Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee register.
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant to the sub-project. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts.	Construction	• 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	• Ensure full compliance with local labor laws. • Ensure that all workers receive clear, written contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. • Establish mechanisms to guarantee fair and timely payment of wages and benefits. • Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues. • Implement and enforce non-discrimination policies to ensure equal treatment	Construction	• Number of grievances filed and time taken to resolve them. • Frequency of labor disputes. • Health and safety violations. • Worker turnover rate

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		of all workers regardless of gender and clan. • Set up a formal, transparent grievance redress mechanism to handle worker complaints and disputes in a timely manner.		and compliance with working hours and overtime rules. • Labor law compliance audits • Worker welfare committee activities.
	Child and forced labour	• Implement and monitor the employment register regularly. • 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.	Construction	• 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	• Conduct a comprehensive risk assessment to identify specific 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. • Provide workers with ID badges and restrict entry to authorized personnel only. • 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	Construction	• 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		kidnappings, armed attacks, and civil unrest. • Have security response teams on standby to address urgent security breaches or emergencies.		functionality. • Frequency of security audits.
	Occupational Health and safety Impacts	• Use skilled personnel for activities which demand skills/technical tasks • Workers coming to the site should be knowledgeable on safety precautions to take • Provide appropriate PPE to all workers. • Undertake risk assessment by contractor of the construction activities and implement mitigation measures appropriately • Availability of equipped first aid box on site • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees	Construction	• Records of any near misses, incident, and accidents. • Records of corrective actions implemented if there was an accident.
	Community health and safety risks	• Allowing migrant workers time to be with their families • Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases • Ensure equal treatment of workers • Informing workers on local cultural values and health matters. • The contractor is impressed upon not to set a construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures.	Construction	• Number of awareness creation sessions conducted. • Availability of and distribution of condoms
	Fire Hazards	• '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. • Create awareness to the construction workers on potential fire hazards • Designate an assembly point • No smoking shall be done on construction site • Provision of firefighting equipment on site during construction.	Construction	• Records of any Fire incidences • Fire equipment and evacuation plan
	Traffic risk	• Develop and implement a Traffic Management Plan (TMP). • Use traffic signs, barriers, and cones to guide and direct both construction and local traffic. • Enforce strict speed limits for construction vehicles within the construction site and along designated transport routes. • Install speed bumps or other traffic-calming measures on roads near the construction site. • Engage with local communities to raise awareness about increased construction traffic and safety measures.	Construction	• Number of traffic incidents. • Traffic management plan compliance. • Speed limit violations. • Traffic safety training attendance. • Community complaints related to

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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.		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	• Update the existing stakeholder engagement/consultation plan (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.	Construction	• 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 and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. • Concerns raised and actions raised.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Inadequate grievances management	• 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.	Construction	• 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.
Impacts on biophysical environment	Landscape and visual	• Fence off the power plant.	Operation	• Presence of a perimeter fence
	Soil, groundwater and surface water contamination	• Infrastructure shall be designed to ensure that contaminated run-off does not reach water source i.e., earth dam. • Contractor to develop an oil-spill containment plan as part of the emergency response plan. • No vehicle maintenance and service shall be done at project site • Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.	Operation	• Oil spill containment plan. • Provision of fuel/oil drip and spill trays
	Flood risks	• Ensure drainage channels are free of any obstruction at all times i.e., not blocked • Construct more channels and or expand existing ones • Raise foundations of the solar panels and ensure a proper and from concrete base • Create flooding diversions and or spill ways to divert water from getting into	Operation	• Provision of drainage system • Raised foundations for the structures

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		the solar power facility		
	Air quality (Dust)	• Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution • Ensure planting of grass around and within the facility compound	Operation	• Visual inspection
	Air quality (Vehicle and exhaust emissions)	• Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter. • Regularly report emissions data to local regulatory authorities as part of environmental compliance.	Operation	• Engine maintenance records • Inspection of stacks
	Noise & vibration	• 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	Operation	• 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)	• Ensure wildlife-friendly designs for infrastructures. • An ecologist shall be hired to coordinate the fauna monitoring. • Bird deterrents will be installed to prevent collisions with solar panels. • Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies.	Operation	Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting
	Biodiversity (Flora)	• Re-vegetation including planting of trees around the plant/facility	Operation	• Number of trees cleared • Planted trees
	Soil erosion	• Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Landscaping with grass on areas without electrical installation (lower areas) • Construct the drainage system in a way to follow natural drain of the water • Concrete only the required area and leave the rest of the land with vegetation like grass • Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use	Operation	• 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Wastes (Solid)	• Provide waste handling facilities such as labelled waste bins • Emphasis on prudent waste generation and give priority to reduction at source • Undertake solid waste management awareness to operators • Operator to contract a licensed waste handler to collect and dispose solid waste *Damaged solar panels and hazardous wastes* • 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 a approved waste handler	Operation	• Presence of well-maintained receptacles and centralized collection points.
	Wastes (Liquid)	*Sanitary wastes* • Provide sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks *Oils from vehicles* • 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. *Chemicals* • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. *Accidental fuel and oil spill* • Ensure quick clean-up of spills by designated response teams trained in handling hazardous materials. • Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. • 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.	Operation	• Presence of separate and clean washrooms for both the gents and ladies. • Engine maintenance records • Oil spill containment plan • Records of all accidental spills and number of Liters
	Water consumption	• Ensure prudent use of water. • Install water-conserving automatic taps.	Operation	• Water usage records

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
Impacts on infrastructure and utilities		• Any water leaks through damaged pipes and faulty taps should be fixed promptly.		
	Energy consumption	*Lightings* • Install an energy-efficient lighting system • 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. • Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. • Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar and BESS.	Operation	• Solar Energy Generation (kWh/month): • Battery Energy Storage System (BESS) Utilization (cycles/month). • Lighting Energy Consumption (kWh/month). • Carbon Emissions (tons of CO2/month).
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Continue consultations with local communities to assess their needs on grazing access alternatives. • Support the development of pasture improvement projects • Provide alternative livelihood opportunities for pastoralists • Install livestock water points at strategic locations near alternative grazing areas. • Establish and maintain a grievance redress mechanism • Conduct regular monitoring of the livelihoods of affected pastoralists.	Operation	• Number of complaints from affected communities (monthly). • Access routes to grazing lands (percentage maintained). • Community satisfaction with alternative grazing lands (% satisfaction). • Community engagement and participation (number of meetings/year). • Conflict or dispute incidents (number reported/year).
	Trespassing of unauthorized personnel	• Fencing off the facility to keep of community members, children and livestock from entering into the facility • Controlled access to the site only with prior approval • Maintain records of any person who comes to site	Operation	• Presence of a controlled access and records of every person accessing the site

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Worker influx – Incoming Workforce	• Prioritize the hiring of local workers to reduce the need for an incoming workforce. • Establish and enforce a strict code of conduct for incoming workers. • Implement awareness programs to sensitize both the incoming workforce and local communities on cultural differences. • Design worker accommodations that are separate from local residential areas but ensure they meet adequate living standards. • Encourage the use of local suppliers for food, materials, and other needs of the workforce to support the local economy. • Implement comprehensive waste management systems in worker accommodation areas. • Ensure both the workforce and the local community have access to a grievance redress mechanism. • Continuously monitor the behavior of the incoming workforce, addressing issues promptly to prevent tensions with the local population. • Maintain ongoing dialogue with local communities to understand and address their concerns about the worker influx.	Operation	• Number of local workers employed (% of total workforce). • Community grievances related to workforce behavior (number of grievances/month). • Community interaction incidents (number reported/month). • Local business engagement (percentage of local suppliers engaged). • Worker turnover rate (%). • Worker welfare program implementation (% of programs implemented). • Community consultation meetings held (number/year).
	Gender-based violence	*GBV- SEA and SH* • Update and customize the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks relevant to the sub-project. • 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts. *Inaccessibility of project benefits to VMGs and other vulnerable individuals due to*	Operation	• 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		affordability challenges • Consult VMGs and Vulnerable individuals and households on charges for sub project services and put in place specific interventions to ensure the vulnerable equally access project benefits.		access to project services.
	Labour disputes	• Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. • Maintain open communication between management and workers. • Ensure full compliance with national labor laws. • Implement fair and transparent disciplinary procedures. • Promote equal opportunities and non-discriminatory practices in hiring, promotion, and compensation to avoid conflicts. • Set up a monitoring system to track and evaluate labor 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.	Operation	• Number of Labor Disputes Raised (disputes/month): • Grievances Resolved Within Agreed Timeframe (%): • Worker Turnover Rate (%). • Number of Grievances Filed Regarding Wages or Compensation (grievances/month). • Number of Labor Dispute Awareness Campaigns (number/year).
	Child and forced labour	• 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.	Operation	• Number of child labor incidents reported (incidents/month). • Number of forced labor incidents reported (incidents/year). • Grievances related to child or forced labor (number of grievances/year). • Community outreach and awareness campaigns on child labor (campaigns/year). • Compliance with international labor

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				standards (compliance level). • Social audits conducted (number of audits/year). • Local community feedback on employment practices (satisfaction level).
	Risks related to poor or inadequate stakeholder engagement (Conflict)	*Risks related to Inadequate stakeholder engagement* • Update the existing stakeholder engagement/consultation plan (SEP) to make it more relevant to the subproject and the identified stakeholders. • 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. • 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 grievance redress mechanism to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. *Inadequate grievances management* • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Work closely with the GRM committee members in solving the conflicts • Solve all conflicts/grievances at the earliest time possible • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures	Operation	• 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.
	Occupational health and Safety	• Ensure only qualified staff are employed to work in the facility • All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. • Operators must be skilled on firefighting management • Annual EHS audits should be done	Operation	• Provision of PPEs and WIBA cover • Environmental audit reports

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Community health and safety risks	*Public Health Impacts* • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. *Shocks and electrocutions* • Inspect the wiring of the houses before connecting power • Safety awareness campaigns to the community before connection of power on safety precautions such as: • 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. *Public Health Impacts –HIV/AIDs* • 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	Operation	• Number of awareness creation sessions conducted. • Records of awareness sessions conducted • Incidences report • Number of awareness creation sessions conducted. • Availability of and distribution of condoms
	Fire hazards	• The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including BESS locations, etc. • Detection/alarm systems that can detect fire should be and installed • A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. • Workers especially operators of the plant must be trained on fire management • 'No smoking' signs shall be posted within the power plant area • A fire Assembly point should be identified and marked	Operation	• Provision of serviced fire equipment, evacuation plan and safety signages • Records of fire safety training
	Security risks	• Monitor local security developments and adjust security protocols accordingly. • Maintain a secure perimeter with robust fencing of the site	Operation	• Number of security incidents reported

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response. • Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. • Deploy trained security personnel to guard the site 24/7. • Continue engaging local communities to foster positive relationships and minimize hostility. • Maintain and regularly update a comprehensive security incident response plan • Maintain close coordination with local law enforcement and security agencies • Implement a rigorous vetting process for all employees to minimize the risk of insider threats. • Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters.		(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 ngos (active partnerships).
Impacts on biophysical environment	Impacts on landscape and visual	• Create a comprehensive decommissioning plan that includes strategies for minimizing visual impacts on the landscape. • Implement a revegetation plan using native plants and vegetation to restore the natural landscape and improve visual aesthetics. • Ensure proper management and disposal of all debris and waste materials to prevent visual pollution in the surrounding landscape. • Conduct regular cleanup and maintenance of the site to remove any debris or unsightly materials, ensuring a tidy landscape. • Install informational signs explaining the decommissioning process and future land use plans, promoting transparency and community understanding. • Provide regular updates to stakeholders on decommissioning progress and visual impacts, ensuring ongoing communication and involvement.	Decommissioning	• Photographic documentation: • Vegetation health monitoring: • Number of complaints: • Soil erosion assessment: • Public awareness programs participation. • Community engagement metrics.
	Impacts on biological environment	• Develop habitat protection plans that outline specific measures to protect sensitive habitats, such as wetlands, flora, and fauna during decommissioning. • Implement erosion and sediment control measures to protect soil and water quality, preventing sediment runoff into adjacent habitats. • Plan for revegetation and habitat restoration using native plant species after decommissioning to promote biodiversity and ecosystem recovery. • Monitor and manage invasive species during and after decommissioning to	Decommissioning	• Biodiversity surveys. • Community engagement records. • Erosion and sedimentation rates. • Flora and fauna species lists.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		prevent their spread into disturbed areas. • Implement measures to control noise and vibration during decommissioning to minimize disturbance to local wildlife. • Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. • Engage with local communities to raise awareness about the importance of protecting the biological environment during decommissioning. • Work with environmental specialists and conservation organizations to develop and implement effective mitigation measures. • Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning.		• Habitat quality assessments. • Invasive species monitoring. • Vegetation health monitoring.
	Solid Waste Generation	• Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal • Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste • 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 • Adequate collection and storage of waste on site • Safe transportation to the disposal sites / designated area • Hazardous waste must be disposed by approved waste handler	Decommissioning	• Presence of well-maintained receptacles and centralized collection points
	Wastes (liquid)	• Conduct a comprehensive assessment to identify and categorize all sources of liquid waste generated during decommissioning. • 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. • Whenever possible, use environmentally friendly materials and products that generate less hazardous liquid waste during decommissioning. • Ensure that all liquid wastes are disposed of in accordance with local regulations and environmental standards, using licensed waste disposal facilities. • Provide training for staff on liquid waste handling, storage, and emergency response procedures to minimize risks. • 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 accurate records of liquid waste management activities, including	Decommissioning	• 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.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		quantities generated, treatment methods, and disposal locations. • Prepare for emergencies related to liquid waste, including establishing an emergency contact list and response procedures. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.		
	Noise and Vibration	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Use quiet equipment (i.e., equipment designed with noise control elements). • Co-ordinate with relevant agencies in case the noise produced will require a license. • Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. • Demolish mainly during the day when most of the neighbours are out working.	Decommissioning	• 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)	• Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. • Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. • Enforce speed limits for vehicles operating on-site and on access roads to reduce dust emissions from vehicle traffic. • Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. • 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. • Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term.	Decommissioning	• Community complaints and feedback. • Cumulative dust impact assessment. • Effectiveness of dust control measures. • Health impact assessments. • Long-term dust emission trends. • Post-activity dust cleanup reports. • Public awareness programs participation. • Soil and vegetation dust monitoring. • Traffic patterns and impact assessment. • Visual assessment of dust levels.
	Air quality (vehicle fumes)	• Implement a regular maintenance schedule for all vehicles to ensure they operate efficiently and emit fewer fumes.	Decommissioning	• Community complaints and

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Implement policies to minimize idling time for vehicles, 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. • 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.		feedback. • Cumulative emission impact assessment: • Environmental compliance audits. • Health impact assessment reports. • Long-term emission trends. • Maintenance records of vehicles.
Impacts on Infrastructure & Utilities	Water Resources	• 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 cleanup. • 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.	Decommissioning	• 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	Impacts on Occupational health and safety	• Conduct a thorough occupational health and safety risk assessment to identify hazards associated with decommissioning activities. • 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. • Conduct regular safety inspections of the worksite to identify and address potential hazards promptly. • Establish clear emergency response procedures for incidents such as fires, chemical spills, and medical emergencies, and ensure all workers are trained in these procedures.	Decommissioning	• Incident reporting and tracking. • Health and safety training participation. • Personal protective equipment (PPE) compliance. • Safety audits and inspections. • First aid response records.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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.		• Compliance with safety regulations. • Incident investigation reports.
	Impact to livelihoods from grazing land access restrictions	• Identify and develop alternative grazing areas for affected livestock herders to ensure • Engage with local communities to discuss the decommissioning process and gather feedback on their concerns and suggestions regarding grazing land access. • Invest in community development programs that provide alternative income-generating opportunities, such as skills training or support for small businesses. • Establish a conflict resolution mechanism to address disputes arising from grazing land access restrictions, ensuring fair and timely resolutions. • Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation.	Decommissioning	• Conflict incidence reports. • Community meetings and feedback. • Long-term livelihood trends.
	Trespassing of unauthorized personnel	• Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. • Conduct regular patrols of the perimeter by security staff to identify and address any instances of trespassing quickly. • Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. • Establish a visitor management system that requires all authorized visitors to sign in and out, ensuring that their presence is monitored. • Define and communicate restricted access hours during which the site is closed to unauthorized personnel. • Hold regular community engagement meetings to discuss security concerns and gather feedback on improving site safety.	Decommissioning	• Incident reports of trespassing. • Visitor logs. • Community awareness programs. • Community feedback on security. • Stakeholder engagement effectiveness. • Reporting mechanisms for trespassing.
	Worker influx – Incoming Workforce	• 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. • Consult with and involve local community in the decommissioning activities. • Sensitize workers regarding engagement with local community.	Decommissioning	• Records of employees/updated employee register. • Number of local community employees

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water. • Establish and operationalize an effective Grievance Redress Mechanism accessible to community members. • Include gender considerations in employment opportunities. • Provide appropriate compensation for work done. • Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms.		and external employees/ updated employee register.
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks relevant 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts.	Decommissioning	• 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
	Inadequate grievances management	• 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. • 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.	Decommissioning	• 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				• 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	• Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. • Develop a stakeholder engagement strategy that outlines the objectives, methods, and timelines for engaging with different stakeholders throughout the decommissioning process. • Organize public consultations and forums to solicit feedback from stakeholders, ensuring their voices are heard and concerns are addressed. • Invest in building the capacity of local communities and stakeholders to engage in the decommissioning process effectively, providing training and resources as needed. • Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. • Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. • Ensure that women and vulnerable groups are actively involved in stakeholder engagement processes, addressing any barriers they may face in participation.	Decommissioning	• 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.
	Child and forced labour	• 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. • 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.	Decommissioning	• Number of reported cases of forced labour. • Updated employment register indicating locals employed, their ages, national identification numbers etc. • Grievances raised,

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				aggrieved persons and status on resolution etc.
	Security risks	• Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities. • Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning. • Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. • 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. • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Develop and communicate an emergency response plan that outlines procedures for handling security incidents, including evacuation protocols. • Develop a crisis communication plan to inform stakeholders and the community about security incidents promptly and transparently. • Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities.	Decommissioning	• 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	• Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the decommissioning process. • 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.	Decommissioning	• 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.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Ensure proper waste management practices to prevent contamination of land and water resources, which could impact community health. • Implement sustainable decommissioning practices that prioritize community health and safety while minimizing environmental impacts. • Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process.		
	Fire hazards	• 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. • Establish fire breaks or cleared areas around the site to help prevent the spread of fire. • 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. • Establish communication and coordination with local fire services to ensure a rapid response in case of a fire emergency. • Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary.	Decommissioning	• Fire incident reports. • Fire risk assessments. • Documentation of fire hazards. • Monitoring of flammable materials storage. • Documentation of community feedback on fire safety.

8.0. Environmental and Social Management Plan

This section describes the environmental and social management plan (ESMP) for the proposed project. The ESMP provides a logical framework within which the identified negative environmental and social can be mitigated and monitored (Table 8.1). It also provide a detailed arrangement on how the ESMP will be implemented in each of the project phases. It is expected that NEPCO will refer to this ESMP during all phases of the project and develop specific implementation plans. In addition, the ESMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring should be done. Overall, the key objectives of the ESMP are:

- To monitor the implementation of mitigation measures against potential adverse impacts of construction and operation phases of the project to ensure that they conform and comply with relevant environmental and social policies, guidelines and legislation;
- To assess for emerging non-anticipated adverse environmental and social impacts and implement relevant mitigation measures to maintain them within acceptable levels; and
- To maintain best practice in environmental, social health and safety during all phases of the project. Ensure the project is implemented according to environmental laws of country and state and policies of the WB.

8.1. THE ESMP IMPLEMENTATION TOOLS

The implementation of the proposed ESMP will be the responsibility of the MoEWR, NEPCO 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 NEPCO.
- *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/NEPCO and the neighbours e.g., the wayleaves agreements signed between MoEWR/NEPCO 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/NEPCO that logs all the complaints raised by the neighbours or the general 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/NEPCO.

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 NEPCO shall include the following key measures:

- The contractor shall prepare and implement measures to minimize diseases likely to be contracted by the construction workers as a result 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. 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.

8.1.1.7. SEA/SH Prevention and Response Plan

The contractor will update the existing SEA/SH Prevention and Response Action Plan that will include a GRM that ensures confidentiality to make it more relevant to the subproject. 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 the existing 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).

8.1.1.8. 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 existing SEP shall be updated to suite the circumstances of the subproject, and shall specify the frequency and type of communications, media, contact persons, and locations of communication events. For this assignment, the Contractor shall customize and apply the SEP already developed by the MoEWR as part of the SESRP, and modify where necessary to meet the local unique challenges.

8.1.1.9. 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 Redress Service (GRS) and the World Bank Inspection Panel at no cost. 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. The GRM committee with representation from the community, including the vulnerable groups especially women shall be established before the commencement of the assignment to manage and handle all GRM issues relevant to the project.

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:

(i) *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.

(ii) *Grievance log book*: 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/NEPCO 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 2 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

8.1.2. Operation Phase

The operation phase of the proposed project will be mainly power supply, line maintenance and clearing of wayleaves. NEPCO 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

8.1.3. 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 Stateauthorities.

(b) The MoEWR and NEPCO 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 NEPCO shall explore options of re-use and recycling of the facility's components/structures.

(ii) The decommissioning
(a) The MoEWR and NEPCO 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 NEPCO shall undertake a further survey to identify any contaminated areas and remediate them accordingly.

(iii) Post Closure
The MoEWR and NEPCO shall ensure that the facility's site is free of impacts associated with the closure and demolition. In this regard, the MoEWR and NEPCO 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.

8.2. MONITORING

A systematic process of collecting, analyzing, and using information to track project's progress will be critical in all project phases. This will involve monitoring of routine performance evaluations and periodic reviews. During the construction phase, NEPCO will monitor contractor activities to ensure compliance with ESMP management measures. During the operation phase, NEPCO will monitor facility operations, conduct EHS audits, and ensure compliance with environmental, health, and social issues. Some of the key variables to be monitored shall include:

- *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 NEPCO determines the issue is resolved satisfactorily.
- A GRM monitoring system shall be established to ensure that all GRM matters are conclusively handled and reported accordingly.

Table 8-1: The Environmental and social management plan (ESMP) for the proposed NEPCO Hybrid Power Plant - Gaalkacyo

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
CONSTRUCTION PHASE						
Impacts on biophysical environment	Landscape and visuals	• Erect a fence around the power plant.	• Contractor • Proponent	• Presence of a perimeter fence	• One-off	2500
	Soil, groundwater and surface water contamination	• Scoop and correctly dispose contaminated soil. • Care must be exercised not to spill any fossil fuels • Construction vehicles must be maintained in good state. • Contractor to develop an oil-spill containment plan. • Ensure waste water generated is discharged or drained into approved drainage facilities • No vehicle maintenance and service shall be done at project site	• Contractor • Proponent	• Records of any leakages from construction equipment/ vehicles. • Oil spill containment plan. • Provision of fuel/oil drip and spill trays	• Quarterly	3500
	Flood risk	• Ensure drainage channels are free of any obstruction at all times. • Create flood diversions/spill ways to divert water from the construction site,	• Contractor • Proponent	• Provision of drainage system • Raised foundations for the structures	• Quarterly	2500
	Air quality (Dust)	• Suppress dust during dry periods by use of water sprays; • Stockpiles of excavated soil should be enclosed/covered/watered during dry or windy conditions. • Burning of woody debris & construction waste to be prohibited • Ensure all the personnel use PPEs. • Restrict speed on loose surface roads during dry or dusty conditions • Keep stockpiles and exposed soils compacted and re-vegetate as soon as possible. • Construction trucks moving materials to site should be covered to prevent material dust emissions.	• Contractor • Proponent	• Visual Observation of dust Provision of PPEs especially masks	• Monthly	4000
	Air quality (Vehicle exhaust emissions)	• Drivers of construction vehicles must be sensitized so that they do not leave vehicles idling so that exhaust emissions are lowered.	• Contractor • Proponent	• Engine maintenance records	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter.		• Inspection of stacks		
	Noise & vibration	• Employ modern construction equipment fitted with noise-reduction technologies • Ensure regular maintenance of machinery to reduce noise emissions. • Establish a GRM for community to report noise or vibration disturbances. • Establish a monitoring program to regularly measure noise and vibration levels. • Inform nearby communities in advance about scheduled high-noise activities. • Provide appropriate PPEs to workers during construction activities. • Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). • Train workers on the importance of noise control and best practices on noise.	• Contractor • Proponent	• Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant	• Monthly	3500
	Biodiversity (Fauna)	• Site clearing work/earthwork shall be carried out 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. • Site preparation shall minimize clearing of vegetation and topsoil. • Ensure wildlife-friendly designs for infrastructures. • Temporary-use areas shall be restored and revegetated • An ecologist shall be hired to coordinate the fauna monitoring.	• Contractor • Proponent	• Full implementation of biodiversity management plan for the project • Regular biodiversity monitoring and reporting	• Quaterly	5000
	Biodiversity (Flora)	• Ensure proper demarcation and delineation of the project area to be affected by construction works. • Designate access routes and parking areas • Re-vegetation including planting of trees around the plant/facility	• Contractor • Proponent	• Number of trees cleared • Planted trees	• Quarterly	4000
	Soil erosion	• Avoid ground-breaking during the seasons of high	• Contractor	• Assess size of rills	• Qaurterly	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		rainfall to avoid erosion. • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Construction related impacts like erosion and cut slope destabilizing should be addressed through landscaping and grassing, carting away and proper disposal of construction materials • Use silt traps where necessary • Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Ensure spoil from excavations is arranged according to the various soil layers. This soil can then be returned during landscaping and then rehabilitation, in the correct order which they were removed that is top soil last	• Proponent	or Gulleys forming from accelerated run off from compacted areas		
	Wastes (Solid wastes)	• All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through a approved waste handler • Segregate waste • Provide litter collection facilities such as bins • Contractor to put in place and comply with a site waste management plan • Use of durable, long-lasting materials that will not need to be replaced as often, thereby reducing the amount of waste generated over time • Recovery of materials remains and return to stores • Re-use of materials where possible • Proper budgeting to avoid waste generation • Proper disposal of waste in line with solid waste regulation • Construction wastes to be managed in accordance with internationally accepted construction standards of a hybrid power plant	• Contractor • Proponent	• Presence of well-maintained receptacles and centralized collection points.	• Quarterly	7500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Wastes (Liquid wastes)	• All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. • Create awareness for the employees on site on procedures of dealing with spills and leaks • Develop and implement a detailed Spill Prevention Plan (SPP) • Disposal of waste through septic tanks • 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 stormwater. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews. • Proper training for the handling and use of fuels for the operators of the power plant. • Provide sanitary waste facilities for both genders clearly marked • Refuelling and maintenance of vehicles will not take place at the construction site. • The waste oil or used oil must be disposed-off appropriately. • Vehicles and equipment must be serviced regularly and kept in good state to avoid leaks.	• Contractor • Proponent	• Engine maintenance records • Oil spill containment plan • Presence of separate and clean washrooms for both the gents and ladies	• Quarterly	6000
Impacts on infrastructure and utilities	Water consumption	• Ensure prudent use of available water • Consultations with the project local committee on water use to avoid conflicts with the community • Source and utilize a sustainable and reliable water supply for both construction and operation phase.	• Contractor • Proponent	• Water usage records	• Monthly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Energy Consumption	• Ensure responsible electricity use at the construction site through sensitization of staff to conserve electricity. • Proper planning of transportation of materials will ensure that fossil fuels (diesel, petrol) are not consumed in excessive amounts. • Complementary to these measures, they monitor energy use during construction and set targets for reduction of energy use.	• Contractor • Proponent	• Energy consumption records	• Monthly	3500
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Coordinate with the local herders on establishing alternative grazing routes or areas. • Engage regularly with affected herders/community leaders to identify their concerns and collaboratively design grazing solutions. • Conduct regular environmental monitoring to assess the availability and quality of alternative grazing areas and adjust mitigation measures. • Provide alternative water points for livestock near the construction area. • Establish a grievance redress mechanism to address any conflicts or complaints from herders regarding grazing land access.	• Contractor • Proponent	• Number of Alternative Grazing Routes/Areas Established. • Frequency of Community Consultations. • Grazing Land Access Complaints. • Usage of Alternative Grazing Areas. • Incidence of Conflict Over Grazing Access. • Changes in Grazing Patterns.	• Quarterly	3000
	Archaeology and cultural heritage	• 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 archaeological artifacts or sites are discovered,	• Contractor • Proponent		One-off	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		establish temporary buffer zones around these areas to protect them from further disturbance. • 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	• Controlled access to the site only with prior approval • Fencing off the construction site to keep of unauthorized personnel • Hazard communication • Maintain records of any person who comes to site • Ensure proper barricading	• Contractor • Proponent	• Presence of a controlled access and records of every person accessing the site	• Weekly	4500
	Worker influx – Incoming Workforce	• 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.	• Contractor • Proponent	• Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee register.	• Quarterly	2500
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks relevant to the sub-project. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment	• Contractor • Proponent	• Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. • Code of conduct signed by all	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		contracts.		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	• Ensure full compliance with local labor laws. • Ensure that all workers receive clear, written contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. • Establish mechanisms to guarantee fair and timely payment of wages and benefits. • Establish worker welfare committees to represent labor concerns, promote dialogue, and facilitate the resolution of potential issues. • Implement and enforce non-discrimination policies to ensure equal treatment of all workers regardless of gender and clan. • Set up a formal, transparent grievance redress mechanism to handle worker complaints and disputes in a timely manner.	• Contractor • Proponent	• 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	3000
	Child and forced labour	• Implement and monitor the employment register regularly. • Compliance with the national labor laws and labour	• Contractor • Proponent	• Updated employment register indicating	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		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	• Conduct a comprehensive risk assessment to identify specific 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. • Provide workers with ID badges and restrict entry to authorized personnel only. • 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	• Contractor • Proponent	• 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	• Quarterly	7500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		functionality. • Frequency of security audits.		
	Occupational Health and safety Impacts	• Develop and implement a comprehensive OHS plan before the commencement of the project • Use skilled personnel for activities which demand skills/technical tasks • Workers coming to the site should be knowledgeable on safety precautions to take • Provide appropriate PPE to all workers. • Undertake risk assessment by contractor of the construction activities and implement mitigation measures appropriately • Availability of equipped first aid box on site • Provide safe drinking water for workers • Engagement of trained first aider on site • Establish safety committees	• Contractor • Proponent	• Records of any near misses, incident, and accidents. • Records of corrective actions implemented if there was an accident.	• Quarterly	5500
	Community health and safety risks	• Allowing migrant workers time to be with their families • Awareness creation and consultations with local communities prior and during construction on the dangers of these diseases • Ensure equal treatment of workers • Informing workers on local cultural values and health matters. • The contractor is impressed upon not to set a construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures.	• Contractor • Proponent	• Number of awareness creation sessions conducted. • Availability of and distribution of condoms	• Quarterly	5500
	Fire Hazards	• 'No smoking' signs shall be posted at the construction site • A fire risk assessment and evacuation plan should be	• Contractor • Proponent	• Records of any Fire incidences • Fire equipment	• Quarterly	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		prepared and must be posted in various points of the construction site including procedures to take when a fire is reported. • Create awareness to the construction workers on potential fire hazards • Designate an assembly point • No smoking shall be done on construction site • Provision of firefighting equipment on site during construction.		and evacuation plan		
	Traffic risk	• Develop and implement a Traffic Management Plan (TMP). • Use traffic signs, barriers, and cones to guide and direct both construction and local traffic. • Enforce strict speed limits for construction vehicles within the construction site and along designated transport routes. • Install speed bumps or other traffic-calming measures on roads near the construction site. • 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. • Designate safe parking and loading zones for construction vehicles away from main roads and community spaces.	• Contractor • Proponent	• 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.	• Monthly	4000
	Risks related to Inadequate stakeholder engagement	• Update the existing SEP and make it more proportionate to the subproject and the identified stakeholders. • In line with the SEP, undertake adequate consultations	• Contractor • Proponent	• Availability of and implementation of the Stakeholder	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		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 and households 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	• 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	• Contractor • Proponent	• Local Grievances Committee in place, composition of committee, awareness of	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		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 PHASE						
Impacts on biophysical environment	Landscape and visual	• Fence off the power plant.	• Proponent	• Presence of a perimeter fence	• One-off	1500
	Soil, groundwater and surface water contamination	• Infrastructure shall be designed to ensure that contaminated run-off does not reach water source i.e., earth dam. • Contractor to develop an oil-spill containment plan as part of the emergency response plan. • No vehicle maintenance and service shall be done at project site	• Proponent	• Oil spill containment plan. • Provision of fuel/oil drip and spill trays	• Quarterly	5000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.				
	Flood risks	• Ensure drainage channels are free of any obstruction at all times i.e., not blocked • Construct more channels and or expand existing ones • Raise foundations of the solar panels and ensure a proper and from concrete base • Create flooding diversions and or spill ways to divert water from getting into the solar power facility	• Proponent • Contractor	• Provision of drainage system • Raised foundations for the structures	• Quarterly	3000
	Air quality (Dust)	• Trees can be planted around the plant/facility provided they do not cast shadows to the solar panels to act as wind breakers and hence decrease dust pollution • Ensure planting of grass around and within the facility compound	• Proponent	• Visual inspection	• Quarterly	4000
	Air quality (Vehicle exhaust emissions)	• Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO2, SO2 and suspended particulate matter. • Regularly report emissions data to local regulatory authorities as part of environmental compliance.	• Proponent	• Engine maintenance records • Inspection of stacks	• Quarterly	3000
	Noise & vibration	• 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	• Proponent	• Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant	• Quarterly	2500
	Biodiversity (Fauna)	• Ensure wildlife-friendly designs for infrastructures. • An ecologist shall be hired to coordinate the fauna	Proponent	Full implementation of biodiversity	Quarterly	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		monitoring. • Bird deterrents will be installed to prevent collisions with solar panels. • Post-construction monitoring will be undertaken to assess the impacts on local fauna and adapt mitigation strategies.		management plan for the project Regular biodiversity monitoring and reporting		
	Biodiversity (Flora)	• Re-vegetation including planting of trees around the plant/facility	• Proponent	• Number of trees cleared • Planted trees	• Quarterly	3000
	Soil erosion	• Monitoring of areas of exposed soil during rainy seasons to ensure that any incidents of erosion are quickly controlled. • Landscaping with grass on areas without electrical installation (lower areas) • Construct the drainage system in a way to follow natural drain of the water • Concrete only the required area and leave the rest of the land with vegetation like grass • Construct rain water harvesting system on the control buildings/office and harness into storage tanks for use	• Proponent	• 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	5500
	Wastes (Solid)	• Provide waste handling facilities such as labelled waste bins • Emphasis on prudent waste generation and give priority to reduction at source • Undertake solid waste management awareness to operators • Operator to contract a licensed waste handler to collect and dispose solid waste *Damaged solar panels and hazardous wastes* • 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 a approved waste handler	• Proponent	• Presence of well-maintained receptacles and centralized collection points.	• Quarterly	8500
	Wastes (Liquid)	*Sanitary wastes*	• Proponent	• Presence of	• Quarterly	7000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Provide sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks *Oils from vehicles* • 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. *Chemicals* • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. *Accidental fuel and oil spill* • Ensure quick clean-up of spills by designated response teams trained in handling hazardous materials. • Install oil-water separators in drainage systems to capture and remove oil or fuel from stormwater. • 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. • Ensure secure storage of all hazardous materials, including fuel and oil, in compliance with local regulations. • Keep accurate documentation of fuel and oil storage volumes, transfer activities, and inspection results to aid in compliance reporting and performance reviews.		separate and clean washrooms for both the gents and ladies. • Engine maintenance records • Oil spill containment plan • Records of all accidental spills and number of Liters		
	Water consumption	• Ensure prudent use of water. • Install water-conserving automatic taps.	• Proponent	• Water usage records	• Monthly	3500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
Impacts on infrastructure and utilities		• Any water leaks through damaged pipes and faulty taps should be fixed promptly.				
	Energy consumption	*Lightings* • Install an energy-efficient lighting system • 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. • Integrate lighting controls into the plant's energy management system to monitor and optimize energy use in real-time. • Conduct periodic energy audits to evaluate lighting energy consumption and identify areas for further improvement.	• Proponent	• Solar Energy Generation (kWh/month): • Battery Energy Storage System (BESS) Utilization (cycles/month). • Lighting Energy Consumption (kWh/month). • Carbon Emissions (tons of CO2/month).	• Monthly	4200
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	• Continue consultations with local communities to assess their needs on grazing access alternatives. • Support the development of pasture improvement projects • Provide alternative livelihood opportunities for pastoralists • Install livestock water points at strategic locations near alternative grazing areas. • Establish and maintain a grievance redress mechanism • Conduct regular monitoring of the livelihoods of affected pastoralists.	• Proponent	• Number of complaints from affected communities (monthly). • Access routes to grazing lands (percentage maintained). • Community satisfaction with alternative grazing lands (% satisfaction). • Community engagement and participation (number of meetings/year). • Conflict or dispute incidents (number	• Quarterly	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				reported/year).		
	Trespassing of unauthorized personnel	• Fencing off the facility to keep of community members, children and livestock from entering into the facility • Controlled access to the site only with prior approval • Maintain records of any person who comes to site	• Proponent	• Presence of a controlled access and records of every person accessing the site	• Monthly	2500
	Worker influx – Incoming Workforce	• Prioritize the hiring of local workers to reduce the need for an incoming workforce. • Establish and enforce a strict code of conduct for incoming workers. • Implement awareness programs to sensitize both the incoming workforce and local communities on cultural differences. • Design worker accommodations that are separate from local residential areas but ensure they meet adequate living standards. • Encourage the use of local suppliers for food, materials, and other needs of the workforce to support the local economy. • Implement comprehensive waste management systems in worker accommodation areas. • Ensure both the workforce and the local community have access to a grievance redress mechanism. • Continuously monitor the behavior of the incoming workforce, addressing issues promptly to prevent tensions with the local population. • Maintain ongoing dialogue with local communities to understand and address their concerns about the worker influx.	• Proponent	• Number of local workers employed (% of total workforce). • Community grievances related to workforce behavior (number of grievances/month). • Community interaction incidents (number reported/month). • Local business engagement (percentage of local suppliers engaged). • Worker turnover rate (%). • Worker welfare program implementation (% of programs implemented). • Community consultation meetings held	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				(number/year).		
	Gender-based violence	*GBV- SEA and SH* • Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts. *Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges* • Consult VMGs and Vulnerable individuals and households on charges for sub project services and put in place specific interventions to ensure the vulnerable equally access project benefits.	• Proponent	• 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	2500
	Labour disputes	• Ensure all employees have clear and legally binding employment contracts that outline their rights, responsibilities, wages, and benefits to prevent misunderstandings. • Establish an accessible, transparent grievance mechanism for workers to voice their concerns or disputes. • Maintain open communication between management and workers. • Ensure full compliance with national labor laws. • Implement fair and transparent disciplinary procedures. • Promote equal opportunities and non-discriminatory	• Proponent	• Number of Labor Disputes Raised (disputes/month): • Grievances Resolved Within Agreed Timeframe (%): • Worker Turnover Rate (%). • Number of Grievances Filed Regarding Wages or Compensation	• Quarterly	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		practices in hiring, promotion, and compensation to avoid conflicts. • Set up a monitoring system to track and evaluate labor 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.		(grievances/month). • Number of Labor Dispute Awareness Campaigns (number/year).		
	Child and forced labour	• 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.	• Proponent	• Number of child labor incidents reported (incidents/month). • Number of forced labor incidents reported (incidents/year). • Grievances related to child or forced labor (number of grievances/year). • Community outreach and awareness campaigns on child labor (campaigns/year). • Compliance with international labor standards (compliance level). • Social audits conducted (number of audits/year).	• Quarterly	3500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				• Local community feedback on employment practices (satisfaction level).		
	Risks related to poor or inadequate stakeholder engagement (Conflict)	*Risks related to Inadequate stakeholder engagement* • Update the existingSEP to make it more relevant to the subproject and the identified stakeholders. • 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. • 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 grievance redress mechanism to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. *Inadequate grievances management* • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Work closely with the GRM committee members in solving the conflicts • Solve all conflicts/grievances at the earliest time possible • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures	• Proponent	• 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.	• Monthly	3000
	Occupational health and Safety	• Ensure only qualified staff are employed to work in the facility	• Proponent	• Provision of PPEs and WIBA cover	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• All workers operating the project site must be equipped with appropriate and adequate person protective equipment (PPE) such as; safety footwear, helmet among others. • Operators must be skilled on firefighting management • Annual EHS audits should be done		• Environmental audit reports		
	Community health and safety risks	*Public Health Impacts* • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. *Shocks and electrocutions* • Inspect the wiring of the houses before connecting power • Safety awareness campaigns to the community before connection of power on safety precautions such as: • 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. *Public Health Impacts –HIV/AIDs*	• Proponent	• Number of awareness creation sessions conducted. • Records of awareness sessions conducted • Incidences report • Number of awareness creation sessions conducted. • Availability of and distribution of condoms	• Monthly	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• 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	• The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including BESS locations, etc. • Detection/alarm systems that can detect fire should be and installed • A fire evacuation plan should be prepared and posted at strategic points and should include procedures to take when a fire is reported. • Workers especially operators of the plant must be trained on fire management • 'No smoking' signs shall be posted within the power plant area • A fire Assembly point should be identified and marked	• Proponent	• Provision of serviced fire equipment, evacuation plan and safety signages • Records of fire safety training	• Monthly	6500
	Security risks	• Monitor local security developments and adjust security protocols accordingly. • Maintain a secure perimeter with robust fencing of the site • Use remote monitoring where feasible, with a centralized control room for real-time surveillance and immediate response. • Enforce strict access control measures, ensuring that only authorized personnel can enter the facility. • Deploy trained security personnel to guard the site 24/7. • Continue engaging local communities to foster positive relationships and minimize hostility. • Maintain and regularly update a comprehensive security incident response plan • Maintain close coordination with local law enforcement and security agencies	• Proponent	• 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	• Monthly	10000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Implement a rigorous vetting process for all employees to minimize the risk of insider threats. • Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters.		(number/year). • Collaboration with local law enforcement (number of meetings/year). • Number of partnerships established with security ngos (active partnerships).		
DECOMMISSIONING PHASE						
Impacts on biophysical environment	Impacts on landscape and visual	• Create a comprehensive decommissioning plan that includes strategies for minimizing visual impacts on the landscape. • Implement a revegetation plan using native plants and vegetation to restore the natural landscape and improve visual aesthetics. • Ensure proper management and disposal of all debris and waste materials to prevent visual pollution in the surrounding landscape. • Conduct regular cleanup and maintenance of the site to remove any debris or unsightly materials, ensuring a tidy landscape. • Install informational signs explaining the decommissioning process and future land use plans, promoting transparency and community understanding. • Provide regular updates to stakeholders on decommissioning progress and visual impacts, ensuring ongoing communication and involvement.	• Contractor	• Photographic documentation: • Vegetation health monitoring: • Number of complaints: • Soil erosion assessment: • Public awareness programs participation. • Community engagement metrics.	• One-off	1500
	Impacts on biological environment	• Develop habitat protection plans that outline specific measures to protect sensitive habitats, such as wetlands, flora, and fauna during decommissioning. • Implement erosion and sediment control measures to	• Proponent • Contractor	• Biodiversity surveys. • Community engagement	• Monthly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		protect soil and water quality, preventing sediment runoff into adjacent habitats. • Plan for revegetation and habitat restoration using native plant species after decommissioning to promote biodiversity and ecosystem recovery. • Monitor and manage invasive species during and after decommissioning to prevent their spread into disturbed areas. • Implement measures to control noise and vibration during decommissioning to minimize disturbance to local wildlife. • Ensure proper disposal of waste materials to prevent pollution and harm to the biological environment. • Engage with local communities to raise awareness about the importance of protecting the biological environment during decommissioning. • Work with environmental specialists and conservation organizations to develop and implement effective mitigation measures. • Develop detailed site restoration plans that include objectives, timelines, and responsibilities for restoring biological habitats post-decommissioning.		records. • Erosion and sedimentation rates. • Flora and fauna species lists. • Habitat quality assessments. • Invasive species monitoring. • Vegetation health monitoring.		
	Solid Waste Generation	• Demolition contractor to adhere to the various manufacturer's guidelines and requirements regarding demolition and disposal • Segregation of waste in order to separate hazardous waste from non-hazardous waste and other streams of waste • 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 • Adequate collection and storage of waste on site • Safe transportation to the disposal sites / designated area • Hazardous waste must be disposed by approved waste handler	• Contractor	• Presence of well-maintained receptacles and centralized collection points	• Monthly	9500
	Wastes (liquid)	• Conduct a comprehensive assessment to identify and	• Contractor	• Liquid waste	• Monthly	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		categorize all sources of liquid waste generated during decommissioning. • 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. • Whenever possible, use environmentally friendly materials and products that generate less hazardous liquid waste during decommissioning. • Ensure that all liquid wastes are disposed of in accordance with local regulations and environmental standards, using licensed waste disposal facilities. • Provide training for staff on liquid waste handling, storage, and emergency response procedures to minimize risks. • 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 accurate records of liquid waste management activities, including quantities generated, treatment methods, and disposal locations. • Prepare for emergencies related to liquid waste, including establishing an emergency contact list and response procedures. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.		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.		
	Noise and Vibration	• Install portable barriers to shield compressors and other small stationary equipment where necessary. • Use quiet equipment (i.e., equipment designed with noise control elements).	• Contractor	• Noise levels- Records of noise measurements done by	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Co-ordinate with relevant agencies in case the noise produced will require a license. • Limit pickup trucks and other small equipment to a minimum idling time and observe a common-sense approach to vehicle use and encourage workers to shut off vehicle engines whenever possible. • Demolish mainly during the day when most of the neighbours are out working.		contractor within the project area and at distances of 30m from the project site		
	Air quality (dust)	• Use water sprays or misting systems to dampen surfaces and reduce dust generation, particularly on unpaved roads and active work areas. • Implement soil stabilization techniques, such as using binders or applying vegetation, to minimize dust from disturbed soil areas. • Enforce speed limits for vehicles operating on-site and on access roads to reduce dust emissions from vehicle traffic. • Use tarps or other coverings to protect stockpiles of loose materials from wind erosion and dust generation. • 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. • Plan for site rehabilitation after decommissioning to restore vegetation cover, which can help prevent dust generation in the long term.	• Contractor	• Community complaints and feedback. • Cumulative dust impact assessment. • Effectiveness of dust control measures. • Health impact assessments. • Long-term dust emission trends. • Post-activity dust cleanup reports. • Public awareness programs participation. • Soil and vegetation dust monitoring. • Traffic patterns and impact assessment. • Visual assessment of dust levels.	• Weekly	3500
	Air quality (vehicle fumes)	• Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions.	• Contractor	• Community complaints and feedback.	• Weekly	4200

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• 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.		• Cumulative emission impact assessment: • Environmental compliance audits. • Health impact assessment reports. • Long-term emission trends. • Maintenance records of vehicles.		
Impacts on Infrastructure & Utilities	Water Resources	• 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 cleanup. • 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.	• Contractor	• 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.	• Monthly	5500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
Impacts on social environment	Impacts on Occupational health and safety	• Conduct a thorough occupational health and safety risk assessment to identify hazards associated with decommissioning activities. • 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. • Conduct regular safety inspections of the worksite to identify and address potential hazards promptly. • 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.	• Contractor	• 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.	• Weekly	5000
	Impact to livelihoods from grazing land access restrictions	• Identify and develop alternative grazing areas for affected livestock herders to ensure • Engage with local communities to discuss the decommissioning process and gather feedback on their concerns and suggestions regarding grazing land access. • Invest in community development programs that	• Proponent	• Conflict incidence reports. • Community meetings and feedback. • Long-term livelihood trends.	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		provide alternative income-generating opportunities, such as skills training or support for small businesses. • Establish a conflict resolution mechanism to address disputes arising from grazing land access restrictions, ensuring fair and timely resolutions. • Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation.				
	Trespassing of unauthorized personnel	• Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. • Conduct regular patrols of the perimeter by security staff to identify and address any instances of trespassing quickly. • Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. • Establish a visitor management system that requires all authorized visitors to sign in and out, ensuring that their presence is monitored. • Define and communicate restricted access hours during which the site is closed to unauthorized personnel. • Hold regular community engagement meetings to discuss security concerns and gather feedback on improving site safety.	• Contractor	• Incident reports of trespassing. • Visitor logs. • Community awareness programs. • Community feedback on security. • Stakeholder engagement effectiveness. • Reporting mechanisms for trespassing.	• Monthly	1500
	Worker influx – Incoming Workforce	• 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. • Consult with and involve local community in the decommissioning activities. • Sensitize workers regarding engagement with local community. • Make provision to provide resources needed by the workers if the need for such resources may result to competition e.g., water.	• Proponent • Contractor	• Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Establish and operationalize an effective Grievance Redress Mechanism accessible to community members. • Include gender considerations in employment opportunities. • Provide appropriate compensation for work done. • Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms.		register.		
	Gender-based violence	• Update the existing SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks that are relevant 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. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts are singed by all employers or incorporated in the employment contracts.	• Proponent • Contractor	• 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	• Monthly	3700
	Inadequate grievances management	• Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism.	• Proponent	• Local Grievances Committee in place, composition of	• Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Implement a worker's grievances mechanism. • 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.		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	• Conduct a comprehensive stakeholder mapping exercise to identify all relevant stakeholders, including local communities, government agencies, NGOs, and other affected parties. • Develop a stakeholder engagement strategy that outlines the objectives, methods, and timelines for engaging with different stakeholders throughout the decommissioning process. • Organize public consultations and forums to solicit	• Proponent	• Frequency of stakeholder meetings. • Documentation of stakeholder concerns. • Follow-up actions on feedback. • Community	• Monthly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		feedback from stakeholders, ensuring their voices are heard and concerns are addressed. • Invest in building the capacity of local communities and stakeholders to engage in the decommissioning process effectively, providing training and resources as needed. • Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. • Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. • Ensure that women and vulnerable groups are actively involved in stakeholder engagement processes, addressing any barriers they may face in participation.		representation in decision-making. • Collaboration with local organizations. • Long-term engagement strategies.		
	Child and forced labour	• 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. • 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.	• Proponent • Contractor	• 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.	• Monthly	3500
	Security risks	• Conduct a thorough security risk assessment to identify potential threats and vulnerabilities associated with the decommissioning activities. • Create a comprehensive security plan that outlines specific measures, protocols, and responsibilities for ensuring site security during decommissioning.	• Proponent • Contractor	• Incident reports. • Access control measures. • Response time to security incidents. • Training of	• Quarterly	7500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Employ trained security personnel to monitor the site, control access, and respond to security incidents as they arise. • 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. • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Develop and communicate an emergency response plan that outlines procedures for handling security incidents, including evacuation protocols. • Develop a crisis communication plan to inform stakeholders and the community about security incidents promptly and transparently. • Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities.		security personnel. • Community security awareness programs. • Stakeholder feedback on security. • Analysis of security trends. • Feedback from security personnel.		
	Community health and safety risks	• Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the decommissioning process. • 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	• Proponent	• Health incident reports. • Community health assessments. • Feedback mechanisms for community concerns. • Community satisfaction surveys. • Communication of health risks. • Injury rate monitoring. • Environmental	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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 impact community health. • Implement sustainable decommissioning practices that prioritize community health and safety while minimizing environmental impacts. • Establish a feedback mechanism that allows community members to report health and safety concerns related to the decommissioning process.		health audits. • Documentation of community feedback.		
	Fire hazards	• 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. • Establish fire breaks or cleared areas around the site to help prevent the spread of fire. • 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	• Contractor	• Fire incident reports. • Fire risk assessments. • Documentation of fire hazards. • Monitoring of flammable materials storage. • Documentation of community feedback on fire safety.	• Weekly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		removal process. • Establish communication and coordination with local fire services to ensure a rapid response in case of a fire emergency. • Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary.				
					Total	**278,600**

8.3. THE ESMP IMPLEMENTATION ARRANGEMENTS

The specific roles and responsibilities of proponent, implementing agency, supervision consultant and contractor are as indicated in Table 8-2.

Table 8-2: The ESMP implementation arrangements for the proposed NEPCO Hybrid Power Plant-Gaalkacyo

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.
NEPCO	NEPCO 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; • NEPCO 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 • NEPCO 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	• 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.

Entity	Roles and responsibilities
	• 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 Gaalkacyo 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	• Implementation of the contractor related aspects of the ESMP and regularly (monthly) reporting • 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 NEPCO. 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.

Entity	Roles and responsibilities
	• 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.

9.0. Stakeholder Analysis, Public Consultations and Disclosure

9.1. OVERVIEW

This section summarizes the outcomes of the stakeholder consultation process for the proposed NEPCO hybrid power plant project in Gaalkacyo, 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 on 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 Gaalkacyo District, Mudug 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.
- Caafi Sanitation Company
- *Community-based organizations* (*CBOs*): Local non-governmental organizations and community groups active in the area.
- Gender advocacy groups
- Golis Telecom Representative
- Health Services Providers (Clinics)
- Internally Displaced Persons – A representative from Saalam IDP Camp
- *Local communities:* Representatives from households in Gaalkacyo City and surrounding villages
- Mass Media – Represented by Radio Ergo
- Ministry of Health – Puntland State
- NGOs (Represented by Hoodo Organization
- *Relevant Puntland State entities:* Representatives from the Ministry of Environment, Ministry of Energy, Ministry of Health, North Gaalkayo Municipality.
- *Religious and cultural leaders*: Leaders who influence social dynamics in Gaalkacyo City.
- Religious Leaders – Represented by Sheikh Mohamud Ahmed (Imam)
- Representatives of Environmental Associations
- Representatives of Persons Living with Disabilities
- Women Groups Representatives
- Youth Groups (represented by Hamilo Youth)

9.2. OBJECTIVES OF THE STAKEHOLDERS' CONSULTATIONS

The key objectives of the stakeholder consultation process were:

- To inform stakeholders about the proposed NEPCO 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. The consultations were facilitated by HD Expert teams in close collaboration with the NEPCO and local communities' representatives. 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 NEPCO from economic perspective.

There are no sacred sites or cultural heritage sites in the vicinity of the project area, and no conflicts over land/land ownership was expressed. Due to its expansive nature and existence of pockets of vegetation dominated mainly by *Acacia tortilis* and *Salvadora persica*, the project site on regular basis hosts a variety of wildlife species, including Gerenuk, Dorcas Gazelle and snakes, especially *Gungume* (the African Rock Python).

A common request across all stakeholder groups was the need for ongoing, transparent communication from the NEPCO throughout the construction and operation phases of the project. Stakeholders emphasized the importance of timely updates on construction activities, any potential disruptions, and the environmental and social performance of the plant. Communities expect the ESP to establish clear channels of communication to keep them informed.

While the majority of stakeholders engaged supported the project, some concerns were raised about possible disruptions during construction, including dust, noise, and increased traffic. They expect that NEPCO will implement mitigation measures and keep them informed of any significant changes or delays.

Local stakeholders, particularly youth and women's groups, emphasized the need for job creation as a significant benefit of the project. They expressed an interest in local recruitment, training, and skills development opportunities provided by the project during both the construction and

operational phases. Some stakeholders expressed concern about the long-term environmental and social impacts of the project. They called for regular monitoring and reporting on the plant's environmental footprint, including any impacts on water resources, air quality, and land use.

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

Stakeholder category	Summary of interests and concerns
Women Groups Representatives	Women group representatives in Gaalkacyo have a vested interest in the proposed NEPCO hybrid power plant due to its potential to transform their social and economic opportunities. These groups advocate for enhanced access to energy to support income-generating activities, such as small-scale businesses and cottage industries, which many women rely on for livelihoods. Improved electricity can also facilitate better access to healthcare, education, and security, addressing key challenges faced by women in the region.
Youth Groups (represented by Hamilo Youth)	Many young people in the region face high unemployment and limited access to reliable electricity, which hampers their ability to pursue entrepreneurial ventures, vocational training, and digital connectivity. The project presents a chance to address these challenges by offering job opportunities during construction and operation, as well as supporting local industries that can thrive with improved energy access. However, they also expressed concerns about potential social risks, such as inequitable resource distribution or social tensions due to workforce influx.
Business operators	Business operator representatives in Gaalkacyo viewed the proposed NEPCO hybrid power plant as a pivotal development for boosting local economic activities and expanding commercial opportunities. Reliable and affordable electricity is a critical enabler for businesses, reducing operational costs, improving productivity, and facilitating the adoption of modern technologies. Representative emphasized that the proposed project can support growth in sectors such as manufacturing, retail, and services, which are often constrained by inconsistent energy supply. He also advocated for energy tariffs that are fair and supportive of small and medium-sized enterprises (SMEs). However, business operators also raise concerns about potential disruptions during construction, such as increased traffic or temporary supply chain interruptions.
Caafi Sanitation Company	Representatives of Caafi Sanitation Company in Gaalkacyo saw the proposed NEPCO hybrid power plant as an opportunity to enhance their operational efficiency and expand their services. Reliable electricity is essential for powering sanitation equipment, waste management facilities, all of which are vital to maintaining hygiene and public health in the region. The plant could also support the company's plans to adopt more sustainable practices, such as energy-efficient technologies or renewable-powered sanitation solutions. However, the company expressed concerns about potential environmental impacts, such as waste generation during construction and operation, and sought assurances that these will be managed responsibly.
Ministry of Health – Puntland State	Representative from the Ministry of Health in Gaalkacyo viewed the proposed NEPCO hybrid power plant as a crucial development for strengthening the healthcare system in the region. Reliable electricity is essential for powering medical equipment, preserving vaccines, and ensuring consistent lighting and climate control in healthcare facilities. The improved energy access could enhance the delivery of critical health services, particularly in rural or underserved areas. Ministry representative also emphasize the potential for the plant to support public health initiatives, such as clean water provision and improved sanitation, indirectly reducing disease burdens. However, he expressed concerns about potential health risks associated with construction, such as dust, noise, or an influx of workers, and advocated for measures to safeguard community health and safety.
Gaalkacyo North Municipality	Representative from the North Gaalkacyo Municipality saw the proposed NEPCO hybrid power plant as a transformative project that aligns with their vision for regional development. The plant promises to enhance energy reliability, which is critical for supporting municipal infrastructure, improving service delivery, and attracting investment to the area. The municipality also viewed the project as an opportunity to foster urban growth, with the potential to stimulate business activity, improve living standards, and create employment opportunities. However, he raised concerns about land use changes, environmental impacts, and the need for adequate stakeholder engagement to address community needs and expectations.

Stakeholder category	Summary of interests and concerns
Ministry of Environment	The Ministry of Environment have a strong interest in ensuring that the proposed NEPCO hybrid power plant aligns with environmental sustainability goals. They may view the project as an opportunity to transition towards cleaner energy solutions, reducing reliance on fossil fuels and contributing to climate change mitigation. However, the ministry advocated for robust implementation of mitigation measures, and adherence to national and international environmental standards. Collaboration with the Ministry of Environment will be essential to ensure that the power plant contributes to sustainable development while safeguarding Gaalkacyo's natural resources and ecosystems.
Puntland State Ministry of Energy	The Puntland State Ministry of Energy viewed the proposed NEPCO hybrid power plant as a strategic initiative to enhance energy access, reliability, and sustainability in the region. The project aligns with their mandate to promote renewable energy integration and reduce dependency on costly and environmentally harmful diesel generation. The saw the project as a priority in addressing energy deficits, supporting economic growth, and fostering energy security for businesses, households, and public facilities. The ministry would be keen on ensuring compliance with energy regulations, technical standards, and policies, as well as leveraging the project to attract further investments in the energy sector.
NGOs (Represented by Hoodo Organization	NGO representatives in Gaalkacyo saw the proposed NEPCO hybrid power plant as an opportunity to advance their goals of community development, poverty reduction, and environmental sustainability. Improved energy access can support initiatives such as education, healthcare, and livelihoods, which align with the priorities of many NGOs operating in the region. They also advocated for the inclusion of marginalized groups, such as women and youth, in the project's benefits through targeted employment, training, and community programs. However, NGOs raised concerns about potential social risks, such as gender-based violence, and emphasize the need for robust community engagement and equitable resource sharing. Partnering with NGOs can help the project integrate broader social and environmental objectives, ensuring that its outcomes contribute meaningfully to sustainable development in Gaalkacyo.
Representatives of Persons Living with Disabilities	Representatives of persons living with disabilities (PLWDs) in Gaalkacyo viewed the proposed NEPCO hybrid power plant as an opportunity to improve accessibility and inclusivity in community services and infrastructure. Reliable electricity will enhance healthcare facilities, educational institutions, and assistive technologies, directly benefiting PLWDs and reducing barriers to their full participation in society. The representative advocated for the plant to include specific measures, such as ensuring project facilities and employment opportunities are accessible to PLWDs.
Health Services Providers (Clinics)	Health service providers in Gaalkacyo viewed the proposed NEPCO hybrid power plant as a critical development that could greatly enhance the quality and accessibility of healthcare in the region. Health services providers were particularly interested in the potential for the plant to support improvements in public health infrastructure and reduce operational disruptions. Furthermore, health providers highlighted the need for health impact assessments to monitor any potential risks to community health during the construction and operation phases, ensuring the safety and well-being of both healthcare workers and the surrounding population.
Religious Leaders – Represented by Sheikh Mohamud Ahmed (Imam)	Religious leadership in Gaalkacyo viewed the proposed NEPCO hybrid power plant as an opportunity to contribute to the region's development while emphasizing the importance of sustainable and ethical practices. They were particularly interested in how the project aligns with principles of social responsibility, equity, and environmental stewardship, which are central to many religious teachings. He advocated for the project to ensure that it benefits the broader community, particularly marginalized groups, and fosters peace and harmony by addressing social tensions that might arise during construction.
Representatives of Environmental Associations	Environmental associations in Gaalkacyo viewed the proposed NEPCO hybrid power plant as an important step towards promoting sustainable energy practices in the region. They may advocated for comprehensive and effective mitigation strategies, and long-term monitoring to ensure the project aligns with national and international environmental standards.
Mass Media – Represented by Radio Ergo	Mass media representative, particularly radio stations in Gaalkacyo viewed the proposed NEPCO hybrid power plant as an important development that offers a range of newsworthy content and community engagement opportunities.

Stakeholder category	Summary of interests and concerns
Golis Telecom Representative	Telecommunication companies in Gaalkacyo viewed the proposed NEPCO hybrid power plant as a significant opportunity to enhance their service reliability and expand coverage in the region. Reliable electricity is crucial for the operation of telecom infrastructure, including cell towers, data centers, and network equipment, which are essential for providing uninterrupted communication services to businesses and residents. They are particularly interested in the potential for improved power supply to support the growing demand for mobile and internet services, especially as Gaalkacyo continues to develop.
Internally Displaced Persons – A representative from Saalam IDP Camp	Internally displaced persons (IDPs) in Gaalkacyo are have a strong interest in the proposed NEPCO hybrid power plant due to the potential for improved access to reliable electricity, which could significantly enhance their living conditions. The project could also create job opportunities for displaced persons, helping them rebuild livelihoods and integrate more fully into the local economy. However, IDP representative voiced concerns about ensuring that the benefits of the power plant are equitably distributed, particularly to vulnerable groups within the displaced community.
Gender advocacy groups	Gender advocacy groups in Gaalkacyo viewed the proposed NEPCO hybrid power plant as an opportunity to promote gender equality and empower women in the region. The representative emphasized the importance of creating equitable employment opportunities for women in the construction and operational phases of the project, as well as ensuring that women are included in decision-making processes related to the plant's development. Additionally, she raised concerns about the potential social impacts of the project, such as gender-based violence, and advocated for measures to prevent such issues.

9.4. EXPECTED COMMITMENTS BY NEPCO

In response to stakeholder feedback, the NEPCO 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*: NEPCO 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 Gaalkacyo 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. NEPCO 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

(i) During the preparation of this report for the proposed development, it was observed and established that most of the negative social and environmental impacts can be mitigated and have potentially short term low significant effects. The positive impacts are highly rated and will benefit the community in the project area and Puntland State at large. The project proponent (MoEWR), the implementing entity (NEPCO) and the contractor must adhere to prudent implementation of the social and environmental and social management plan. The contractor shall commit to obtaining all necessary permits and licenses from the relevant authorities and have qualified and adequate personnel to do the project as proposed. The ESIA has proposed adequate environmental, health and safety mitigation measures as part of the relevant statutory requirements.

(ii) The analysis of the ESIA has demonstrated that the construction and operation of the proposed power plant will have positive impacts to the FGS, Puntland State governments, and residents of Puntland State at large. The positive impacts will include; increase in reliable and sustainable clean energy, employment to local community members, increase in the national/local investment, increase in government revenue, improvement of standards of living for Gaalkacyo residents. However, despite the outlined positive impacts, the proposed development may cause some negative impacts such as; noise, dust generation, soil erosion, oil spills, fire hazards, electrocution, shocks, solid waste generation, occupational health hazards, social risks such as labour influx, demand for resources, gender-based violence, among others that need to be avoided, reduced and mitigated against.

(iii) An Environmental and Social Management Plan (ESMP) has been developed to ensure sustainability of the project area activities from construction through operation to decommissioning. The ESMP plan provides a general outlay of the activities, associated impacts, mitigation action plans and appropriate monitorable indicators. Implementation timeframes and responsibilities are defined, and where practicable, the cost estimates for recommended measures are also provided.

(iv) A monitoring plan that highlights some of the environmental performance indicators that should be monitored has been developed. Monitoring creates possibilities to call to attention changes and problems in environmental quality. It involves the continuous or periodic review of operational and maintenance activities to determine the effectiveness of recommended mitigation measures. Consequently, trends in environmental degradation or improvement can be established, and previously unforeseen impacts can be identified, or pre-empted and mitigation measures proposed.

(v) From the findings of this ESIA, the following specific conclusions can be drawn:

- The proposed project will generate socio-economic benefits which would not be realized if the 'NO development option'' is considered.
- The relevant stakeholders have been consulted and the relevant project information shared and the views of the stakeholders is that the project is long overdue.
- The potential adverse impacts associated with the proposed project are possible to be successfully mitigated. Most impacts before implementation of mitigation measures are assessed as very low to medium low and the ratings are expected to improve further with the implementation of the proposed 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 project will be designed, constructed, and operated according to the acceptable industry norms and standards. Successful implementation of the proposed ESMP will ensure environmental sustainability.
- The proposed project design has integrated mitigation measures with a view to ensuring compliance with all the applicable laws and procedures. The proposed power plant and associated structures will be installed to the required planning/architectural/structural designs and standards. During project implementation, operation and decommissioning stages sustainable environmental management would be ensured; avoiding inadequate use of natural resources, conserving nature sensitively and guaranteeing a respectful and fair treatment of all people working on the project, general public at the vicinity and the expected PAPs of the project.
- In relation to the proposed mitigation measures that will be incorporated during construction, operational and decommissioning phases; the development's input to the society and environment; the project is considered beneficial and important.

10.2. RECOMMENDATION

(i) It is strongly recommended that a concerted effort is made by the MoEWR and NEPCO in particular, to implement the ESMP provided herein. Following the commissioning of the project, 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.

(ii) On the basis of the findings from this ESIA, the following specific recommendations can be made:

- The NEPCO 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 is mandatory to ensure environmental and social sustainability of the project.
- Cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders.
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt out
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Stakeholder engagement to the 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.
- EHS Audits shall be carried annually or as prescribed by the FGS Authority during the operational phase.
- Diligence on the part of the contractor and proper supervision by the MoEWR and NEPCO is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.

10.3. AUTHORIZATION OPINION

The Horizon Development (HD) believes that the present Environmental and Social Impact Statement (ESIA) provides enough information for decision-making on the project. They have shown that the proponent's preferred alternatives and technological alternatives are generally acceptable. The ESIA has also identified essential mitigation measures to limit project impacts. The HD believes that the applicant's proposal should be approved on environmental grounds, provided essential mitigation measures are implemented. The HD believes that the anticipated negative impacts can be effectively mitigated, and that the proposed project does not pose a significant threat to environment and social aspects and that the proponent (MoEWR and NEPCO) will own the entire implementation and reporting on this ESIA during all the project phases.. The project should therefore be allowed to proceed.

11.0. Annexes

ANNEX 11.1. LAND OWNERSHIP DOCUMENT FOR THE PROPOSED PROJECT SITE

DAWLADDA HOOSE EE
DEGMADA GAALKACYO MUDUG
PUNTLAND, SOOMAALIYA

LOCAL MUNICIPALITY
OF GALKAIO DISTRICT
PUNTLAND, SOMALIA

SHAHAADADA MULKIYADDA DHULKA

Tixraac: 91862422229254

Taariikh: 29/04/2024

Magaca Mulkiilaha

SHIRKADDA KORONTADA NEPCO GAALKACYO

Faah Faahinta Dhulka

Tuulada/Xaafada	Laanta	Zone	Nooca
Garsoor	Laanta 5	Halabookhad	Deegaan

Cabirka Dhulka

Balac	Dherar	Bed ka Dhulka M^2
1000M	2000M	2000000 M^2

Jihooyinka Dhulka (SOOHDIN)

Bari	Koonfur	Galbeed	Waqooyi
Waddo	Waddo	Waddo	Waddo

Duqa Dagmada Gaalkacyo

Xoghayaha Dagmada Gaalkacyo

Madaxa Dhulka

ANNEX 11.2. PUBLIC CONSTULTATION QUESTIONNAIRES

NEPCO-ESIA-FGD-Women Group-2024	10/27/2024 7:57 AM	Microsoft Edge PDF ...	966 KB
NEPCO-ESIA-FGD-Youth Group-2024	10/27/2024 7:56 AM	Microsoft Edge PDF ...	963 KB
NEPCO-ESIA-GBV questionaires-2024	11/20/2024 9:45 AM	Microsoft Edge PDF ...	2,495 KB
NEPCO-ESIA-KII-Questionnaires-1-2024	11/20/2024 9:45 AM	Microsoft Edge PDF ...	12,677 KB
NEPCO-ESIA-KII-Questionnaires-2-2024	11/7/2024 9:52 AM	Microsoft Edge PDF ...	8,144 KB

ANNEX 11.3. FOCUS GROUP DISCUSSIONS

Environmental and Social Assessment Checklist

Project Name: NEPCO	District/City: Gaalkacyo
Project Location: Puntland	Nature/Size: ESP
Type of activity: (Hybrid power plant)	
Name & Signature of Evaluator: SAAD ADAN AIDED	Date of Field Evaluation: 10 June 2024

Item		Appraisal	Risk / Significance rating					
		Yes/No	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				**X**		
1.2	Soil erosion/siltation in the area	No						
1.3	Pollution to land by diesel, oils etc.	**Yes**		**X**				
1.4	Dust emissions	**No**						
1.5	Solid and liquid wastes	**Yes**		**X**				
1.5	Borrow pits and pools of stagnant water	**No**						
1.6	Rubble/heaps of excavated soils	**No**						
1.7	Emergence of wildfire	**yes**		**x**				
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**		**X**				
1.12	Loss of soil fertility	**No**						
1.13	Generation of hazardous waste including solar batteries	**Yes**		**X**				
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.	**Yes**		**x**				
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	**No**						

Item		Appraisal	Risk / Significance rating					
		Yes/No	None	Low	Moderate	Substantial	High	Unknown
3.4	Disruption of important pathways, footpath/roads	**Yes**		**x**				
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	**No**						
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		
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 probe 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.		
Section A: General Information		Responses
1	Date and time of meeting	10th June 2024
2	Name of facilitators (inc note taker)	Saad Adan Aided

3	Region/District	Mudug , Gaalkacyo
4	Name of Village	
5	Number/gender of participants	Males: 7 Females:4
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?	We have heard about the project, but the information available to us is limited and mostly based on hearsay, lacking detailed or official communication.
2	What do you think could be the positive impacts of the project on youth, so that people benefit?	The project is expected to lower electricity costs and provide a reliable, stable power supply.
3	What other impacts to you think that the project could have on the youth and communities?	This will enhance the quality of life for residents and open up new business opportunities, especially for the youth in the community.
4	How do you think that the project could minimize or avoid negative impacts?	Measures should be implemented to mitigate potential project impacts, including protecting natural habitats, minimizing deforestation, and establishing a comprehensive mitigation plan.
5	Do you have any questions/comments regarding the project?	A decision on electricity costs should be prioritized, followed by informing the community of the associated benefits and costs. It is essential to promote public participation and ensure transparency to gain public support. Additionally, reliance on a single provider should be avoided to prevent monopolies, which could limit competition and increase costs for residents.
Section C: Overview		
1.	If a youth group - When was your youth group established? Why was it established?	Not a youth a group None
2.	What are the key priorities among the youth? What are the main issues faced? Why?	Youth confront unique issues, with top goals frequently centered on job, education, security, and access to healthcare. These goals arise from deeper structural challenges and the complex sociopolitical climate in Somalia.
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?	There are various programs in Gaalkacyo that provide young people with education, employment, and peace-building. The Proponent also has Technical Institute, which offers technical skills training to young people. However, most programs have significant charges, limiting access for some. While the industry has made improvements, concerns regarding the quality of education remain.
Section D: Education		
1.	How many of the youth have completed secondary education?	Approximately 50% completed secondary education, and many moved on to universities for advanced study, yet there are no jobs available after graduation.
2.	How many of the youth have been to vocational school and have qualifications? What subjects do these apply?	None of the youths has been in a vocational training facility.
3.	What skills to the youth feel they have that enable them to work?	Youth have a mix of skills that they believe enable them to enter the workforce, even if barriers remain. The skills they have include: 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 Gaalkacyo are underemployed or unable to secure full-time work due to the limited job opportunities available in the city.

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?	Unemployed youth face numerous challenges that prevent them from finding jobs. These obstacles range from structural economic issues to social and security-related barriers
Section F: Employment		
1.	How many of the youth are working? How many are self-employed and how many work for an employer?	All the youths reported that they were in informal employment
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	Youth are dedicated to 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?)	The youth expressed appreciation for being included in the project discussions. They suggested holding regular meetings with diverse community groups to ensure inclusive engagement. 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 description below each photo:		

Focus Group Discussion Guide - Female

FGD Female	
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. Ensure everyone participates in the discussion. 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. *Show the participants the layouts/models*	
Section A: General Information	Responses
6 Date and time of meeting	10th June 2024

7	Name of facilitators (inc note taker)	Saad Adan Aided
8	Name of Region Region/District	Mudug, Gaalkacyo,
9	Number of participants	10
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 To have representation of different women categories including those with more responsibility as female household head.
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 but expressed uncertainty about its start date and scale. 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. Additionally, they emphasized that improved lighting will enhance safety, particularly benefiting displaced persons with the provision of security lighting.
8	How do you think that the project could minimize or avoid negative impacts on women and the community?	The proponent should actively engage women by creating job opportunities, providing tailored training programs, and promoting empowerment initiatives that enable them to contribute meaningfully to the project and the community..
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—typically from early morning (4 a.m.) until late at night (11 p.m.)—managing household responsibilities, with some even working outside the home to supplement family income.
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. Women face various obstacles in the workplace, including restricted job choices and cultural expectations that prioritize domestic responsibilities. Employment opportunities are often limited to fields deemed "acceptable" for women, such as education, healthcare, and small-scale retail, while men more commonly pursue roles in construction, technology, and management. With regards to education families prioritize sons' education over daughters, and girls often face added responsibilities at home that interfere with their schooling
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. However, Women typically manage the day-to-day household budget and have decision-making power over basic household expenditures
4	Do women feel safe in the community?	Yes. But they also raised concerns regarding GBV

	Are there any particular crimes that are common in the community? Have you experienced any conflicts in the community? Explain responses	Yes, mostly brought about by insecurity.
5	How do women receive information about local issues and developments, news etc in the community?	Most of information is received informally, and occasionally in formal manner through social and mass 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 Gaalkacyo 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 socio-economic development programmes and activities.
Section E: Economy/Income Generation		
1	What could women do to have greater economic opportunities in this area?	Advocacy on capacity building and 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 participants mentioned receiving remittance from relatives abroad.
Section F: Land Use		
1	What the main land based activities that women undertake? Please complete the seasonal calendar at the back of the form.	Housework is a common activity among women, who can also work in various industries, including teashops, shops, and government offices.
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?	Data not provided.
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	Participants do not collect firewood or other timber, 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?	There is a meat and vegetable market in Gaalkacyo where people can sell and buy vegetables, meat, and other animal goods. INJI market is located in the centre of Gaalkacyo on Eng Khalid Road. There are several other minor marketplaces around town. People take tuk-tuks to the market to shop.

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 Gaalkacyo 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 and quality of education in the area are generally good, with all children attending school. However, education can be costly, and privately owned schools are often more expensive than public ones. Some of the key academic institutions in the project area include Jinni Badane School and East Africa University in Gaalkacyo, both of which are located approximately three kilometers from the project site.
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. The issues of girl child labor versus education are central, as girls often bear the brunt of domestic and economic responsibilities that hinder their educational opportunities.
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, including Gaalkacyo Medical Centre, Manhal Hospital, Yameys Health Centre, and Anfac Community Hospital, among others. However, healthcare services in the private sector are expensive and often lack adequate quality, with services provided only after payment. Public hospitals, while more affordable, are not of the highest standard. 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?	Girls and women face several health challenges, many of which are compounded by cultural, economic, and environmental factors. Maternal health problems, including complications during pregnancy and childbirth, are among the leading health issues faced by women. Women often suffer from iron deficiency anemia, which can be caused by poor diet and repeated pregnancies, which deplete their nutrient stores
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 and berket	Out of the town	Piped	Hard water
		Cooking:	Borehole and berket	Out of the town	Piped	Hard water
		Washing dishes:	Borehole and berket	Out of the town	Piped	Hard water

		Bathing:	Borehole and berket	Out of the town	Piped	Hard water
		Livestock:	Borehole and berket	Out of the town	Piped	Hard water
		Irrigation:				
2	Do you have to treat drinking water? If so, how?		No			
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 septics 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:	NEPCO	In town		
		Keeping warm:				
		Cooking:	Gas, firewood, charcoal			
		Heating water:	none			
		Charging mobile phones:	Solar, NEPCO			
		Cooling food:	NEPCO			
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?		Vehicles, tuktuks.			

	Please describe the quality/accessibility of transportation in the community	
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 ATTENDADANCE LISTS

NEPCO-ESIA-FGD-WG-YG-Attendance of list-20...	11/20/2024 9:50 AM	Microsoft Edge PDF ...	399 KB
NEPCO-ESIA-GBV-Attendance List-2024	11/7/2024 9:52 AM	Microsoft Edge PDF ...	579 KB
NEPCO-ESIA-KII-Attendance List-2024	11/20/2024 9:45 AM	Microsoft Edge PDF ...	427 KB

ANNEX 11.5. STAKEHOLDERS' ENGAGEMENT PHOTO LOGS

Photo1: View of the enumerator and the youth activists representative in Gaalkacyo during the stakeholders engagement

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

Photo 3: View of the enumerator and the Representative of persons living with disability in Gaalkacyo during the stakeholders engagement

Photo 4: View of the enumerator and the Regional Officer for the Ministry of Environment representative in Gaalkacyo during the stakeholders engagement

Photo 5: View of the enumerator with the NGO representative in Gaalkacyo during the stakeholders' consultations

Photo 6: View of the enumerator with the Gaalkacyo North Municipality Official engaged during the stakeholders' consultations

Photo 7: View of the enumerator with the Gaalkacyo Municipality Official engaged during the stakeholders' consultations

Photo 8: View of the enumerator with the Ministry of Health Official in Gaalkacyo engaged during the stakeholders' consultations

Photo 9: View of the enumerator with the representative of Caafi Sanitation Company in Gaalkacyo engaged during the stakeholders' consultations

Photo 10: View of the enumerator with the representative of business operators in Gaalkacyo engaged during the stakeholders' consultations

Photo 11: View of the representatives of the women groups engaged during the stakeholders consultations

Photo 12: View of the representatives of the youth groups engaged during the stakeholders consultations