



PUNTLAND STATE OF SOMALIA
MINISTRY OF ENVIRONMENT, RANGE AND CLIMATE CHANGE
OFFICE OF THE MINISTER
GAROWE

ESIA License No: MoERCC-2025-L-006

This is to certify that the Environmental and Social Impact Assessment (ESIA) report received from the NEPCO for the

**PROPOSED HYBRID POWER PLANT FOR NEPCO
GALKACYO, Puntland-SOMALIA**

has been submitted to the Ministry of Environment Range and Climate Change in accordance with the Puntland Social and Environmental Impact Assessment Act 2023.

The report has been reviewed and a license is hereby issued for the implementation of the project subject to the attached conditions

Date: 7th August, 2025

Valid until: 7th August, 2026.



Sign

Mohamed Abdirahman Mohamed (Farooole)
Minister of Puntland Ministry of Environment, Range and
Climate Change

Please Turn Over

Office of the Minister, MoERCC-Puntland

Email: minister.moecc@plstate.so

1.0: General Conditions

- a. This approval is only for the proposed Hybrid Power Plant for NEPCO, Gaalkacyo, Puntland-Somalia.
- b. The license shall be valid for 12 months from the date of signature. To renew the license, an ESMP audit report will be submitted to the MoERCC for approval.
- c. Without prejudice to other conditions of this license, the proponent shall implement and maintain an environmental and social management system, organizational structure, and allocated resources that are sufficient to achieve compliance with the requirements and conditions of this license
- d. The MoERCC shall take action against the proponent in the event of a breach of any of the conditions stated herein or any contravention to the Puntland Environmental Management Act, Environmental Management Policy, and the Environmental and Social Impact Assessment Act
- e. This license shall not be taken as a statutory defense against any charges of environmental degradation or pollution in respect of any manner of degradation/pollution not specified herein
- f. The proponent shall ensure that records on conditions of license/approval and ESMP monitoring shall be kept on the project site for inspection by the MoERCC
- g. The proponent shall comply with the MoERCC improvement orders throughout the project cycle

2.0 Operational Conditions

- a. The proponent shall ensure strict adherence to the ESMP developed throughout the project cycle
- b. The proponent shall comply with the relevant principles, laws, by-laws, and guidelines as indicated in the ESMP
- c. The proponent shall ensure that adequate and appropriate sanitary facilities are provided for the workers during the operational phase
- d. The proponent shall ensure that the workers are provided with adequate personal protection equipment as well as adequate training.
- e. The proponent shall ensure that all pollutants and polluted materials are contained, and adequate mitigation measures provided during the operational phase

3.0 Notification Conditions

- a. The proponent shall seek written approval from the MoERCC for any operational changes under this license

- b. The proponent shall ensure that MoERCC is notified of any malfunction of any system within 12 hours and mitigation measures put in place
- c. The proponent shall keep records of all pollution incidences and notify the MoERCC within 24 hours

4.0 Decommissioning Conditions

- a. The proponent shall ensure that a decommissioning plan is prepared and shared with the MoERCC for approval 3 weeks before the decommissioning.



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



PROJECT

Somali Electricity Sector Recovery Project (SES RP) (P173088)

ELECTRICITY SERVICE PROVIDER



National Electric Power Corporation

OCTOBER 2024

Title : Consultancy Services for Environmental and Social Risk Management Support to the Implementation of the Somalia Electricity Sector Recovery Project (SESRP).

Client : Ministry of Energy and Water Resources
Federal Republic of Somalia

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

Report: Name : ENVIRONMENTAL AND SOCIAL IMPACT
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PLANT FOR NEPCO, GAALKACYO, SOMALIA
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Acronyms and Abbreviations

AC	:	Alternating Current
ADR	:	Alternative Dispute Resolution
AfDB	:	African Development Bank
ALARP	:	As-low-as-reasonably-possible
BESS	:	Battery Energy Storage Systems
CO	:	Carbon Monoxide
CO ₂	:	Carbon Dioxide
CSO	:	Civil Society Organization
DC	:	Direct Current
DIN	:	German Institute for Standardization
DOD	:	Depth of Discharge
DoECC	:	Directorate of the Environment and Climate Change
DRE	:	Distributed Renewable Energy
E&S	:	Environment and Safety
EHS	:	Environment, Health and Safety Guidelines
ELV	:	Extra-low voltage
ESF	:	Environmental and Social Framework
ESIA	:	Environmental and Social Impact Assessment
ESMF	:	Environmental and Social Management Framework
ESMP	:	Environmental and Social Management Plan
ESP	:	Electricity Services Provider
ESS	:	Environmental and Social Standards
FGS	:	Federal Government of Somalia
FMS	:	Federal Member State
FRS	:	Federal Republic of Somalia
GBV	:	Gender-based Violence
GDP	:	Gross Domestic Product
GHG	:	Greenhouse Gas
GN	:	Guidance Notes
GRM	:	Grievance Redress Mechanism
HD	:	Horizon Development
HIV/AIDS	:	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
ICP	:	Informed Consultation and Participation
IDO	:	Industrial Diesel Oil
IDP	:	Internally Displaced Persons
IEC	:	International Electrotechnical 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
NO ₂	:	Nitrogen Oxide
NT	:	Near-threatened
OHS	:	Occupational Health and Safety
PAP	:	Project Affected Persons
PIU	:	Project Implementation Unit

PMP	:	Power Master Plan
PPE	:	Personal Protective Equipment
PV	:	Photovoltaic
PWD	:	People with Disability
RAP	:	Resettlement Action Plan
REF	:	Renewable Energy Factor
RPF	:	Resettlement Policy Framework
SCADA	:	Supervisory Control and Data Acquisition
SDG	:	Sustainable Development Goal
SEA/SH	:	Sexual Exploitation and Abuse and Sexual Harassment
SEP	:	Stakeholder Engagement Plan
SESRP	:	Somali Electricity Sector Recovery Project
SME	:	Small and Medium Enterprise
SO ₂	:	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 Sector of Gaalkacyo City participating the SESRP project, especially in implementing 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°43'54.3"N, 47°26'10.8"E) is in northern sector of Gaalkacyo City within the Puntland State, Somalia on approximately 2km² land in the outskirts of northern sector Gaalkacyo 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.

- (ii) The feasibility study recommends scenario 2 of 50% REF for detailed design of a hybrid power plant with a 3.5MW capacity. A transmission line will be constructed from the proposed power plant and linked to an existing sub-station at the current NEPCO power plant in Gaalkacyo. The proposed power plant will comprise of PV modules and lithium-ion battery storage system. The plant is expected to operate for 25 years with a battery lifetime of 6000 cycles (approximately 17.5 years), and shall be decommissioned thereafter. Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power plant is to operate for 25 years, a replacement plan will be implemented to ensure continued functionality. This shall include procuring and installing new batteries or upgraded storage technologies, safely recycling or disposing of expired batteries in line with environmental regulations, and allocating funds for the replacement. Battery replacement shall be coordinated with routine maintenance to minimize downtime. Additionally, this shall present an opportunity to adopt newer, more efficient technologies that could enhance the plant's performance for the remainder of its operational life. The proposed power plant will be connected to a substation located in Gaalkacyo City, and would require a nine (9) km transmission line.

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) has also been 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 frameworks (ESF) 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 7km 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 7 km 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 (7km away) 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 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; and no squatters, encroachers or other claims to the land.
- (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
Impacts on biophysical environment	Landscape and visuals	Erect a fence around the power plant.	Construction
	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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	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 - Re-vegetation including planting of trees around the plant/facility	Construction
	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	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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	
	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. • Frequent inspection and maintenance of the generator to minimize leakages. • 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
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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	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.	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 and workforce accommodation camp	• 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
	Gender-based violence	• Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed by all employers or incorporated in the employment contracts.	Construction
	Labour disputes	• Ensure full compliance with local labor laws.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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.	
	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. • 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.	Construction
	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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		Electrical hazards: • Use insulated tools and equipment. • Provide electrical safety training. • Install safety signage and warning labels. • Conduct regular safety audits and inspections. • Provide appropriate PPEs for all workers • Maintain safe distances from live electrical parts. • Prohibit electrical work in wet conditions. • Restrict electrical work to qualified personnel. • Establish emergency response plans. Fall hazards: • Provide secure scaffolding and work platforms. • Conduct fall hazard risk assessments. • Implement a work permit system for working at heights. • Provide fall prevention training to all workers. • Provide appropriate PPEs, especially shoes • Restrict access to high-risk areas. • Establish fall rescue procedures. • Train workers in emergency response and first aid. Heat stress: • Provide shaded rest areas. • Schedule high-heat tasks during cooler hours. • Conduct regular heat stress monitoring. • Provide breathable, lightweight clothing. • Train workers on heat stress symptoms and prevention. • Establish emergency procedures for heat-related illnesses. UV radiation exposure: • Use UV-protective screens or barriers. • Schedule work during early mornings or late afternoons to avoid peak sun hours. • Implement a UV protection policy and awareness training. • Require workers to wear UV-rated safety glasses or goggles. • Rotate workers to minimize prolonged sun exposure. • Educate workers on UV radiation risks and prevention. • Train workers on recognizing sunburns and heat-related illnesses. Chemical exposure: • Use proper ventilation systems in enclosed areas. • Implement spill containment and drainage systems. • Develop and enforce a Chemical Hazard Management Plan. • Maintain Safety Data Sheets (SDS) for all chemicals on-site. • Provide chemical-resistant gloves, goggles, and protective clothing. • Train workers on chemical handling, usage, and disposal. • Enforce handwashing and hygiene protocols. • Establish spill response and decontamination procedures. • Train workers in first aid for chemical exposure incidents. Ergonomic risks: • Design workstations to minimize awkward postures and repetitive motions. • Provide anti-fatigue mats for standing work areas. • Implement an ergonomics training program for workers. • Conduct regular ergonomic risk assessments. • Provide back-support belts for lifting tasks. • Encourage workers to take micro-breaks to reduce strain. • Train workers to recognize early symptoms of musculoskeletal disorders. • Provide access to on-site first aid and medical support. Weather related hazards: • Provide temporary shelters for extreme weather conditions.	

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		- Secure scaffolding, cranes, and loose materials against strong winds. - Establish emergency evacuation procedures. - Ensure workers use sun protection (hats, sunglasses, and sunscreen) for extreme heat. - Train workers on recognizing and responding to weather-related illnesses and injuries. - Prohibit work near power lines or on elevated surfaces during storms. - Conduct regular weather emergency drills.	
	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	- Prepare a stakeholder engagement/consultation plan (SEP) that is 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. - 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
	Inadequate grievances management	Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism.	Construction

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		- 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.	
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 and genset exhaust emissions)	<i>Vehicles</i> - Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. <i>Generators</i> - Use of diesel which is Sulphur- free to run the power producing generators to be encouraged - The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters - Invest in modern diesel generators with advanced combustion systems. - Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. - Use Selective Catalytic Reduction (SCR) to significantly reduce NO_x emissions by injecting ammonia or urea into the exhaust stream. - Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. - Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. - Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. - Implement strategies to reduce idling time when diesel generators are not needed or can be supplemented by the hybrid system. - Regularly report emissions data to local regulatory	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		authorities as part of environmental compliance.	
	Noise & vibration	<i>Genset</i> • Install soundproof enclosures around the diesel generators • Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. • Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations • Ensure regular servicing of the diesel generator to maintain its optimal function. • Install high-performance silencers on the generator's exhaust system to reduce noise emissions • Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <i>BESS</i> • 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
	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 <i>Damaged solar panels and hazardous wastes</i> • Ensure segregation from other waste streams • All hazardous products and waste should be labelled and handled properly to avoid contact with the ground • Dispose hazardous waste through a approved waste handler	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
	Wastes (Liquid)	<i>Sanitary wastes</i> • Provide sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks <i>Oils from vehicles</i> • 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. <i>Chemicals</i> • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <i>Generators</i> • Proper storage of the oil is required to ensure no leakages • Frequent inspection and maintenance of the generator to minimize leakages. • No vehicles should be serviced or maintained at the project site. • The waste oil or used oil must be disposed-off appropriately. • Proper training for the handling and use of fuels for the operators of the power plant. • In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <i>Accidental fuel and oil spill</i> • Develop and implement a detailed Spill Prevention Plan (SPP) • Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. • Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. • Install spill and leak detection systems on fuel storage tanks, transformers, and pipelines. • Implement safe fuel handling protocols to reduce the risk of spills during fuel transfers. • Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear. • 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.	Operation
	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	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		should be fixed promptly.	
	Energy consumption	<i>Lightings</i> • 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. <i>Diesel generators</i> • Implement energy-efficient technologies and practices in plant operations. • Conduct scheduled maintenance and servicing of diesel generators. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime. • Ensure high-quality, low-sulfur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. • Implement measures to reduce unnecessary idling of diesel generators. • Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. • Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel consumption and improve overall generator efficiency.	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 and workforce accommodation	• 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	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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.	
	Gender-based violence	<i>GBV- SEA and SH</i> • Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed by all employers or incorporated in the employment contracts. <i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i> • 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)	<i>Risks related to Inadequate stakeholder engagement</i> • Prepare a stakeholder engagement/consultation plan (SEP) that is 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,	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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. <i>Inadequate grievances management</i> • 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	<i>Public Health Impacts</i> • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. <i>Shocks and electrocutions</i> • 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. <i>Public Health Impacts –HIV/AIDs</i> • 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
	Fire hazards	• The power plant must contain firefighting equipment (Portable fire extinguishers) of recommended standards and in key strategic points, including diesel generators,	Operation

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		- 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	
	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 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
	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 prevent their spread into disturbed areas. - Implement measures to control noise and vibration during decommissioning to minimize disturbance to local wildlife.	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		• 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 procedures. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation and facilitate proper management.	Decommissioning
	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	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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.	
	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)	- Use high-quality fuels with lower sulfur content to minimize emissions from vehicles and generators. - Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. - Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. - Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use. - Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. - Establish an air quality monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. - Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. - Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. - Establish a reporting system for emissions data to track progress and compliance with environmental standards.	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. - Use temporary storage solutions to manage water	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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 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	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		improving site safety.	
	Worker influx – incoming workforce and workforce accommodation camp	• 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	• Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed 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 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.	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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. - 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	Decommissioning

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE
		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 **281,100**. 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. 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.

- *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

- (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.

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 be carried out throughout the construction and operation and decommissioning phases.
 - Contractor to ensure grievance redress mechanism is established and operational before commencement of the operation.
 - 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

HD believes that sufficient information has been provided in this ESIA to enable decision making on proceeding with the project. Additionally, HD have shown that the proponent's preferred alternative and technological alternatives are generally acceptable. Furthermore, the ESIA has also assisted in the identification of essential mitigation measures that will mitigate the impacts associated with the project to within acceptable limits. HD is of the opinion that on purely 'environmental' grounds (i.e., the project's potential socio-economic and biophysical implications) the application as it is currently articulated in the applicant's proposal should be approved provided the essential mitigation measures are implemented. It is in the opinion of the HD that the anticipated negative impacts can be readily and effectively mitigated and the proposed project does not pose any significant threat to the Environment and may be approved 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 inefficient¹. The current installed capacity of 276 MW in main load centres across the country is insufficient to meet present demand. A combination of high costs and irregular supply compound the electricity generation, transmission, and distribution has made Somalia ranked among the worst in the world for electricity affordability^{2,3}. To address these difficulties, the Federal Government of Somalia obtained World Bank funding to support the efforts to increase access to cleaner and cheaper electricity supply and to re-establish the electricity supply industry through SESRP project. The SESRP Development Objective is to increase access to lower cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry in different load centres within the Federal Republic of Somalia”.The 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.

1.1.1. 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

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>

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, labor conditions, and community health and safety. By doing so, it promotes sustainability, safeguards the well-being of local communities, and ensures compliance with national environmental regulations. Furthermore, the ESIA fosters transparency and stakeholder engagement, building community support for the project and ensuring that development benefits, such as increased energy access and economic growth, are balanced with responsible environmental stewardship and social equity.

1.2. Objectives of The ESIA

The main objective of this ESIA was to examine both positive and negative effects of the proposed hybrid power plant on the people, their property, and the environment particularly in the Project Area (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 ESSi guidelines and submission to the MoEWR for further instructions and/or approval.

1.3. SCOPE OF THE ESIA STUDY

The ESIA scope largely covered the following areas:

- Baseline Conditions: Environmental setting (climate, topography, geology, hydrology, ecology, water resources, sensitive areas, baseline information, etc.); socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.), and infrastructural issues (roads, water supplies, drainage systems, power supplies, etc.).
- Legal and policy framework: Focusing on the relevant national and WBG's EHS in general, and those relevant to power generation and supply, and other national laws and policies focusing on allied activities relative to the project in question.
- 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, check lists, interviews and stakeholders' consultation.

1.5.1. Key Activities Undertaken During the ESIA

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

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

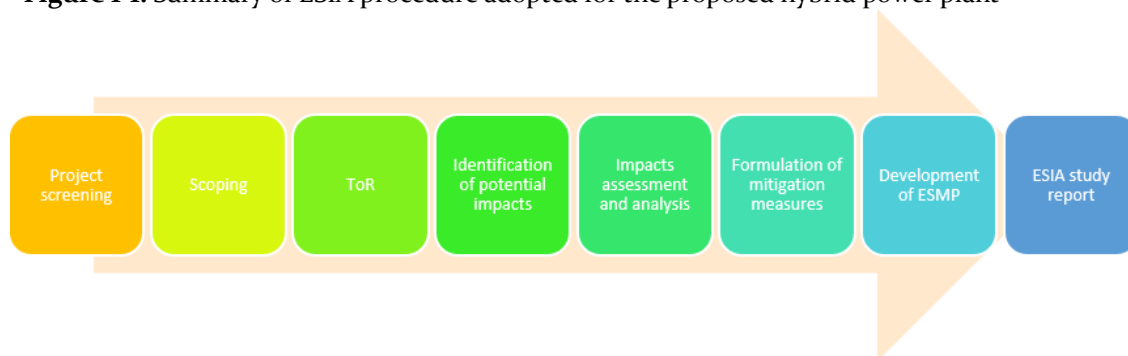
- Physical inspections of the proposed project area and site
- Literature review of relevant documents
- Stakeholder consultations with different stakeholders and project-affected persons
- Gathering environmental and socio-economic data of the area by use of checklist
- Continuous discussions with the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

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

Figure 1.1 summarizes the basic steps used in developing this ESIA. The details can be described as follows:

- **Step 1: Project concepts:** The project details regarding; scope, design, implementation, tests, commissioning were first analysed. A feasibility study report was obtained and analysed.
- **Step 3: Project Screening:** Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.
- **Step 4: Identification of Potential Environmental and Social Impacts:** The Potential Environmental impacts were identified, Classified and magnitude determined.
- **Step 5: Impact Assessment and Consultations:** The Environmental and Social Impacts were analysed, assessed and discussed in details involving consultations with the 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 its 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 soil⁴, 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
- 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.

⁴Farah, 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>

⁵Ali, 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>

⁶Mahmoud, 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

⁷Omar, 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>

⁸Abdullahi, 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>

⁹Yusuf, 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>

¹⁰Mohamed, 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>

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.

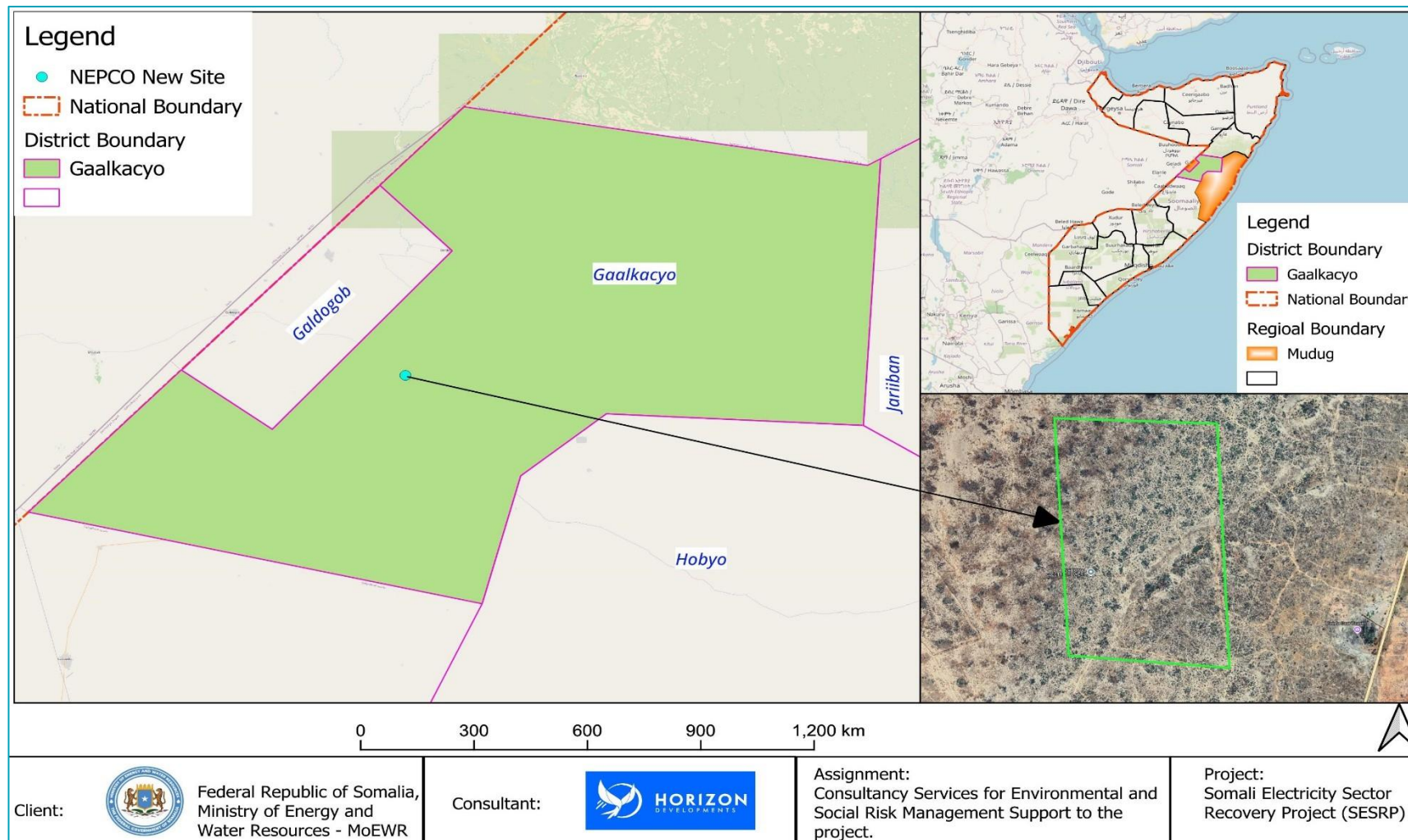
2.2. Location of The Site

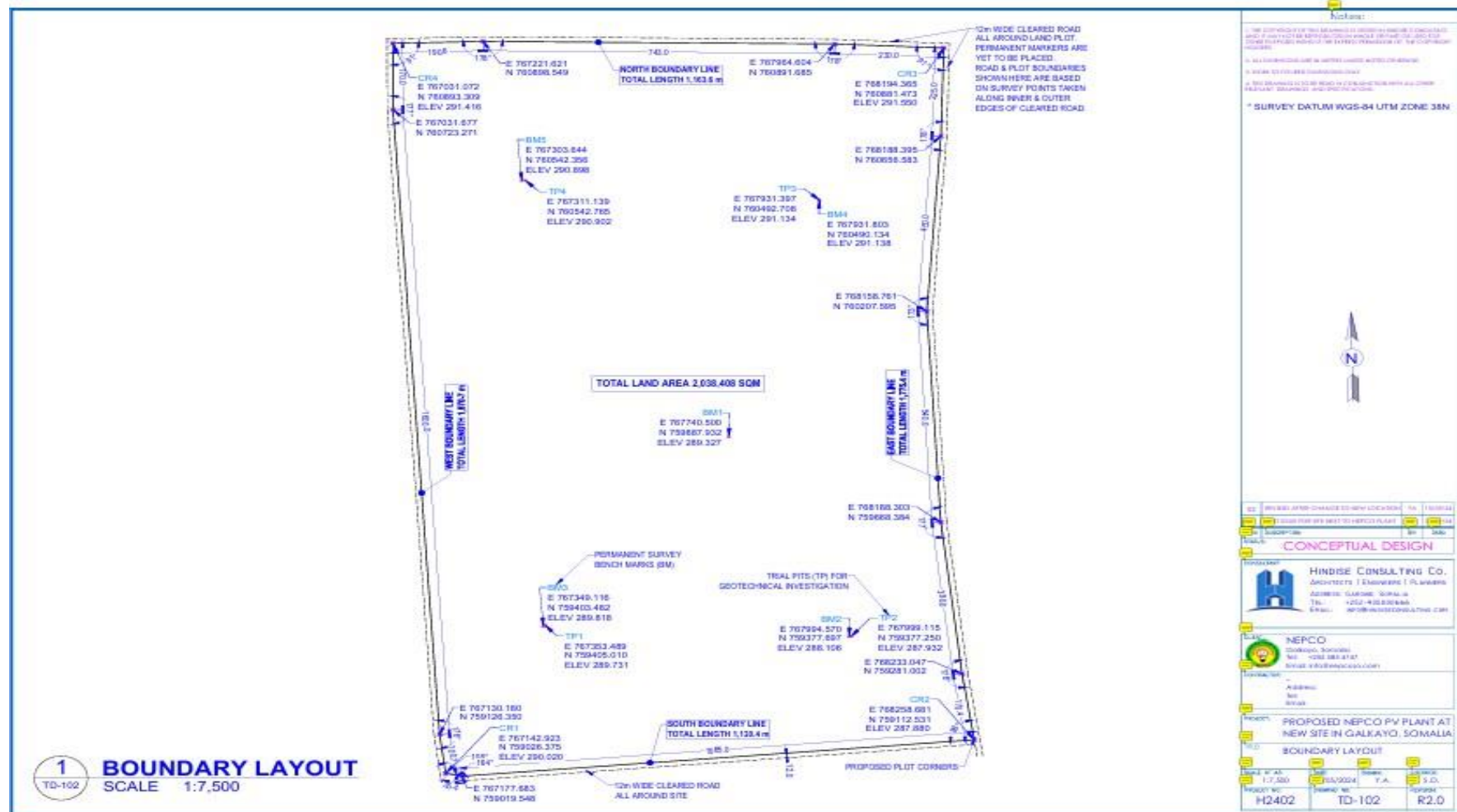
The proposed Hybrid power plant ($6^{\circ}43'54.3''\text{N}$, $47^{\circ}26'10.8''\text{E}$) shall be located in the outskirts of Gaalkacyo City, Puntland State within the north-eastern Somalia (Figure 2.1). The project site is in an open area with sparse settlements in the immediate vicinity with 2km^2 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 will combine solar PV, battery storage and genset, affecting air quality, water resources, noise, and livelihoods. The project may also disrupt traditional livelihoods and increase traffic and transport risks. Overall, the direct and indirect areas of influence is expected to be 2km and 5km radius respectively.



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





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 major land uses near and around the proposed project site include sparsely distributed settlements. However, given the projected human population growth, there is likelihood that public facilities such dispensaries, schools, shopping centres and residential houses will spring-up in the project site's surroundings in the future. The site is connected by a gravel road but NEPCO also plans to construct a proper access road during the construction and operation phases of the project.

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 production capacity from the current 4.9432MW from gensets and solar PV (0.5MW). Currently, NEPCO uses both analogue and digital metering systems but is increasingly investing in smart metering systems.

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

ESS8 may be relevant to 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., 2.7MW) has been recommended for detailed design. Given this scenario selection, the proposed location will be adequate to accommodate the proposed installation. On the basis of 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°43'54.3"N, 47°26'10.8"E. On the basis of 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. 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 generators. However, NEPCO is advised to consider stabilizing the system through a genset. 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

The system will be modular, so that it can be upgraded easily to meet future demand needs. The proposed power plant will be configured as AC coupled due to the significant portion of daytime loads that can be fed directly from the solar PV generator without intermediate battery storage.

2.4.3. Architecture and Basic Design Specifications

This hybrid power generation site is projected to generate 8.5MW from renewable energy, and a further 2.8MW for which NEPCO will invest in diesel generators. 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.

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

Year	Total of Customers	Customers 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%

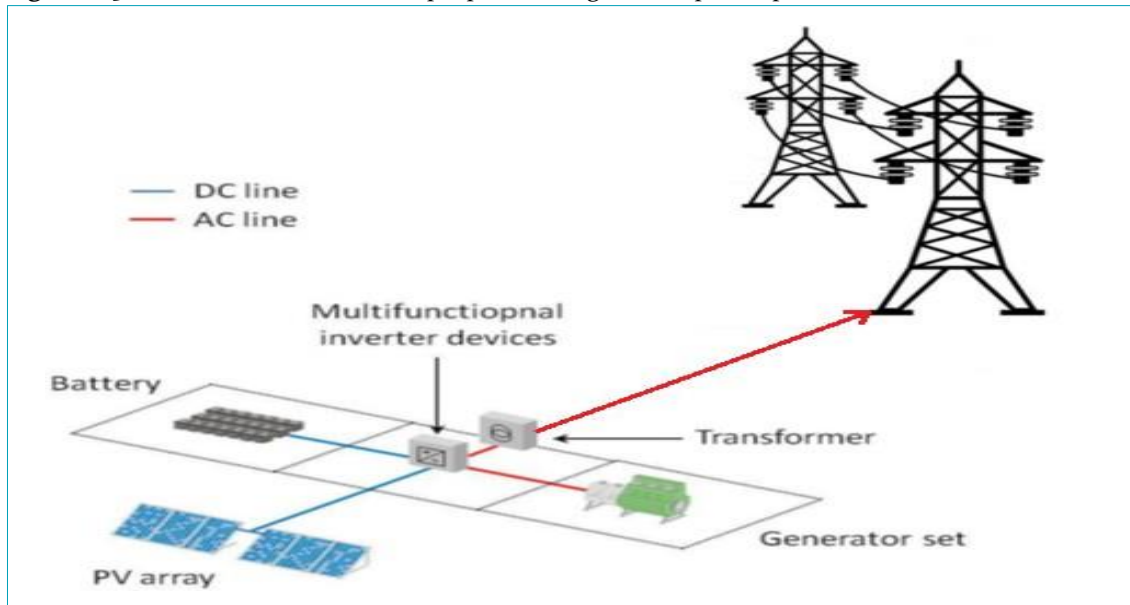
Source: MoEWR (2024). Technical due diligence and proposed design report for NEPCO Hybrid Power Plant, Gaalkacyo, Somalia

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 standby generator will also be connected to the system as a backup. The goal of the hybridization of diesel systems is to reduce fuel consumption by switching off diesel generator set(s) for several hours a day, in order to reach a PV energy, share in the final mix of at least 60% or more. 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 guard house.

The Solar PV hybrid system will be based on a centralized photovoltaic plant connected to a 3-phase 400V AC busbar line, where the multi-mode battery inverter and the diesel generator are also connected. The plant is configured such that a significant portion of daytime loads is fed directly from the solar generator (grid-tie inverter) without intermediate battery storage usage. The Hybrid Power Plant will also be equipped with a Diesel Generator to be used as reserve power. Under this design arrangement, the diesel generator switches on automatically whenever the battery state of charge reaches a certain defined DOD (Depth of Discharge). The diesel generator will be equipped with automatic start-up function controlled by the battery inverter charger. Figure 2.2 illustrates the preliminary design of the proposed NEPCO Hybrid Power Plant.

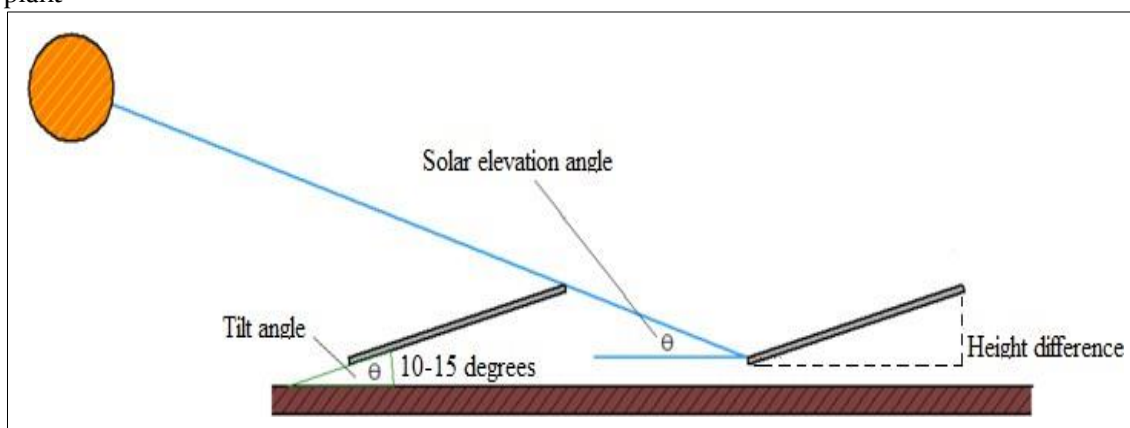
Figure 2-3: Illustration sketch of the proposed design of the power plant



2.4.4. Placement of the Solar PV Arrays

The PV array module support structure shall be ground-mounted on arid soil with a base made of concrete. The support shall have a tilt angle between 10° - 15° from the horizontal (Figure 2.3). The support frame shall be of either lightweight aluminium or galvanized steel and it shall be easy for installation, maintenance and disassembly at the end-of-life cycle. Cables used within the PV generator shall have a voltage rating; have a temperature rating higher than 40°C above ambient temperature; they will be UV-resistant; water resistant and it is recommended that they be flexible (multithreaded) to allow for thermal/wind movement of modules. The PV inverter shall be of type current source grid-tied to convert DC to an AC Sinusoidal current. String inverters shall be installed indoors or outdoors with a cover and suitable for desert conditions with high ambient temperatures and dust.

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



2.4.5. Powerhouse

The battery, multi-mode inverter and all monitoring equipment will be 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°C and fully charged) of its rated capacity and shall have a Coulombic efficiency of at least 85% and energy conversion efficiency of at least 85% when new and charged to more than 50% of capacity. The battery cycle life for discharge/charge regular cycles down to 80% DOD shall be more than 1500 cycles (According to IEC 896-1).

2.4.8. Diesel Genset

The Diesel Generator Set shall have a capacity of 2.8MW. The proposed Diesel Genset shall be suitable for indoor or outdoor installation and shall perform accordingly with Multi-mode Inverter. The Diesel Genset shall work in a fully automatic manner. There will also be an external reserve fuel tank with a capacity of approximately 2000 litres. The selected diesel generator shall have a noise rating of not more than 75dBA @ 1 meter at 75% load under free field conditions. The generator sets will have a high-quality noise absorbent and fire-retardant grade acoustic insulation material.

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 2km² piece of land located approximately 9km to the north 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

The final design and construction of the power plant shall be undertaken by a contractor selected through a bidding process. 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
- Installing of containerized generators
- Piping of fuel lines
- Cabling
- Installation of the solar panels
- Completion of the plant
- Post construction clean-up, restoration and landscaping of site
- Load testing
- Remedying of defects after functional tests
- Solid waste collection and commissioning of the plant.

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

2.6.1.2. Construction materials, equipment and services

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

2.6.1.3. Input materials and equipment & machinery

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

- building stones
- bus bars, switch gears, circuit breakers
- concrete mixers
- conductors
- electrical equipment

- excavators
- fuels (diesel)
- generator sets,
- 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 3.5 MW solar farm, the number of panels can vary based on the panel specifications, but a rough estimate can be made. For example, if each panel is around 300 watts, a 3.5 MW installation would have about 11,667 panels (3,500,000 watts / 300 watts per panel) translating to approximately 40,000 litres per cleaning session. The water demand for a 2.8 MW generator set (genset) will depend on several factors, including the type of generator, cooling system design, and operational conditions. However, for a diesel genset, the water demand for cooling typically ranges from 1.5 to 2.5 liters per kWh produced. Using an average water consumption of 2 litres per kWh, the estimated water demand for a 2.8 MW genset operating continuously could be around 7,000 liters per hour or approximately 168,000 liters per day.
- *Labor:* The size and the composition of the workforce will be at the discretion of the contractor(s). The contractors will adhere to all the relevant employment legislations in the 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 a portable generator 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 Diesel Generator and their associated switching equipment's
- Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power 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 like the Diesel generators
- Ensure proper handling of the demolished materials and have an authorized and guided transportation and disposal away from human settlement, water bodies and wildlife conservation areas.
- Demolish and remove all the concrete works.

3.0. POLICY, LEGAL AND REGULATORY FRAMEWORK

3.1. Overview

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

3.1. National Laws and Regulatory Framework

3.1.1. Provisional Constitution of Somalia

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

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

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

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

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

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

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

3.1.3. Somalia's Ninth National Development Plan

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

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.*

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

- *The proponent and the contractors will be by the existing labour laws, including any amendments thereof, including abiding with all stipulations on employee management and relations in all the phases of the project.*
- *The Proponent and Contractor will maintain an insurance policy cover for its employees, record of accident, carryout proper accident investigations; organize for pre-employment and regular medical examinations for staff during construction and operation phases of the project.*
- *The proponent and the contractor will sensitize workers against abuse and exploitation of children, and shall not engage in any child labour during all phases of the project.*

3.1.6. Policy and Law on Gender Equality and GBV

Gender Based Violence (GBV) remains one of the most serious threats to the health and safety of women and girls globally. The situation is dire in Somalia where women and girls are at more risk of rape, Intimate Partner Violence (IPV), early and forced marriage and FGM. The Somalia context is fraught with GBV and protection concerns, especially for women and girls¹³. For example, a recent study on GBV in Somalia¹⁴ found out that 18.5% of the women and girls in the IDP camps had experienced gender-based violence in the last 12 months. 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 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 specialized¹⁵

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

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>.

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

adequate legal framework for dealing with GBV cases¹⁶. 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, enforce and monitor the sector. Currently, the Federal and State MoEWR are mandated to issue operating licenses to power plant. However, there are no licensing guidelines and there is not yet any legal basis to regulate their operations once licenses are granted.

Relevance

- *The proposed project shall align its operations to the Somalia's Power Masterplan¹⁷ 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.*

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.

¹⁷ https://moewr.gov.so/wp-content/uploads/2020/07/Master_plan1.pdf

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

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

Relevance

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

3.1.10. Customary Legal System and Sharia law

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

The customary *xeer* system also handles most cases of sexual violence and GBV. The FGS and some Federal Member States are making efforts to reintroduce law courts, but the capacity of and trust in the formal justice system remains weak, and the customary system functions in parallel to state law. A number of customary practices go against basic human rights standards and serve to re-victimize GBV survivors, for example, crimes of rape are commonly resolved through the marriage of the victim to the perpetrator, and revenge and honour killings are tolerated¹⁸. Numerous cultural and institutional barriers limit women's access to justice, including fear of punishment, reprisals and harassment for reporting GBV incidents, and social stigma¹⁹.

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.*
- *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.

¹⁸See 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.

¹⁹UNDP, UN Women, and UNFPA, 2018.

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 grazing practices to support 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 (2023)

The Puntland Environmental and Social Impact Assessment (ESIA) Act was revised and officially enacted in December 2023 through Law No. 12, following approval by the Puntland State Parliament and signature by the President. This updated legislation provides a strengthened and modernized legal framework for managing the environmental and social risks of development projects across Puntland. Under the 2023 Act, all significant development activities, particularly those in the energy, infrastructure, and natural resource sectors, must undergo a comprehensive ESIA process prior to approval. The Act mandates clear procedures for project classification, licensing of ESIA experts, public consultation, environmental permitting, and post-approval monitoring.

The law emphasizes:

- Mandatory engagement with local communities, including women, youth, and vulnerable groups, as part of the assessment process (Article 28);
- Licensing and registration of ESIA consultants by the Ministry of Environment, Climate Change and Range (MoERCC) (Articles 5 and 7);
- Submission of five ESIA report copies to the Ministry and a structured review and approval process within set timelines (Articles 13–16);
- Annual monitoring for high-risk projects and biennial reviews for others (Article 20);
- Strict enforcement, penalties, and revocation mechanisms to ensure compliance (Articles 17, 24, 31).

Relevance

The 2023 ESIA Act ensures that all significant projects, such as the hybrid power plant, undergo a structured assessment to identify, evaluate, and mitigate environmental and social impacts before implementation. The updated provisions promote proactive risk management, transparent stakeholder engagement, and sustainable development. This adherence safeguards community well-being and environmental integrity, while aligning with Puntland's national and international development obligations.

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 (Amended 2023)

The Puntland Environmental Management Act (Amended 2023), which came into force on 15 August 2023, provides a comprehensive legal framework for the protection, conservation, and sustainable use of the environment and natural resources in Puntland, Somalia. It designates the Ministry of Environment as the competent authority with powers to formulate policies, enact regulations, designate protected areas, oversee environmental assessments, and enforce compliance. The Act regulates critical sectors including land, water, forestry, wildlife, and marine resources, prohibiting unauthorized activities such as deforestation, overgrazing, illegal hunting, pollution, and unregulated waste disposal. It mandates environmental impact assessments for projects with potential adverse impacts, enforces safe handling and disposal of hazardous substances, and sets pollution control standards for air, water, and soil. Local governments are tasked with integrating environmental protection into development plans and cooperating with the Ministry in monitoring and enforcement. The Act promotes public participation, transparency, and accountability, granting citizens the right to environmental information and consultation in decision-making processes. Enforcement provisions empower inspectors to conduct site visits, collect evidence, and impose penalties, including fines of up to 150 million Somali Shillings and imprisonment for up to 10 years, alongside obligations for restoration and compensation in cases of environmental damage. It authorizes the Ministry to issue technical standards and guidelines, repeals conflicting legislation, and seeks to balance economic growth with the preservation of ecosystems, biodiversity, and the long-term environmental health of Puntland.

Relevance

The NEPCO Hybrid Power Plant project in North Galkayo fully complies with the Puntland Environmental Protection and Management Act (Amended 2023) by aligning with its objectives of sustainable development, biodiversity conservation, pollution control, and public participation. The ESIA confirms the site is outside protected areas, incorporates mitigation measures to prevent environmental damage, and includes an Environmental and Social Management Plan (ESMP) covering waste management, hazardous substance handling, pollution prevention, and biodiversity protection. All required permits will be obtained from the Ministry of Environment and Climate Change, which will oversee monitoring and inspections, while local authorities and stakeholders—including vulnerable groups—have been consulted. The project commits to following technical standards, restoring any environmental damage, compensating affected persons if necessary, and granting full access for regulatory compliance checks, ensuring adherence to both the letter and spirit of the Act throughout construction, operation, and decommissioning phases.

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

3.3.3. Resettlement Policy Framework (RPF) for SESRP Projects

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

Relevance

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

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

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

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

World Bank ESFs	FRS laws	Comparison	Recommendation
ESS1 requires screening to determine level of environmental and social assessment to be done. An ESIA is prepared before project implementation ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts	- 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 consultation with the Federal Member States and other stakeholders, shall regulate land policy, and land control and use measures (Art. 43).	Similar- displacement in projects should be avoided to the extent possible by exploring alternatives.	WB policy is more elaborate than the FRS Law.
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	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	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 policy more elaborate and the two are being used to compliment

The policy requires these groups to be consulted separately to enhance their participation	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.	WB needs a social assessment to be conducted	
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 assessment²⁰.

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 UNCCD²¹.

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.

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

²¹The Somalia National Action Programme on UNCCD: <https://knowledge.unccd.int/sites/default/files/naps/2018-06/NAP%20Full%20Report%20-%20Final%202023%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 area.

4.4. Alternative Sources of Energy

4.4.1. Thermal Power Generation

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

4.4.2. Wind Power Generation

Wind power generation, while a valuable renewable energy source, has several limitations compared to the proposed hybrid power plant. Wind power is highly dependent on geographic location, and suitable sites for wind farms are limited (areas with consistent and strong winds) in the 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.

²²Archer, C. L., & Jacobson, M. Z. (2005). Evaluation of global wind power. *Journal of Geophysical Research: Atmospheres*, 110(D12). <https://doi.org/10.1029/2004JD005462>

²³Rawn, 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>

²⁴Holttinen, H. (2005). Hourly wind power variations in the Nordic countries. *Wind Energy*, 8(2), 173-195. <https://doi.org/10.1002/we.144>

²⁵Sorensen, P., & Cutululis, N. A. (2004). Variability and predictability of large-scale wind energy production. *Risø National Laboratory*.

²⁶Kaldellis, 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>

²⁷Hansen, 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>

²⁸López, 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 of alternatives compared the existing power plant location, which lacks adequate space for the new hybrid power infrastructure, with a new site 9 km 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 (9km away) 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. The transmission line has already been selected, and the selection considered the following factors distance, cost, grid stability, capacity needs, terrain, geographical constraints, and technical complexity.

A hybrid energy system was chosen over a purely solar power plant to ensure reliable and stable energy supply. Solar power is intermittent and depends on sunlight availability, while the Battery Energy Storage System (BESS) allows for energy storage during high solar generation. Diesel generators provide additional stability during cloudy days or peak demand periods. This setup maximizes renewable energy use while ensuring grid stability and reliability, leveraging existing diesel 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 ($6^{\circ}43'54.3''\text{N}$, $47^{\circ}26'10.8''\text{E}$) 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 2km² 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 highlands²⁹. North-easterly and south-easterly air masses meet in the Intertropical Front (ITF) and raise air upwards to produce rain. The annual movements of the ITCZ from north to south across Africa and back again, give rise to four different seasons in the State like

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

rest of Somalia, comprising two distinguishable rainy seasons alternating with two marked dry seasons³⁰, 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 day³¹. 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 scenario³² (Figure 5-1a).

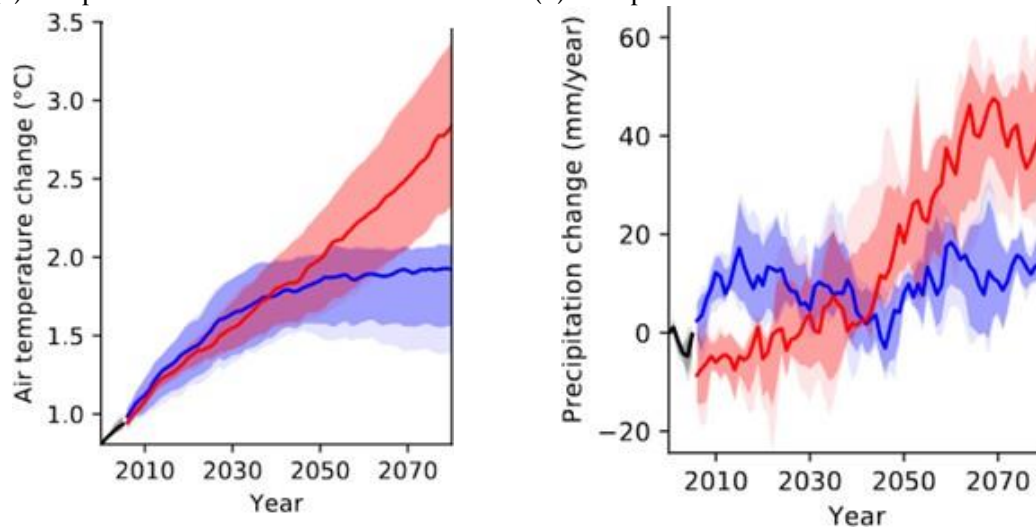
³⁰ FAO-SWALIM (2010). Somalia Water and Land Information Management (2010). Atlas of the Juba and Shabelle Rivers in Somalia. Nairobi: FAO-SWALIM. Available from http://www.faoswalim.org/subsites/River_Atlas_Files/River_Atlas_Documents/index.html

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 Gaalkacyo area of Puntland State in Somalia is diverse and varied, consisting of plains, plateaus, hills, and low mountains³³. 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 Gaalkacyo 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 river valleys in Puntland State that provide vital water resources and support vegetation along their banks. 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 valleys³⁴. This geological setting has influenced the area's landscape and the types of rocks found there. The soils in Gaalkacyo 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 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.

³³Central 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



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 quality³⁵. 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 flowing³⁶. 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 boreholes, rehabilitating wells, and promoting sustainable water management practices in Gaalkacyo area.

³⁵Federal 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].

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, creating patches of grazing land for herbivores like gazelles. 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.

A variety 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 (*Uromastix 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, and depletion of grazing land, causing food insecurity and population displacement. The region's limited infrastructure and weak governance exacerbate its vulnerability, with poor access to climate-resilient resources and increasing desertification. Climate change also increases conflict risks over dwindling resources, contributing to social instability. The CORDEX Africa multi-model median projections indicate that the number of extreme heat days in which maximum daytime temperatures exceed 40°C is likely to increase in South Central Somalia including 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

³⁷Gutiérrez, 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/>.

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

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

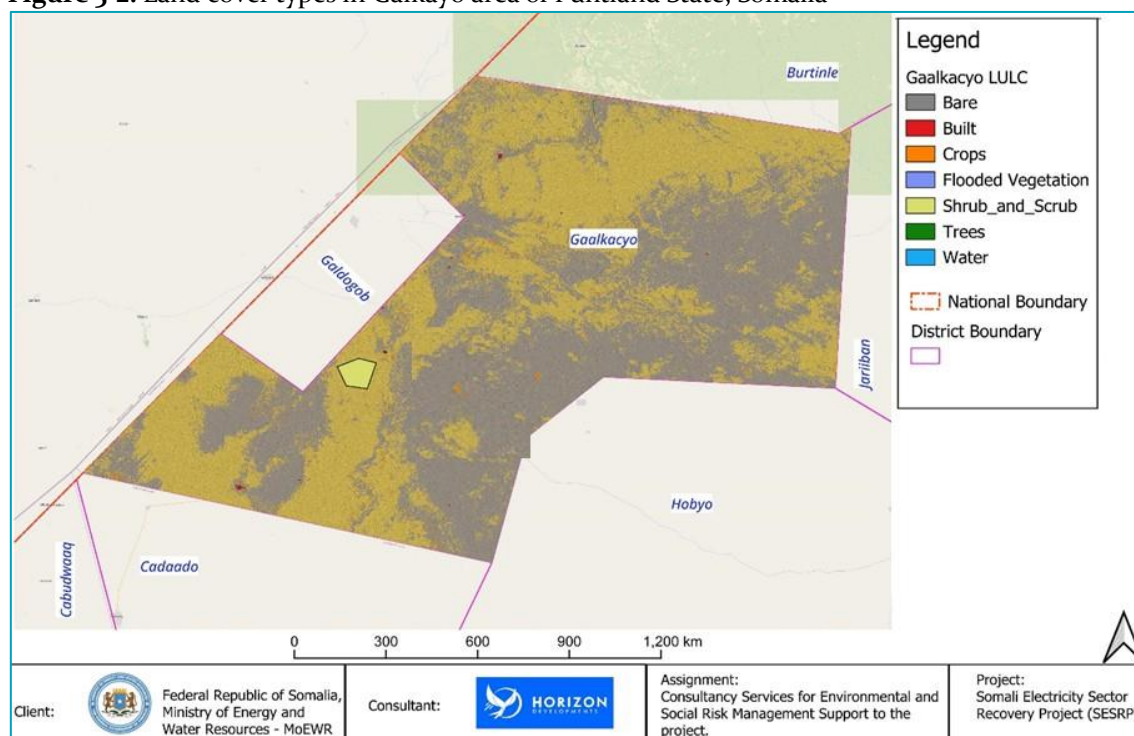
Agricultural land contamination in the northern outskirts of Gaalkacyo City, Somalia, is a growing concern due to a combination of factors including improper waste disposal, use of chemical fertilizers, and industrial activities related to infrastructure development. The area, traditionally reliant on 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 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 floodplains³⁹. 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.

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

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.

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 people⁴⁰. The northern sector of Gaalkacyo City within Puntland State, is a dynamic and diverse area with a rapidly growing

⁴⁰file:///C:/Users/pc/Downloads/Puntland%20State%20Development%20Plan%20(GSDP-3)%20-%202023-2025.pdf

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) people⁴¹.

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 needs⁴². 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, Murursade, 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, 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.

⁴¹ Somalia National Bureau of Statistics (Formerly Directorate of National Statistics, Federal Government of Somalia), Somali Health and Demographic survey - Puntland Report 2021.

⁴² Saferworld. (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>.

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)

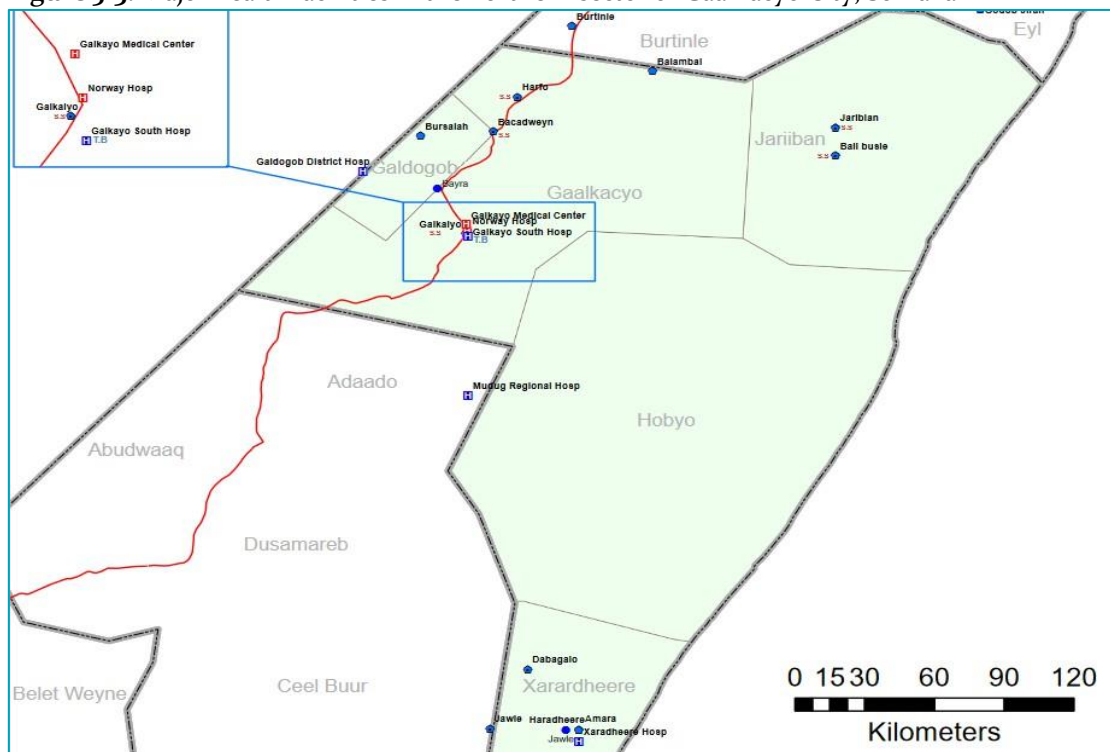
Puntland State faces challenges in its productive sectors, including agriculture, livestock, and extractive industries. Livestock marketing is primarily driven by private enterprises, and public-private partnerships are crucial for effective development. The government should prioritize private sector 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 people⁴³ 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 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 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.

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

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 city⁴⁴. 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 resolved⁴⁵. Lack of genuine reconciliation from both administrations, less effective governance, and negative social media have further complicated the situation⁴⁶.

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.

⁴⁴Omar, 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.

⁴⁵Interpeace. (2021). Puntland reconciliation: Processes, challenges, and opportunities ahead. Accessed, https://www.interpeace.org/wp-content/uploads/2021/02/2021-Puntland_Report.pdf, p.16.

⁴⁶Heritage 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.o. 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. As part of the investment, NEPCO will also incorporate a 2.8MW genset to the facility.
- *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 stemmed from the following key elements:

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

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

Table 6-1: Categories of significance

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

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

Table 6-2: Overall significance criteria for environmental impacts

Receptor sensitivity	Impact Magnitude		
	Low	Medium	High
Low	Minor	Minor	Moderate
Medium	Minor	Moderate	Major
High	Moderate	Major	Major

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

6.2. THE ENVIRONMENT AND SOCIAL COMPONENTS AFFECTED BY THE PROJECT

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

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

Components Affected		
Physical	Biological	Human
Surface 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
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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	Medium – the changes to the visual condition of the land will occur within the Project Site and will be noticeable across the surrounding area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.1.2. Soil, Groundwater and Surface Water Contamination

The 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 also 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-to medium as the generation of floodwater is seasonal although could impact receptors outside of the Project Site located within the Project Area.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor.

6.2.2.1.4. Air Quality

Dust

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 and genset emissions

Exhaust emissions, mostly from generators 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. Because the proposed project will also involve the establishment of a 2.8MW genset, emissions from the generators will be a key factor affecting the ambient air quality. The 2.8MW diesel generator is expected to contribute to air emissions with impacts on local air quality and public health. Key emissions include carbon dioxide (CO₂), nitrogen oxides (NO_x), particulate matter (PM), sulfur dioxide (SO₂), and volatile organic compounds (VOCs), all of which result from diesel combustion. Emission factors, which estimate pollutant release per unit of fuel consumed, vary based on fuel quality, engine efficiency, and operational load. The type of diesel fuel used, particularly its sulphur content, along with the generator's load factor and maintenance practices, plays a crucial role in determining overall emissions. 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 generator's footprint and protecting air quality in the project area.

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

6.2.2.1.5. Noise

The usage of construction machines and vehicles will cause noise on the project site and in the project area. Off-site noise impacts may cause a nuisance to the adjacent land users engaged in grazing activities. Vehicles used to carry staff and materials can add to the noise during construction.

Impact	Noise
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that noise levels will rapidly revert to baseline conditions after construction works is completed
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.

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

6.2.2.1.6. Biodiversity

Fauna

The 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

Risk Matrix-Biodiversity Disturbance

Project phase	Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Construction phase	Impacts on social environment	Biodiversity (Fauna)	Direct	Long-term	Irreversible	Low	Low/medium	Moderate	Minor
		Biodiversity (Flora)	Direct	Long-term	Reversible	Low	Low/medium	Moderate	Minor
Operation phase	Impacts on social environment	Biodiversity (Fauna)	Direct/indirect	Long-term	Irreversible	High	Low/medium	Moderate	Minor

		Biodiversity (Flora)	Direct/indirect	Long-term	Reversible	Low	Low	Moderate	Minor
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Vulnerability Analysis –Biodiversity Disturbance

Vulnerability Category	Key Vulnerability Aspects	Core Mitigation Measures
Fauna	Habitat Loss & Fragmentation: Reliance on grazing land, movement corridors; susceptibility of NT/VU species to displacement. "Lake Effect": Migratory and local birds vulnerable to visual illusion causing collisions/exhaustion.	Habitat-Centric Design: Minimize clearing, design wildlife-friendly fencing/access, create buffer zones, consider habitat restoration. Avian Protection: Use less reflective materials, implement visual deterrents, conduct careful monitoring.
Flora	Habitat Loss & Alteration: Reliance on direct sunlight, vulnerability to soil erosion from clearing, susceptibility to invasive species. Arid Environment: Slow natural regeneration makes flora more vulnerable to disturbance.	Vegetation Management: Minimize clearing, implement resilient groundcover, active restoration, manage invasive species (e.g., Prosopis juliflora), maintain buffer zones.
Overall Monitoring	Limited baseline data, potential for unforeseen long-term impacts on delicate ecosystem.	Continuous Monitoring: Implement robust ecological monitoring programs throughout operation to assess and adapt mitigation.

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 – the project site is located in an area with no adjacent settlements.
Magnitude	Low – 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

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. The use of waste treatment/disposal facilities is expected to be non-reversible as once space in landfill facilities is used, this will be permanently used.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact with 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 (mainly diesel) 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 2km² 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 and Workforce Accommodation

The anticipated impacts that could be generated by the influx of workers and the construction of the living camp are similar in nature 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 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

Risk Matrix-Worker Influx

Project phase	Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Construction phase	Impacts on social environment	Worker influx	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
Operation phase	Impacts on social environment	Worker influx	Direct	Short/long-term	Reversible/irreversible	Low	Low/medium	Moderate	Minor
Decommissioning phase	Impacts on social environment	Worker influx	Direct	Short term	Irreversible	High	Low	Moderate	Minor

Vulnerability Analysis –Labor Influx

Vulnerability Factor	Description & Key Impacts	Exposed Groups	Core Mitigation Measures (Project & Community)
Socio-economic Strain & Inflation	Increased demand for housing, food, and basic services (water, electricity) by incoming workers (and their potential "followers" seeking opportunities) in a city with already limited resources.	Low-income households, IDPs, existing small businesses, general population of Gaalkacyo.	Conduct a needs assessment to estimate demand for local goods/services.
Increased Competition for Employment	While the project creates jobs, the influx of skilled or semi-skilled workers from outside could lead to competition with local job seekers, especially for lower-skilled roles.	Unskilled and semi-skilled local laborers, youth, IDPs, and marginalized occupational groups.	Develop a Local Content and Employment Plan prioritizing local hiring where skills match.
Pressure on Public Services (Health & Education)	The increased population can strain already limited public services like healthcare facilities, schools, and emergency services, potentially reducing quality or access for existing residents.	General population of Gaalkacyo, particularly vulnerable groups requiring healthcare (e.g., children, elderly), students.	Assess local public service capacity (healthcare, education). - Establish on-site medical facilities for workers to reduce burden on local clinics.
Social Tension & Cultural Clashes	Differences in cultural norms, behaviors, and economic status between incoming workers and the local community can lead to misunderstandings, friction, or resentment.	Local community members, project workers, specific cultural/ethnic groups.	Conduct a cultural sensitivity training for all workers on local customs, norms, and respectful behavior.
Environmental Degradation	Increased population density, waste generation, and demand for resources (water, fuel wood) can put pressure on the local environment, particularly in a resource-scarce region.	Local environment (water sources, land, vegetation), communities reliant on natural resources.	Implement a comprehensive Environmental and social Management Plan (ESMP). - Develop and enforce strict waste management, water conservation, alternative energy source and air and water quality protocols for the project site and worker camps.

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

Risk Matrix-Gender Based Violence (GBV)

Project phase	Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Construction phase	Impacts on social environment	Gender-based violence	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
Operation phase	Impacts on social environment	Gender-based violence	Direct	Short/long-term	Irreversible	High	Low/medium	Major	Minor
Decommissioning phase	Impacts on social environment	Gender-based violence	Direct	Short term	Irreversible	High	Low	Moderate	Minor

Vulnerability Analysis – Gender-Based Violence (GBV)

This table presents the vulnerability analysis for Gender-Based Violence (GBV) risks associated with the construction, Operation and Decommissioning phases of the NEPCO hybrid power plant in Gaalkacyo. It highlights the specific factors contributing to vulnerability among affected populations, especially women, girls, and other at-risk groups.

Vulnerability Factor	Description/Justification	Mitigation measures
Exposed Groups	Women and girls, especially from vulnerable households (IDPs, female-headed households, low-income groups).	Implement targeted outreach and support programs for vulnerable women and girls, including safe spaces, livelihood support, and educational opportunities. Prioritize their inclusion in community-based protection initiatives.
Socio-cultural norms	Conservative gender norms may inhibit survivors from reporting incidents or seeking help.	Conduct community-based awareness campaigns to challenge harmful norms. Engage religious and community leaders as allies. Establish confidential and culturally sensitive reporting mechanisms.
Community preparedness and awareness	Limited GBV awareness or reporting mechanisms; stigma and fear may hinder community response.	Develop and disseminate culturally appropriate GBV awareness materials. Train community focal points and volunteers on GBV prevention, response, and referral pathways. Establish confidential and accessible reporting channels at the community level.
Presence of external labor force	Incoming male workers unfamiliar with local norms may increase risks of GBV.	Implement awareness campaigns for incoming workers on local norms, and consequences of GBV. Establish clear codes of conduct for workers. Strengthen community-based protection mechanisms and reporting channels in areas with high labor influx.
Access to GBV services	Poor access to safe spaces, psychosocial support, or legal services in rural/remote settings.	Establish mobile outreach teams to provide services in remote areas. Set up temporary safe spaces and referral pathways to existing services. Train community health workers and volunteers to provide basic psychosocial support and referrals.
Institutional capacity	Weak institutional frameworks to address or respond to GBV (lack of trained personnel, reporting channels, etc.).	Provide comprehensive training to service providers (health, social work, legal, law enforcement) on GBV case management, survivor-centered approaches, and data collection..
Law enforcement effectiveness	Weak law enforcement mechanisms or lack of community trust in justice system.	Train law enforcement personnel on gender-sensitive policing, investigation of GBV cases, and survivor protection. Promote community-police dialogue to build trust.

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 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	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Major
Significance of the impact with mitigation	Minor

6.2.2.3.11. Fire Hazards

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

6.3.1.3. Improved Quality of Life

Access to electricity at the household level and schools will enable children to study longer hours and access education programs through radio and TV channels. This will also allow schools to utilize information technology and communication, which are becoming a part of the education sector. The impact is significant as it will provide power to schools over a long period, allowing for additional study time in the night and morning. Enhancements proposed include connecting more learning institutions with electricity and partnering with the 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	Medium given that project will be visible within immediate vicinity and up to some kilometers
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3.2.1.2. Soil, Groundwater and Surface Water Contamination

During the operation phase 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 from diesel generators 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	Moderate
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	Medium – nearby land users that could be impacted from changes in drainage flows.
Magnitude	Low-to medium as the generation of floodwater is seasonal although could impact receptors outside of the Project Site located within the Project Area.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor.

6.3.2.1.4. Air Quality

Dust

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 the project when appropriate mitigation measures are implemented.
Receptor sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Low-to-medium given that the generation of dust is expected to be from extent sources during the operation phase.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Negligible

Vehicle and genset exhaust emissions

During the operation phase of a hybrid power plant, exhaust and fumes from vehicles and diesel generators are expected. 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. Diesel generators in a hybrid plant can have significant negative impacts on air quality, releasing harmful pollutants such as carbon dioxide, nitrogen oxides, sulfur oxides, and particulate matter, which contribute to air pollution and harm human health and the environment. 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. Particulate matter from diesel exhaust, particularly fine particles (PM_{2.5}), poses significant health risks, leading to cardiovascular diseases. Despite the hybrid system's benefits from renewable energy sources, the intermittent reliance on diesel reduces overall air quality gains, underscoring the importance of transitioning to cleaner energy solutions.

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

6.3.2.1.5. Noise

Noise pollution during the operation phase will generally be minimal. However, some noise sources can still affect the surrounding environment. These include the hum of electrical equipment like transformers and inverters, as well as occasional noise from maintenance activities, such as vehicle movement or cleaning processes, and diesel generators. Due to the Project Area's typically quiet, even low-level noise may be noticeable to nearby communities or wildlife. While the noise 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 levels.

Impact	Noise
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities with the Project Site.
Reversibility	Reversible given that noise levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low given that there are no permanent/temporary settlements adjacent to the Project Site.
Magnitude	Medium given that the generation of noise is likely to be limited to the use of construction machinery and earth movements.
Significance of the impact without mitigation	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 grazing 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, including the NT and VU species.
Receptor Sensitivity	High - Presence of NT and VU fauna species in and around the project area.
Magnitude	Low-medium as site operation activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas while others become habituated.
Significance of the impact without mitigation	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

⁴⁷Barros, 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>

⁴⁸Wiggins, 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>

⁴⁹Zeppel, 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>

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 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 <i>Prosopis juliflora</i> , <i>Solanum incanum</i> and <i>Datura stramonium</i> 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	Moderate
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	Moderate
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 – 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

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. The use of waste treatment/disposal facilities is expected to be non-reversible as once space in landfill facilities is used, this will be permanently used.
Receptor Sensitivity	Low as such utilities are expected to be able to handle project requirements
Magnitude	Low as waste generated from project is considered relatively minimal
Significance of the impact without mitigation	Minor
Significance of the impact without mitigation	Negligible

6.3.2.2. Impacts on Infrastructure and Utilities

6.3.2.2.1. Water Consumption

During the operation phase, water consumption is relatively low compared to other types of power generation. However, some water is required for routine maintenance activities, such as cleaning the solar panels to ensure optimal performance. On average, cleaning solar panels typically requires about 2-4 litres of water per panel. For the proposed 3.5 MW solar farm, the number of panels can vary based on the panel specifications, but a rough estimate can be made. For example, if each panel

is around 300 watts, a 3.5 MW installation would have about 11,667 panels (3,500,000 watts / 300 watts per panel) translating to approximately 40,000 litres per cleaning session. The water demand for a 3.5MW generator set (genset) will depend on several factors, including the type of generator, cooling system design, and operational conditions. However, for a diesel genset, the water demand for cooling typically ranges from 1.5 to 2.5 liters per kWh produced. Using an average water consumption of 2 litres per kWh, the estimated water demand for a 3.5 MW genset operating continuously could be around 7,000 liters per hour or 168,000 liters per day.

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), still relies on diesel generators as a backup, which negatively impacts overall energy consumption efficiency. The fuel used in these generators—typically diesel—remains a fossil fuel, contributing to inefficient energy use and higher carbon emissions compared to fully renewable alternatives. During periods of low solar availability or high-energy demand, the generators may run for extended periods, consuming significant amounts of fuel. This not only increases operational costs but also contributes to pollution and reliance on imported fuel, particularly in remote locations like Gaalkacyo. The inefficiency of diesel fuel in terms of energy output and the associated greenhouse gas emissions further dampen the sustainability advantages of the hybrid system, highlighting the need for more optimized renewable energy solutions to reduce fuel consumption.

Impact	Energy consumption
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as energy will be required during both construction and operation phases
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low but 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
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6.3.2.3. Impacts on Social Environment

6.3.2.3.1. Impact to Livelihoods from Grazing Land Access Restrictions

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 Project Site.
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Negligible

6.3.2.3.3. Worker Influx – Incoming Workforce and Workforce Accommodation

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 and workforce accommodation
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as some workers are likely to permanently settle in the Project Area
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low because of homogenous nature of the local Somali

	communities.
Magnitude	Low-to-medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.4. Gender-based Violence

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	Major
Significance of the impact with mitigation	Minor

6.3.2.3.5. Labour Disputes

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

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

6.3.2.3.6. Child and Forced Labour

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	Major
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.

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 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	Major
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. The storage of fuel for generators in a hybrid power plant poses significant fire hazards, potentially causing extensive damage to the power plant infrastructure, disrupting energy production, and potentially causing injuries or fatalities. 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.

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

6.4. KEY IMPACTS DURING THE DECOMMISSIONING

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 restoration in visual character will occur.
Reversibility	Irreversible
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	High – the restoration of 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	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 – the project site is located in an area with no adjacent settlements.
Magnitude	Low – 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	Major
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 from demolition works. The impact significance has been assessed minor because the impact magnitude is low and the receptor sensitivity is medium.

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

6.4.2.3.2. Impact to Livelihoods from Grazing Land Access Restrictions

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 activities, including grazing.
Receptor Sensitivity	Low as the area is not unique pastureland and there are adjacent areas of similar quality available locally and throughout the region.
Magnitude	Low as the number of pastoralists active is relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.4.2.3.4. 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
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Type of impact	Negative
Type of effect	Direct
Duration	Short term
Reversibility	Could be irreversible as it could result in potential permanent health and safety impacts
Receptor Sensitivity	High on the basis that safety is the Project's highest priority.
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.5. Worker Influx – Incoming Workforce and Workforce Accommodation

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

6.4.2.3.7. 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
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Type of impact	Negative
Type of Effect	Direct
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	Direct
Duration	Short term during decommissioning phase
Reversibility	Reversible with appropriate mitigation measures
Receptor Sensitivity	High on the basis that it violates human rights
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.9. 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 given that could result in potential health and safety risks
Magnitude	Low given distance of any nearby settlements or villages
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.10. 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 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 construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	High as the number of road movements could be substantial when compared to the existing situation.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

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

6.5. SUMMARY OF THE IMPACTS

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

6.5.1. Construction Phase

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Long term	Irreversible	Low	Medium	Minor	Negligible
	Soil, ground and surface water contamination	Direct	Short term	Reversible	Low	Low	Moderate	Minor
	Flood risk	Direct	Long term	Reversible	Medium	Low/medium	Moderate	Minor
	Air quality (Dust)	Direct	Short term	Reversible	Low	Medium	Moderate	Negligible
	Air quality (vehicle and genset emissions)	Direct	Short-term	Reversible	Low	Medium	Moderate	Minor
	Noise	Direct	Short term	Reversible	Low	Medium	Minor	Negligible
	Biodiversity (Fauna)	Direct	Long-term	Irreversible	Low	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct	Long-term	Reversible	Low	Low/medium	Moderate	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
Impacts on infrastructure and utilities	Wastes (solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Wastes (liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on social environment	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 and workforce accommodation camp	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	High	High	Major	Minor
	Fire hazards	Direct	Short-term	Irreversible	High	Low	Minor	Negligible

6.5.2. Operation Phase

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

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Occupational health and safety	Direct	Long-term	Irreversible	High	Low	Moderate	Minor
	Community health and safety risks	Direct	Short/long-term	Irreversible	High	High	Major	Minor
	Fire hazards	Direct	Short/long-term	Irreversible	High	Low	Moderate	Minor

6.5.3. Construction Phase

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Short term	irreversible	Low	High	Minor	Minor
	Biological environment	Direct/indirect	Short term	Reversible/Irreversible	Low	Medium	Moderate	Minor
	Solid waste generation	Direct/indirect	Short-term	Reversible	Low	Low	Major	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	Moderate	Minor
	Trespassing of unauthorized personnel	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Worker influx – incoming workforce and workforce accommodation camp	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Gender-based violence	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Labour disputes	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Child and forced labour	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Security	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	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	Key impacts during operation phase are site-specific and related to project interaction with landscape and visual receptors, with cumulative impacts irrelevant. No key landscape or visual receptors exist on the project site.
Land Use	Impacts are primarily related to the planning and construction phase, as the project development could result in land use impacts. It should be noted that the activity of extensive pastoralism is undertaken in the open lands of the Gaalkacyo and entire Puntland State. Because of the proposed solar PV project, there is the likelihood that the grazing land size shall reduce by at least 2km ² .
Geology, hydrology and hydrogeology	Key impact is related to waste management onsite (solid waste, wastewater, and hazardous waste) during both the construction and operation phase. Such impacts in general are considered site-specific and shall be related to the overall managements of waste practices by NEPCO - onsite and offsite. The ESIA identified proper mitigation measure for waste storage onsite, collection and transportation and final disposal (e.g., coordination with relevant local authorities to obtain list of authorized contractors for waste collection, utilization of manifests, allocation of proper areas for storage onsite with measures for construction of such areas, etc.).
Biodiversity	Impacts are mainly related to construction phase. Construction activities will damage/disturb existing habitats and any species which might be present within each project site. Those are considered site-specific impacts related to the project site and therefore cumulative impacts are irrelevant. A biodiversity management plan shall be developed for purposes of managing biodiversity during construction and operation phases
Archaeology and cultural heritage	Impacts mainly related to construction phase at the project site, as construction activities could damage/disturb potential archaeological remains, as well as potential archaeological remains which could be buried in the ground (if any). Those are considered site-specific impacts related to the project site and therefore cumulative impacts are irrelevant. Additionally, it would be a chance find for any archeological information at the Project Site.
Air quality and noise	Impacts are mainly related to construction phase as construction activities will likely result in an increased level of dust and noise level emissions which in turn could impact nearby receptors. Those are considered site-specific impacts related to the project site and therefore cumulative impacts are irrelevant.
Infrastructure and utilities	Key cumulative impacts in relation to infrastructure and utilities is related to the water requirements during both the construction and operation phase. Similarly, it is expected that the project will undertake consultations to determine the most feasible and practical approach for securing the water requirements of the Project.
Socio-economic conditions	Key impacts in relation to socio-economic development includes the potential for job and procurement opportunities for local communities during the construction and operation phase, which would to some extent enhance the socio-economic conditions of local communities. The ESIA recommends the development and implementation of a Community Integration Plan by NEPCO for working with the local community members during the construction phase, and a Community Integration Plan during operation phase, which shall consider local recruitment and procurement procedures.
Occupational health and safety	Key impacts are related to construction and operation which include generic risks to workers health and safety from working on construction and operational sites, as it increases the risk of injury or death due to accidents. Those are site-specific impacts and are applicable only for the project. NEPCO is expected to develop a site and project specific Occupational Health and Safety Plan (OHSP). The Contractor will prepare and implement

Attribute	Cumulative Impacts
	a Worker Accommodation Plan, and using this plan, the accommodation camp will be selected which will take into consideration the nearby proximity of social receptors such as residential housing units and schools, and the road route to be used by vehicles transporting personnel. The ESIA recommends that a site selection study shall be undertaken to justify the location of the camp.
Community health, safety, and security	The construction and operation of a project may lead to potential hazards such as unauthorized personnel trespassing, health and safety risks, and social vices. Inappropriate security management can also lead to resentment and escalation. To prevent these impacts, appropriate site- specific security measures and a security management plan are recommended.
Infrastructure and public services	The main cumulative impacts related to infrastructure and utilities concern water requirements during the construction phases. It is recommended that NEPCO coordinates with the water resources authority to ensure sustainability.
Socio-economic conditions	Key impacts in relation to socio-economic development include employment and service opportunities for local communities during the construction and operation phase, which would improve the socio-economic conditions of local communities to some extent. It is important to note that all of these infrastructure projects will (1) strengthen (leverage) the capital stock of the Puntland State, improve the attractiveness of the Gaalkacyo and surrounding areas for foreign investment and (3) contribute to the socio-economic development of the Puntland State.
Health and safety at work	The main impacts are construction-related, including generic health and safety risks to workers on construction sites, as they increase the risk of injury or death from accidents. These are site-specific impacts and each entity involved in such development projects (contractors, project operators, etc.) should develop site and project-specific occupational health and safety plans (OHS plans), and SEA/H Prevention and Response Action Plan.
Health, protection and safety of communities	These include specific impacts related to: (i) during construction, the intrusion of unauthorized personnel at each project site could lead to potential risks related to several hazards; (ii) during construction, the influx of project workers could lead to certain health, safety and security impacts on the community, such as risky diseases, inappropriate code of conduct, increase in social vices; and (iii) during construction, inappropriate management of security issues and incidents by security personnel towards local communities could lead to resentment, mistrust and conflict. It is recommended that a worker influx plan be put in place

7.0 MITIGATION, MONITORING AND REPORTING

This section examines the mitigation measures for the outlined impacts as assessed for the project (Section 5). It also gives detailed account on monitoring and reporting requirements for the mitigation measures. The mitigation measures together with the accompanying monitoring and reporting requirements have been pooled according to the project phases – construction, operation and decommissioning. The proposed solar power plant, presents a valuable opportunity to harness renewable energy and promote sustainable development, especially in the 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
	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	- Provision of drainage system - Raised foundations for the structures
	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 - Ensure regular maintenance of machinery to reduce noise emissions.	Construction	Noise levels-Records of noise measurements done by contractor

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- 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.		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, 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	Construction	Presence of well-maintained receptacles and centralized collection points.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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. • Frequent inspection and maintenance of the generator to minimize leakages. • 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
	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.	Construction	• Energy consumption records

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
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	
	Trespassing of unauthorized personnel	• Controlled access to the site only with prior approval • Fencing off the construction site to keep off 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
	Worker influx – incoming workforce and workforce accommodation camp	• 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 complaints 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.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Gender-based violence	• Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed 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 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	• 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.
	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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				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 kidnappings, armed attacks, and civil unrest. • Have security response teams on standby to address urgent security breaches or emergencies.	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 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	Construction	• Records of any near misses, incident, and accidents. • Records of corrective actions implemented if there was an accident.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- Establish safety committees Electrical hazards: - Use insulated tools and equipment. - Provide electrical safety training. - Install safety signage and warning labels. - Conduct regular safety audits and inspections. - Provide appropriate PPEs for all workers - Maintain safe distances from live electrical parts. - Prohibit electrical work in wet conditions. - Restrict electrical work to qualified personnel. - Establish emergency response plans. Fall hazards: - Provide secure scaffolding and work platforms. - Conduct fall hazard risk assessments. - Implement a work permit system for working at heights. - Provide fall prevention training to all workers. - Provide appropriate PPEs, especially shoes - Restrict access to high-risk areas. - Establish fall rescue procedures. - Train workers in emergency response and first aid. Heat stress: - Provide shaded rest areas. - Schedule high-heat tasks during cooler hours. - Conduct regular heat stress monitoring. - Provide breathable, lightweight clothing. - Train workers on heat stress symptoms and prevention. - Establish emergency procedures for heat-related illnesses. UV radiation exposure: - Use UV-protective screens or barriers. - Schedule work during early mornings or late afternoons to avoid peak sun hours. - Implement a UV protection policy and awareness training. - Require workers to wear UV-rated safety glasses or goggles. - Rotate workers to minimize prolonged sun exposure. - Educate workers on UV radiation risks and prevention. - Train workers on recognizing sunburns and heat-related illnesses. Chemical exposure: - Use proper ventilation systems in enclosed areas.		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- Implement spill containment and drainage systems. - Develop and enforce a Chemical Hazard Management Plan. - Maintain Safety Data Sheets (SDS) for all chemicals on-site. - Provide chemical-resistant gloves, goggles, and protective clothing. - Train workers on chemical handling, usage, and disposal. - Enforce handwashing and hygiene protocols. - Establish spill response and decontamination procedures. - Train workers in first aid for chemical exposure incidents. Ergonomic risks: - Design workstations to minimize awkward postures and repetitive motions. - Provide anti-fatigue mats for standing work areas. - Implement an ergonomics training program for workers. - Conduct regular ergonomic risk assessments. - Provide back-support belts for lifting tasks. - Encourage workers to take micro-breaks to reduce strain. - Train workers to recognize early symptoms of musculoskeletal disorders. - Provide access to on-site first aid and medical support. Weather related hazards: - Provide temporary shelters for extreme weather conditions. - Secure scaffolding, cranes, and loose materials against strong winds. - Establish emergency evacuation procedures. - Ensure workers use sun protection (hats, sunglasses, and sunscreen) for extreme heat. - Train workers on recognizing and responding to weather-related illnesses and injuries. - Prohibit work near power lines or on elevated surfaces during storms. - Conduct regular weather emergency drills.		
	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	Construction	- Records of any Fire incidences - Fire equipment and evacuation plan

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- No smoking shall be done on construction site - Provision of firefighting equipment on site during 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	- Number of traffic incidents. - Traffic management plan compliance. - Speed limit violations. - Traffic safety training attendance. - Community complaints related to traffic. - Emergency response time to traffic incidents. - Community awareness programs on traffic safety. - Use of alternative routes by construction vehicles.
	Risks related to Inadequate stakeholder engagement	- Prepare a stakeholder engagement/consultation plan (SEP) that is 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. - 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				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 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	Operation	- Provision of drainage system - Raised foundations for

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- base - Create flooding diversions and or spill ways to divert water from getting into the solar power facility		the structures
	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 genset exhaust emissions)	<i>Vehicles</i> - Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. <i>Generators</i> - Use of diesel which is Sulphur- free to run the power producing generators to be encouraged - The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters - Invest in modern diesel generators with advanced combustion systems. - Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. - Use Selective Catalytic Reduction (SCR) to significantly reduce NO_x emissions by injecting ammonia or urea into the exhaust stream. - Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. - Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. - Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. - Implement strategies to reduce idling time when diesel generators are not needed or can be supplemented by the hybrid system. - Regularly report emissions data to local regulatory authorities as part of environmental compliance.	Operation	- Engine maintenance records - Inspection of stacks
	Noise & vibration	<i>Genset</i> - Install soundproof enclosures around the diesel generators - Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. - Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations - Ensure regular servicing of the diesel generator to maintain its optimal function. - Install high-performance silencers on the generator's exhaust system to reduce noise emissions	Operation	Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <i>BESS</i> - Install soundproof or acoustically treated enclosures around noisy inverters and transformers. - Use quieter, high-efficiency fans and cooling systems, or design them with lower noise outputs. - Equip the BESS unit with vibration isolators or mounts to reduce noise generated by vibrations - Install sound barriers or walls around the BESS unit to deflect or absorb noise. - Use sound-absorbing materials within the BESS unit's housing to absorb sound before it escapes. - Regularly service and maintain fans, inverters, and other equipment to ensure they operate smoothly		
	Biodiversity (Fauna)	- 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
	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 <i>Damaged solar panels and hazardous wastes</i> - Ensure segregation from other waste streams - All hazardous products and waste should be labelled and handled properly to avoid contact with the ground	Operation	Presence of well-maintained receptacles and centralized collection points.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Wastes (Liquid)	- Dispose hazardous waste through a approved waste handler <i>Sanitary wastes</i> - Provide sanitary waste facilities for both genders clearly marked - Disposal of waste through septic tanks <i>Oils from vehicles</i> - 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. <i>Chemicals</i> - All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <i>Generators</i> - Proper storage of the oil is required to ensure no leakages - Frequent inspection and maintenance of the generator to minimize leakages. - No vehicles should be serviced or maintained at the project site. - The waste oil or used oil must be disposed-off appropriately. - Proper training for the handling and use of fuels for the operators of the power plant. - In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <i>Accidental fuel and oil spill</i> - Develop and implement a detailed Spill Prevention Plan (SPP) - Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. - Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. - Install spill and leak detection systems on fuel storage tanks, transformers, and pipelines. - Implement safe fuel handling protocols to reduce the risk of spills during fuel transfers. - Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear. - Ensure quick clean-up of spills by designated response teams trained in handling hazardous materials.	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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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.		
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	• Water usage records
	Energy consumption	<i>Lightings</i> • 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. <i>Diesel generators</i> • Implement energy-efficient technologies and practices in plant operations. • Conduct scheduled maintenance and servicing of diesel generators. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime. • Ensure high-quality, low-sulfur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. • Implement measures to reduce unnecessary idling of diesel generators. • Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. • Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel consumption and improve overall generator efficiency.	Operation	• Diesel Generator Usage (hours/month): • Solar Energy Generation (kWh/month): • Battery Energy Storage System (BESS) Utilization (cycles/month). • Lighting Energy Consumption (kWh/month). • Maintenance Records for Diesel Generators. • Carbon Emissions (tons of CO₂/month).
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	Operation	• Number of complaints from affected communities

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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.		(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
	Worker influx – incoming workforce and workforce accommodation	• 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)

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				implemented). Community consultation meetings held (number/year).
	Gender-based violence	<i>GBV- SEA and SH</i> - Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. - 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 signed by all employers or incorporated in the employment contracts. <i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i> - 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	- 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.
	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	Operation	- Number of child labor incidents reported (incidents/month). - Number of forced labor

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		form of forced labour. Report any form of forced labour at the site.		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). - Local community feedback on employment practices (satisfaction level).
	Risks related to poor or inadequate stakeholder engagement (Conflict)	<i>Risks related to Inadequate stakeholder engagement</i> - Prepare a stakeholder engagement/consultation plan (SEP) that is 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 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. <i>Inadequate grievances management</i> - 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	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.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- 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	- Provision of PPEs and WIBA cover - Environmental audit reports
	Community health and safety risks	<i>Public Health Impacts</i> - Informing workers on local cultural values and health matters. - Allowing migrant workers time to be with their families - Ensure equal treatment of workers. <i>Shocks and electrocutions</i> - 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. <i>Public Health Impacts –HIV/AIDs</i> - 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 diesel genarators, 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.	Operation	- Provision of serviced fire equipment, evacuation plan and safety signages - Records of fire safety training

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- 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		
	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	- Number of security incidents reported (incidents/month): - Number of security audits conducted (audits/year): - Community engagement activities held (number/year): - Incidents of violence or threats against staff (number/year). - Collaboration with local law enforcement (number of meetings/year). - Number of partnerships established with security 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	- Biodiversity surveys. - Community engagement records. - Erosion and sedimentation rates.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		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.		• 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	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 quantities generated, treatment methods, and disposal locations. • Prepare for emergencies related to liquid waste, including establishing an	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
		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)	- Use high-quality fuels with lower sulfur content to minimize emissions from vehicles and generators. - Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. - Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. - Implement policies to minimize idling time for vehicles and generators,	Decommissioning	- Community complaints and feedback. - Cumulative emission impact assessment: - Environmental compliance audits.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- encouraging operators to turn off engines when not in use. - Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. - Establish an air quality monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. - Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. - Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. - Establish a reporting system for emissions data to track progress and compliance with environmental standards.		- 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. - Develop and enforce safe work practices and standard operating procedures for decommissioning tasks, including equipment handling, dismantling, and waste disposal.	Decommissioning	- 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• 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.		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 and workforce accommodation camp	• 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.	Decommissioning	• Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee register.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		• Respect for community values/culture. • Prompt payment of workers as per the contractual agreements/terms.		
	Gender-based violence	• Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed 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 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 • 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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	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	Inspection Panel. - 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, 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.	Decommissioning	- Incident reports. - Access control measures. - Response time to security incidents. - Training of security personnel. - Community security awareness programs. - Stakeholder feedback

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		- 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.		- 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. - 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.	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.
	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	Decommissioning	- Fire incident reports. - Fire risk assessments. - Documentation of fire hazards. - Monitoring of flammable materials storage. - Documentation of community feedback on fire safety.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		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.		

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 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 can be done. Overall, the key objectives of the ESMP are:

- (i) 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;
- (ii) to assess for emerging non-anticipated adverse environmental and social impacts and implement relevant mitigation measures to maintain them within acceptable levels; and
- (iii) 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. MONITORING

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

During construction phase, NEPCO shall monitor the contractor's activities in order to verify that the management measures/procedures/specifications are implemented as contained in the ESMP. Compliance will mean that the contractor is fulfilling their contractual obligation. During operation phase, NEPCO will monitor facility's operations to ensure compliance with management measures in the ESMP and operation procedures. As part of this monitoring, the NEPCO will undertake EHS Audits, and make provisions for monitoring and evaluation. Special attention shall be given to the monitoring arrangements relating to biophysical impacts, occupational health and safety, social risks, facility operational and emergency response. NEPCO will require that contractors monitor, keep records and report on the following environmental, health and social issues of the proposed project.

- *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
- *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
- *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.
- *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).
- *Training on E&S issues*: including dates, number of trainees, and topics.

- *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
 - *External stakeholder engagement*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
 - *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
 - *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
 - *External stakeholder e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed shall include those received since the preceding report and those that were unresolved at the time of that report. Grievance data shall be age and gender-disaggregated.
 - Major changes to contractor's environmental and social practices.
 - *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until NEPCO determines the issue is resolved satisfactorily.
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Table 8-1: Environmental and social management plan (ESMP) for the proposed NEPCO Hybrid Power Plant-Gaalkacyo

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR (SMART)	MONITORING FREQUENCY	ESTIMATED COST (USD)
CONSTRUCTION PHASE						
Impacts on biophysical environment	Landscape and visuals	Erect a fence around the power plant.	- NEPCO - Contractor	Perimeter Fence: 100% of the project site perimeter secured and maintained by Week 2 of construction.	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	- NEPCO - Contractor	Fuel/Oil Spill Management: Approved spill plan in place by Day 3, with 100% equipment areas having spill kits/trays and zero uncontained spills >1 liter/month.	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,	- NEPCO - Contractor	Drainage & Foundations: Foundations raised (min 0.5m) and functional drainage installed across 100% of the site within the first month of earthworks.	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.	• NEPCO • Contractor	• 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. • Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate	• NEPCO • Contractor	• Engine maintenance records • Inspection of stacks	• Monthly	3000
IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		matter.				
	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. • Use soundproof materials for enclosures. • Maintain equipment to reduce noise. • Monitor noise levels near communities	• NEPCO • Contractor	• 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.	- NEPCO - Contractor	- Full implementation of biodiversity management plan for the project - Regular biodiversity monitoring and reporting	Quarterly	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	- NEPCO - Contractor	- Number of trees cleared - Planted trees	Quarterly	4000
	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	- NEPCO - Contractor	Assess size of rills or Gulleys forming from accelerated run off from compacted areas	Quarterly	5000
IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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				

	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 - Develop a waste tracking system to monitor quantities and types of waste generated and disposed. - Train workers on proper waste segregation and disposal practices to ensure compliance on site. - Designate a temporary solid waste storage area that is secure, covered, and isolated from drainage paths. - Schedule regular waste collection and transportation by licensed service providers to avoid accumulation.	- NEPCO - Contractor	Presence of well-maintained receptacles and centralized collection points.	Quarterly	7500
	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.	- NEPCO - Contractor	- Engine maintenance records - Oil spill containment plan - Presence of separate and clean washrooms for both the gents and ladies	Quarterly	6000
IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)

		• Frequent inspection and maintenance of the generator to minimize leakages. • 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. • Install designated containment areas for liquid waste collection and prevent direct discharge into the environment. • Use sealed, leak-proof containers for the temporary storage and transport of liquid waste. • Develop an emergency response plan for managing accidental spills of liquid waste, including clear reporting procedures. • Ensure regular monitoring of discharge points to check for compliance with effluent quality standards.				
Impacts on infrastructure and utilities	Water consumption (Groundwater depletion)	• 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. • Establish a maximum groundwater extraction threshold based on hydrogeological studies to maintain aquifer balance • Schedule periodic groundwater level monitoring using observation wells near the abstraction site. • Implement automated logging systems to track daily groundwater withdrawal against set limits. • Develop a groundwater recharge plan, such as rainwater harvesting or infiltration pits, to support aquifer replenishment.	• NEPCO • Contractor	• Water usage records	• Monthly	2500

	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.	• NEPCO • Contractor	• Energy consumption records	• Monthly	3500
Impacts on social environment	Impact to livelihoods from	• Coordinate with the local herders on establishing alternative grazing routes or areas. • Engage regularly with affected herders/community	• NEPCO • Contractor	• Number of Alternative Grazing	• Quarterly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	grazing land access restrictions	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.		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.	- NEPCO - Contractor		One-off	3000
	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	- NEPCO - Contractor	Presence of a controlled access and records of every person accessing the site	Weekly	4500
	Worker influx – incoming workforce and workforce	- Tap into the local workforce to the extent possible to reduce labor influx. - Recruit local workforce to the extent possible especially for unskilled and semi-skilled jobs.	- NEPCO - Contractor	Records of employees/updated employee register.	Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	accommodation camp	• 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. • Coordinate with local authorities and elders to manage expectations and ensure equitable resource access. • Implement a community water access plan to prevent conflicts over shared water resources. • Monitor labor influx patterns regularly and adjust workforce size to minimize pressure on local services. • Organize joint community-worker forums to promote dialogue, resolve grievances early, and build trust.		• Number of local community employees and external employees/ updated employee register.		
	Gender-based violence	• Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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 signed by all employers or incorporated in the employment contracts.	• NEPCO • 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	• Quarterly	2500

	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.	• NEPCO • Contractor	• Number of grievances filed and time taken to resolve them. • Frequency of labor disputes.	• Quarterly	3000
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IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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.		- Health and safety violations. - Worker turnover rate 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. - Conduct routine labor audits and inspections to verify compliance with labor laws and project standards. - Establish a worker grievance mechanism to report labor violations confidentially and safely. - Train contractors and workers regularly on labor rights, child pr Raise community awareness on the dangers of child labor in agriculture, including health and education impacts. - Support families with livelihood programs to reduce economic reliance on child labor in farming. - Collaborate with local schools and authorities to identify at-risk children and promote school attendance. - Ban hazardous tasks for minors in agricultural activities, including pesticide handling and machinery operation. - protection, and ethical employment practices.	- NEPCO - Contractor	- Updated employment register indicating locals employed, their ages, national identification numbers etc. - Grievances raised, aggrieved persons and status on resolution etc. - Number of reported cases of forced labour.	Quarterly	2500

	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	• NEPCO • Contractor	• Number of security incidents and response time to security incidents. • Compliance with security protocols. • Incidents of unauthorized site access. • Grievances	• Quarterly	7500
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IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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 kidnappings, armed attacks, and civil unrest. - Have security response teams on standby to address urgent security breaches or emergencies.		- related to security. - Community engagement on security issues. - Security risk assessments. - Coordination with local law enforcement. - Security equipment functionality. - Frequency of security audits.		
	Occupational Health and safety 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 - Introduce a system of spot checks and surprise inspections - Restrict access to high-risk zones to authorized personnel only - Enforce consistent use of PPE through supervision and penalties	- NEPCO - Contractor	- 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	• NEPCO • Contractor	• Number of awareness creation sessions conducted. • Availability of and distribution of condoms	• Quarterly	5500
IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		construction camp on site. • The contractor will provide public education/information about HIV/AIDS transmission and prevention measures.				
	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.	• NEPCO • Contractor	• Records of any Fire incidences • Fire equipment and evacuation plan	• Quarterly	4500

	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.	• NEPCO • Contractor	• 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
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IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Risks related to Inadequate stakeholder engagement	• Prepare a stakeholder engagement/consultation plan (SEP) that is 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. • 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.	• NEPCO • Contractor	• 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.	• Quarterly	2500

	Conflict during borehole site selection	- Engage all stakeholders early, including community leaders, women, youth, and vulnerable groups in the site selection process. - Conduct participatory mapping and needs assessment to ensure fair and evidence-based site selection. - Use transparent criteria for site selection, such as proximity, hydrogeological suitability, and accessibility for all. - Hold community consultations and dialogue forums to discuss proposed sites and collect feedback. - Document and publicly share the decision-making process to build trust and accountability. - Establish a local grievance redress mechanism to address complaints and disputes promptly. - Coordinate with local government and water authorities to align with land use plans and avoid disputes over land ownership.	- NEPCO - Contractor	- Neighboring community engagement during the site selection process - Existence of an active grievance redress mechanism during the site selection phase.	Monthly	2,500
	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	- NEPCO - Contractor	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)
		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. • Conduct land ownership verification with local authorities and elders before project activities begin. • Document all land agreements through written MoUs signed by relevant stakeholders. • Ensure fair and transparent compensation for any land acquisition or access restrictions. • Facilitate inclusive land discussions involving women, minority groups, and traditional leaders to ensure equitable decision-making.		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.	• NEPCO • Contractor	• 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 • Ensure that potential sources of petro-chemical pollution are handled in such a way to reduce chances of spills and leaks.	• NEPCO • Contractor	• 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)
	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	- NEPCO - 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	NEPCO	Visual inspection	Quarterly	4000
	Air quality (Vehicle and genset exhaust emissions)	<i>Vehicles</i> - Maintain all machinery and equipment in good working order to ensure minimum emissions of carbon monoxide, NO₂, SO₂ and suspended particulate matter. <i>Generators</i> - Use of diesel which is Sulphur- free to run the power producing generators to be encouraged - The stack chimney of the generators will be increased from its normal height of 3 meters to 6 meters - Invest in modern diesel generators with advanced combustion systems. - Install Diesel Particulate Filters (DPF) in each generator to trap particulate matter. - Use Selective Catalytic Reduction (SCR) to significantly reduce NO_x emissions by injecting ammonia or urea into the exhaust stream. - Install Oxidation Catalysts: these catalysts to reduce carbon monoxide (CO) and volatile organic compound (VOC) emissions. - Ensure regular maintenance of diesel generators to maintain optimal efficiency, minimize fuel consumption, and reduce emissions. - Regularly monitor emissions and adjust generator performance to ensure compliance with environmental standards. - Implement strategies to reduce idling time when diesel	NEPCO	- Engine maintenance records - Inspection of stacks	Quarterly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		generators are not needed or can be supplemented by the hybrid system. Regularly report emissions data to local regulatory authorities as part of environmental compliance.				
	Noise & vibration	<i>Genset</i> - Install soundproof enclosures around the diesel generators - Construct barriers or walls around the generators to block or deflect sound away from sensitive areas. - Use anti-vibration mounts or isolators under the generator to minimize the transmission of vibrations - Ensure regular servicing of the diesel generator to maintain its optimal function. - Install high-performance silencers on the generator's exhaust system to reduce noise emissions - Use flexible connectors on the exhaust system to reduce vibrations that can amplify noise. <i>BESS</i> - 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	NEPCO	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 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.	NEPCO	Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting	Quarterly	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Biodiversity (Flora)	Re-vegetation including planting of trees around the plant/facility	NEPCO	- 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	NEPCO	- 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 <i>Damaged solar panels and hazardous wastes</i> - Ensure segregation from other waste streams - All hazardous products and waste should be labelled and handled properly to avoid contact with the ground - Dispose hazardous waste through a approved waste handler	NEPCO	Presence of well-maintained receptacles and centralized collection points.	Quarterly	8500
	Wastes (Liquid)	<i>Sanitary wastes</i> - Provide sanitary waste facilities for both genders clearly marked - Disposal of waste through septic tanks <i>Oils from vehicles</i> - 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	NEPCO	- Presence of separate and clean washrooms for both the gents and ladies. - Engine maintenance records - Oil spill containment plan - Records of all	Quarterly	7000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		and kept in good state to avoid leaks. <i>Chemicals</i> - All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <i>Generators</i> - Proper storage of the oil is required to ensure no leakages - Frequent inspection and maintenance of the generator to minimize leakages. - No vehicles should be serviced or maintained at the project site. - The waste oil or used oil must be disposed-off appropriately. - Proper training for the handling and use of fuels for the operators of the power plant. - In the event of accidental leaks, contaminated top soil should be scooped and disposed of appropriately. <i>Accidental fuel and oil spill</i> - Develop and implement a detailed Spill Prevention Plan (SPP) - Ensure that secondary containment systems are in place for all fuel storage tanks, oil storage areas, and transformers. - Conduct regular maintenance checks on fuel tanks, pipelines, transformers, generators, and other oil equipment. - Install spill and leak detection systems on fuel storage tanks, transformers, and pipelines. - Implement safe fuel handling protocols to reduce the risk of spills during fuel transfers. - Set up a routine for monitoring fuel and oil storage areas, and other fuel-handling equipment for leaks or wear. - Ensure quick clean-up of spills by designated response teams trained in handling hazardous materials. - Install oil-water separators in drainage systems to		accidental spills and number of Liters		

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.				
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.	NEPCO	Water usage records	Monthly	3500
	Energy consumption	<i>Lightings</i> - 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. <i>Diesel generators</i> - Implement energy-efficient technologies and practices in plant operations. - Conduct scheduled maintenance and servicing of diesel generators. - Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar, BESS, and diesel power, reducing diesel generator runtime.	NEPCO	- Diesel Generator Usage (hours/month): - Solar Energy Generation (kWh/month): - Battery Energy Storage System (BESS) Utilization (cycles/month). - Lighting Energy Consumption (kWh/month). - Maintenance Records for Diesel Generators. - Carbon Emissions (tons of CO₂/month).	Monthly	4200

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• Ensure high-quality, low-sulfur diesel is used to improve generator efficiency and reduce fuel consumption and emissions. • Implement measures to reduce unnecessary idling of diesel generators. • Provide training to operational staff on energy-efficient practices and optimal use of the hybrid system to minimize diesel reliance. • Install technologies such as diesel particulate filters (DPF) or catalytic converters to reduce the environmental impact of diesel consumption and improve overall generator efficiency.				
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.	• NEPCO	• 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).	• Quarterly	4000
	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	• NEPCO	• Presence of a controlled access and records of every person accessing the site	• Monthly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Worker influx – incoming workforce and workforce accommodation	• 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.	• NEPCO	• 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).	• Quarterly	2500
	Gender-based violence	<i>GBV- SEA and SH</i> • Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. • 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.	• NEPCO	• Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. • Documented	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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 signed by all employers or incorporated in the employment contracts. <i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i> - 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.		- 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.		
	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.	NEPCO	- 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).	Quarterly	4000
	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	NEPCO	Number of child labor incidents reported (incidents/month).	Quarterly	3500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		Act, which outlaws any form of forced labour. • Report any form of forced labour at the site. • Conduct routine labor audits and inspections to verify compliance with labor laws and project standards. • Establish a worker grievance mechanism to report labor violations confidentially and safely. • Train contractors and workers regularly on labor rights, child protection, and ethical employment practices.		• 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). • Local community feedback on employment practices (satisfaction level).		
	Risks related to poor or inadequate stakeholder engagement (Conflict)	<i>Risks related to Inadequate stakeholder engagement</i> • Prepare a stakeholder engagement/consultation plan (SEP) that is 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	• NEPCO	• Availability of and implementation of the Stakeholder Engagement Plan. • Number of stakeholder consultations held • Record of stakeholder	• Monthly	3000

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 grievance redress mechanism to deal with grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. <i>Inadequate grievances management</i> • 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		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	• NEPCO	• Provision of PPEs and WIBA cover • Environmental audit reports	• Monthly	3000
	Community health and safety risks	<i>Public Health Impacts</i> • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. <i>Shocks and electrocutions</i> • Inspect the wiring of the houses before connecting power • Safety awareness campaigns to the community before connection of power on safety precautions such as:	• NEPCO	• Number of awareness creation sessions conducted. • Records of awareness sessions conducted • Incidences report • Number of awareness creation sessions	• Monthly	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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. <i>Public Health Impacts –HIV/AIDs</i> - 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		- 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 diesel generators, 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	NEPCO	- 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.	NEPCO	Number of security incidents	Monthly	10000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• 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.		reported (incidents/month): • Number of security audits conducted (audits/year): • Community engagement activities held (number/year): • Incidents of violence or threats against staff (number/year). • Collaboration with local law enforcement (number of meetings/year). • Number of partnerships established with security 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	• NEPCO	• Photographic documentation: • Vegetation health monitoring: • Number of complaints: • Soil erosion assessment: • Public awareness programs participation.	• One-off	1500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		• 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 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.	• NEPCO • Contractor	• Biodiversity surveys. • Community engagement records. • Erosion and sedimentation rates. • Flora and fauna species lists. • Habitat quality assessments. • Invasive species monitoring. • Vegetation health monitoring.	• Monthly	2500
	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	• Contractor	• Presence of well-maintained receptacles and centralized collection points	• Monthly	9500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		• 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				
	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 procedures. • Maintain an inventory of chemicals and hazardous substances to prevent unnecessary waste generation	• Contractor	• 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.	• Monthly	4500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.	• Contractor	• Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the project site	• Monthly	3000
	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

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Air quality (vehicle fumes)	• Use high-quality fuels with lower sulfur content to minimize emissions from vehicles and generators. • Implement a regular maintenance schedule for all vehicles and generators to ensure they operate efficiently and emit fewer fumes. • Optimize generator operation by running them only when necessary and using them at optimal loads to reduce emissions. • Implement policies to minimize idling time for vehicles and generators, encouraging operators to turn off engines when not in use. • Provide training for drivers and equipment operators on eco-driving practices that reduce fuel consumption and emissions. • Establish an air quality monitoring program to track emissions from vehicles and generators and ensure compliance with local regulations. • Engage with local communities to inform them about emissions reduction efforts and address any concerns related to air quality. • Conduct scheduled checks to ensure that exhaust systems and emission control devices are functioning correctly. • Establish a reporting system for emissions data to track progress and compliance with environmental standards.	• Contractor	• Community complaints and feedback. • Cumulative emission impact assessment: • Environmental compliance audits. • Health impact assessment reports. • Long-term emission trends. • Maintenance records of vehicles.	• Weekly	4200
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	• Contractor	• Community feedback • Compliance with water usage regulations: • Impact on local water resources: • Mitigation measure implementation records. • Water consumption efficiency	• Monthly	5500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		• 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. • 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	• Identify and develop alternative grazing areas for affected livestock herders to ensure	• Proponent	• Conflict incidence reports.	• Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	grazing land access restrictions	- 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.		- 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.	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 and workforce accommodation camp	- 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	- NEPCO - Contractor	- Records of employees/updated employee register. - Number of local community employees and external employees/	Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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.		updated employee register.		
	Gender-based violence	- Prepare an SEA/SH Prevention and Response Action Plan, to manage the SEA/SH risks. - 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 signed by all employers or incorporated in the employment contracts.	- NEPCO - 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. - Implement a worker's grievances mechanism. - All reported grievances are logged, dated, processed, resolved and closed out in a timely manner.	Proponent	Local Grievances Committee in place, composition of committee, awareness of community and	Monthly	3000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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.		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 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.	Proponent	- Frequency of stakeholder meetings. - Documentation of stakeholder concerns. - Follow-up actions on feedback. - Community representation in decision-making. - Collaboration with local organizations. - Long-term	Monthly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		- 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.		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.	- NEPCO - 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. - 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	- NEPCO - Contractor	- Incident reports. - Access control measures. - Response time to security incidents. - Training of security personnel. - Community security awareness programs. - Stakeholder feedback on security. - Analysis of	Quarterly	7500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		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 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. - 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.	NEPCO	- 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.	Quarterly	2500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	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.	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
Total						281,100

8.2. 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.

8.2.1. 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

8.2.1.1. 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.

8.2.1.2. 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.

8.2.1.3. 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.

8.2.1.4. 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.

8.2.1.5. 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.

8.2.1.6. 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.

8.2.1.7. SEA/SH Prevention and Response Plan

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

- Ensuring that the local employment opportunities are equitably accessible to all segments of the community
- Ensure equal pay for equal work
- Preparing and implementing GBV (SEA/SH management) plan that shall include sensitisation of community members and subproject workers on the potential of the subproject giving rise

- to, exacerbating and/or mitigating SEA and SH, and the appropriate mitigation measures.
- The contractor shall map all GBV service providers and document referral services for survivors
- The contractor shall sensitize community members and subproject workers on the referral pathways, prepare and implement a functional and accessible GBV GRM for use by workers and community members (as appropriate).

8.2.1.8. 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 plan prepared shall specify the frequency and type of communications, media, contact persons, and locations of communication events. For this assignment, the Contractor shall apply the SEP already developed by the MoEWR as part of the SESRP, and modify where necessary to meet the local unique challenges.

8.2.1.9. 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.

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

8.2.1.9.1 Proposed Grievance Procedures, Focal Points, and Timelines

Step	Procedure Description	Focal Point(s)	Timeline
(i) Registration	Community members, including PAPs, can submit concerns directly to the Contractor's Community Liaison Officer (CLO), or through trusted community leaders. Grievances will be recorded in a dedicated logbook (hardcopy/electronic), categorized, prioritized, and routed.	Primary: Contractor's Community Liaison Officer (CLO) Secondary: Community Leaders, GRC Members	Immediate: Grievance recorded within 24 hours of receipt.
(ii) Grievance Logbook & Tracking	A comprehensive grievance logbook ensures each complaint has a unique reference number, allowing for proper tracking and recording of all actions. Information recorded includes complainant details (name, age, gender), dates of reporting, logging, actions taken, proposed corrective action notifications, and complaint closure dates.	Contractor's Community Liaison Officer (CLO), GRC Secretary	Daily: Log updated for new complaints and status changes. Weekly: Review of pending grievances by CLO/GRC Secretary.
(iii) Sorting & Processing (Eligibility)	This step determines if a complaint is eligible for the	Contractor's Community Liaison Officer (CLO), GRC	Within 3 days of logging the grievance, the complaint is

Step	Procedure Description	Focal Point(s)	Timeline
	GRM based on its relevance to the power plant project and within the GRM's mandate. Ineligible complaints (not project-related, outside mandate, no standing, or better addressed by other procedures) will be respectfully noted.	Chairperson	screened for eligibility. Within 5 days: Complainant informed if grievance is deemed ineligible (with clear reasons).
(iv) Resolution & Action	For eligible grievances, the GRC, led by the CLO, will aim for resolution through customary approaches, direct negotiation, or mediation. On-site resolution will be prioritized. The outcome and agreed actions are documented.	Primary: GRC, Contractor's Community Liaison Officer (CLO) Support: Relevant Contractor's technical teams, local authorities	Within 14 days of eligibility confirmation, attempt initial resolution at the lowest level. Within 30 days: Majority of resolved grievances should be closed. Complex cases requiring external expertise or significant resources may take longer but with clear communication of revised timelines.
(v) Closing Out & Escalation	Once resolved and actions completed, project-related grievances will be formally closed out. If a complainant is not satisfied with the GRC's resolution, they have the right to escalate the complaint through the project's formal escalation channels (e.g., to higher project management, or external mechanisms like the World Bank GRS/Inspection Panel, or legal system).	GRC, Contractor's Management, Proponent (MoEWR/NEPCO)	Within 7 days of agreed action completion, complaint formally closed. Upon dissatisfaction: Escalation process initiated immediately upon formal request by complainant.
(vi) Monitoring & Evaluation	The Proponent (MoEWR/NEPCO) will monitor all stakeholder engagement and grievance management activities, including the effectiveness of the GRM, trends in complaints, and resolution rates.	Primary: Proponent (MoEWR/NEPCO) Support: Contractor's Environmental and Social Safeguard Team, GRC	Monthly: Internal review of GRM logs and performance by Contractor E&S team. Quarterly: Joint review by Proponent and Contractor of GRM effectiveness, including resolution rates and trends. Annually: Comprehensive GRM audit and stakeholder feedback session.

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:
 - Online by accessing the online form;
 - Sending an Email to grievance@worldbank.org; or
 - 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.

8.2.1.10. Labour Influx Management Plan

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

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

The plan shall consider these measures:

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

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

8.2.2. Operation Phase

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

8.2.3. Decommissioning Phase

The rehabilitation and decommissioning management plan shall include the following:

- (i) Planning for Closure
 - (a) The MoEWR (the proponent) shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant FRS and Puntland State authorities.
 - (b) The MoEWR and 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.

8.3. 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. • 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.

Entity	Roles and responsibilities
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. • 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 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. It's worth mentioning that Women groups within such affected communities in the study area are considered a vulnerable group – this is mainly due to cultural norms within such rural areas which limit the participation in the decision-making process; and (ii) other interested parties and stakeholder groups were identified based on the understanding of the Project location, nature of activities which are to take place, type of development, and the potential environmental and social impacts and how they could potentially affect certain stakeholder.

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.

9.3. The Stakeholders

Stakeholders were identified on the basis of their interaction with the proposed project site. Stakeholders identified were:

- *Relevant Puntland State entities:* Representatives from the Ministry of Environment, Ministry of Energy, Ministry of Women and Family Affairs; Department of Water, amongst others.
- *Local communities:* Representatives from households in Gaalkacyo City and surrounding villages.-
- *Community-based organizations (CBOs):* Local non-governmental organizations and community groups active in the area.
- *Business operators:* Local business owners, particularly those in industries that may be affected by the project.
- *Religious and cultural leaders:* Leaders who influence social dynamics in Gaalkacyo City.



Plate 1. In-person meeting with the Mudug regional coordinator, Ministry of Environment, Rangeland and Climate change (MOERCC)-PL



Plate 2. Photo of the engagement with Mudug Regional coordinator, MOEMW-PL



Plate 3. Discussion with the Deputy Chairperson of the Women's Association in Mudug Region, who also serves as the Chairperson of Garsoor District, Galkayo City.



Plate 4: Engagement with the NRC Gender-Based Violence (GBV) Protection Case Manager, Mudug Region.

Focus group discussions were held separately with women and men. The groups consulted were deemed to be knowledgeable on the proposed project site.



Plate 5. Photo of the male FGD



Plate 6. Photo of the female FGD



Plate 7: Meeting and briefing on the Proposed NEPCO hybrid power plant and Environmental, Health, and Safety Measures at office of governor, Mudug Region, Puntland



Plate 8: Briefing session with the Mayor of Galkacyo, Puntland, on the Proposed NEPCO hybrid power plant and its associated EHS measures.





Plate 9: community feedback and active participation of both genders



Plate 10: Community Participants actively engaging public consultation session

9.4. Approach and Methodology

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.

9.5. Summary of Key Feedbacks From Stakeholders

9.6. Summary of Key Feedbacks From Relevant Public Institutions And NGOs

- **Meeting with Mudug Regional Coordinator, MOERCC-PL:**
Discussions focused on environmental safeguards, particularly biodiversity protection during construction, Operations and decommissioning phases of the project. The coordinator emphasized compliance with Puntland environmental regulations, early identification of potential environmental risks, and alignment with national climate change strategies.
- **Meeting with Mudug Regional Coordinator, MOEMW-PL:**
The engagement addressed technical aspects of the hybrid power plant, energy access expansion plans, and potential integration with regional electricity infrastructure. The coordinator stressed the need for community sensitization and training to maximize local benefits.
- **Meeting with Deputy Chairperson of Women's Association / Garsoor District Chairperson:**
The discussion centered on ensuring gender inclusion, particularly in employment opportunities and SRP design. Women leaders requested targeted initiatives for female-headed households and proposed capacity-building programs for women entrepreneurs.
- **Meeting with NRC GBV Protection Case Manager:**
Discussions highlighted the importance of integrating gender-based violence prevention measures into the project, especially during the influx of workers in the construction phase. The NRC representative recommended training for project staff on safeguarding protocols and establishing clear grievance channels for women and vulnerable groups.

9.7. Summary of key feedbacks from community engagements

The public consultation exercise yielded various outcomes summarised below:

- *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 used mainly for grazing activities, but users consulted did not express any objection and stated that there are similar alternatives areas in Gaalkacyo District that can be used for the same purposes and that the Project does not have any specific different values.
- *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 Gerenuk, Dorcas Gazelle and snakes, especially *Gungume* (the African Rock Python).
- *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.

9.8. 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.

9.9. 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

- (vi) During the preparation of this report for the proposed development, it is 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.
- (vii) The analysis of the ESIA has demonstrated that the construction and operation of the proposed power plant in Gaalkacyo will have positive impacts to the FGS, Puntland State governments, and residents of Puntland State at large. The 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 will 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.
- (viii) 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.
- (ix) 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.
- (x) 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 mitigate successfully. 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

- (iii) 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 and WB regulatory requirements. The environmental performance of the site operations shall be evaluated against the recommended measures and targets laid out in this report.
- (iv) 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 be carried out throughout the construction and operation and decommissioning phases.
 - Contractor to ensure grievance redress mechanism is established and operational
 - 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

- (i) HD believes that sufficient information has been provided in this ESIA to enable decision making on proceeding with the project. Additionally, HD have shown that the proponent's preferred alternative and technological alternatives are generally acceptable. Furthermore, the ESIA has also assisted in the identification of essential

mitigation measures that will mitigate the impacts associated with the project to within acceptable limits.

- (ii) HD is of the opinion that on purely 'environmental' grounds (i.e., the project's potential socio-economic and biophysical implications) the application as it is currently articulated in the applicant's proposal should be approved provided the essential mitigation measures are implemented. It is in the opinion of the HD that the anticipated negative impacts can be readily and effectively mitigated and the proposed project does not pose any significant threat to the Environment and may be approved to proceed.

11.O. 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. Stakeholder Engagement Plan



Stakeholder-Engage
ment-Plan-SEP-Soma



Public Consultation
Attendance List.pdf

ANNEX 11.3. Public Constultation Questionnaires – Key Informant Interview Guides

 KII NGO	10/4/2024 5:06 PM	Microsoft Edge PDF ...	1,375 KB
 KII Puntland disability Org	10/4/2024 5:06 PM	Microsoft Edge PDF ...	1,436 KB

ANNEX 11.4. Focus Group Discussions

 FGD mixed	10/4/2024 5:06 PM	Microsoft Edge PDF ...	2,154 KB
 FGD women group	10/4/2024 5:06 PM	Microsoft Edge PDF ...	2,302 KB
 FGD youth	10/4/2024 5:06 PM	Microsoft Edge PDF ...	1,802 KB
 GBV 3	10/4/2024 5:06 PM	Microsoft Edge PDF ...	674 KB
 GBV 5	10/4/2024 5:06 PM	Microsoft Edge PDF ...	694 KB
 GBV 6	10/4/2024 5:06 PM	Microsoft Edge PDF ...	722 KB
 GBV 7	10/4/2024 5:06 PM	Microsoft Edge PDF ...	751 KB
 GBV4	10/4/2024 5:06 PM	Microsoft Edge PDF ...	687 KB
 GPV 1	10/4/2024 5:06 PM	Microsoft Edge PDF ...	746 KB
 GPV2	10/4/2024 5:06 PM	Microsoft Edge PDF ...	771 KB

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: 03 September 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	No						
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						

Item	Appraisal Yes/No	Risk / Significance rating					
		None	Low	Moderate	Substantial	High	Unknown
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	Yes		x			
3.3	Conflicts over use of local water resources	No					
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 (SES RP) 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 (SES RP) 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
<i>Facilitator Instructions: The purpose of the meeting is to gather information on the socio-economic situation of the youth in terms of participation in decision making, employment, recreation and aspirations. There should be no more than 10 participants. Keep the discussion focused and please <u>probe</u> for explanations for responses (what, where, when, why, how). Take lots of pictures. The Federal Government of Somalia has secured a grant from the World Bank to implement the Somali Electricity Sector Recovery Project (SES RP). The SES RP 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</i>

<i>purpose of this study is to collect comprehensive information to comprehend the potential impacts of the project and solicit feedback from stakeholders.</i>		
Section A: General Information		Responses
1	Date and time of meeting	3rd June 2024
2	Name of facilitators (inc note taker)	Saad Adan Aided
3	Region/District	Mudug , Gaalkacyo
4	Name of Village	1 da ogosto
5	Number/gender of participants	Males: 10 Females:10
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?	The project has not been previously mentioned due to the negative relationship between the Somali federal government and Puntland regional administration, which has significantly impacted numerous projects, making information scarce on upcoming projects.
2	What do you think could be the positive impacts of the project on youth, so that people benefit?	The project aims to provide youth with job opportunities and affordable electricity, but requires regulation for public use, especially with NEPCO's investment.
3	What other impacts to you think that the project could have on the youth and communities?	More access to electricity can improve lives of the populations in Gaalkacyo and could impact on economy Of the region
4	How do you think that the project could minimize or avoid negative impacts?	This project aims to reduce environmental pollution, noise, displacement, road disturbance, poor electricity cables, and unsafe systems in power companies by minimizing machine noise.
5	Do you have any questions/comments regarding the project?	Yes, there is need to have more information about the project shared publicly through various means. NEPCO doesn't share much information to public about the project. They shall see the project as a public investment given to them to improve services and not to take it away for their own good.
Section C: Overview		
1.	<u>If a youth group</u> - 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 prioritize a good life, health, education, and employment, but face unemployment, security incidents, and fear of clan revenge, preventing them from traveling to rural areas.
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 different educational insitutions in Puntland including universities and technical training institute. NEPCO itself has technical training institute known as NTI which provides range of technical training skills to youth. But most of the programmes are costly and not free but education wise this is an area moving on well may be questions about quality exist but not bad.
Section D: Education		
1.	How many of the youth have completed secondary education?	About 50% completed secondary education and many went to universities for further studies but after university there are no jobs.
2.	How many of the youth have been to vocational school and have qualifications? What subjects do these apply?	Two of them have vocational skills and have qualification, electrical technicians so overall indicating small number of the youth prefer technical institutes but many go universities. Electricrial technicians, solar technicians, mechanical
3.	What skills to the youth feel they have that enable them to work?	The skills which youth feel they have that enable them to work are like driver skills, electric skills , mechanic skills and also they have skills can creates business opportunities.
Section E: Unemployment		
1.	How many of the youth do not have a full-time salaried job?	50% of the youth of this city Gaalkacyo they haven't full time job salaries because scarcity of jobs in this city.
2.	Why do the unemployed youth not have a job?	Because there are mostly no jobs and there is also corruption, only rich are growing rich and the rest are left behind.

	What are they doing to find a job? Are there any barriers to finding work? What are these?	Upgrading education and becoming more creative in business ideas is some of the things youth are focusing for achieving better life.
Section F: Employment		
1.	How many of the youth are working? How many are self-employed and how many work for an employer?	Only 5 of the participants were working meaning approximately 50% are having jobs and the rest are not working. Out of the 5 working participants 4 were working with employers and one having own small kiosk.
2.	What are the main jobs that the youth have?	Different activities some are working with NGOs, others driving cars, taxi, technicians, teaching and barber shops, construction, material hardwares etc.
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?	To have good education with good quality To have better technical training institutes that offer marketable courses, To have better participation and representation in the national development and decision making process, Participate in the development of their community and to keep their city clean. Main challenge corruption where few available chances are given to those with connection like a ministry employing his own son or brother and not making fair competition for jobs.
Section H: Recreation		
1.	What do the youth do in their spare time? Where do they go?	They play or do different entertainment like football mostly.
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 feel to be much committed to supporting their families but also still get some social life through sports which is the most active game the youth are interested. But use of mobile phones is blamed of many those suffering addition of phone use and depression and withdrawal from social life etc,
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?)	All was ok and the youth group were really interested to participate.
Section J: Insert photos here		
Please take some pictures of the meeting with a <u>description below each photo</u> :		



Focus Group Discussion Guide - Female

FGD Female

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 (SESERP). The SESERP is implemented by the Ministry of Energy and Water Resources (the MoEWR). The Project Development Objective is to increase access to lower-cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry. We are conducting an environmental and social impact study for Component 1 of the project, focusing on the sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Galkacyo. 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	03 September 2024
7	Name of facilitators (inc note taker)	Saad Adan Aided
8	Name of Region Region/District	Mudug, Gaalkacyo, 1 Ogost
9	Number of participants	10

10	Describe the demographics / composition of the group (<u>age range, ethnicity and any vulnerabilities</u>)	20 – 53 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?	4 To have better 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)	No The project was explained to women group, as they didn't have any information. But they all know NEPCO as the only power supply company but they didn't have any idea about the new project of renewable energy expansion
7	What is your view on the project? How do you think that the project could impact women in the community positively and negatively?	Provided mixed reactions some feeling like being lost investment given to powerful people others feeling it will provide good benefits.
8	How do you think that the project could minimize or avoid negative impacts on women and the community?	We hope to minimize price of power if this project implementing,
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 play various roles in the home, including caring for children, managing household tasks, and contributing to the family's economic well-being also they are also responsible for providing informal care to family members who are ill, and who have special needs, especially in rural areas with limited healthcare facilities. Women always long hours from 4am in the morning to upm managing family and some are even working in some hours of these.
2	Do you think that men and women have equal opportunities in the community, workplace and education?	Women and men have not equal opportunities in the community ,workplaces or education ,because in the community always men are the ones who get respects , take decisions ,give orders and they completely have the power of the society, while the women are the ones who obey the decisions men made only. Women respect their brothers and no competition but also want share on decision and resources.
3	What resources do women mainly have control of compared to men? (eg land, assets, equipment) Please explain response	Mostly nothing much compared to men
4	Do women feel safe in the community? Are there any particular crimes that are common in the community? Have you experienced any conflicts in the community? Explain responses	Yes Sometimes crimes like rape happen but not common. Yes, mostly have seen fightings in Gaalkacyo involving political disagreement between different government and opposition, army mutineers. But gorowe is peaceful city now.
5	How do women receive information about local issues and developments, news etc in the community?	They receive information their relatives, social media or TV and from socializing and from men and all have phones to make calls for information.
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 each other like childcare, they help income generation and when election held they vote each other.
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	Yes, there is a female head/leader who champions their interest. Yes some women make decision in the community like mothers she can make some decisions about her home and her children, there are some women works in the governments or other places who can lead and can make decision about the country and her workplace.

	important meetings? If not, do men discuss decisions with you?	
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 called "women Unions" or similar names. They are normally formed by organizations, and the purposes differs depending on the organizations formed them. Some are there to advocate for women rights, some for better education and some are there to make living out of problems that women face but some are genuine
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 organizations like save the children, ICRC, DRC, NRC, ALIGHT, ADRA, Somali red crescent and many other organizations were named having presence in Puntland. They offer different programs including health, education, wash and livelihoods supports.
Section E: Economy/Income Generation		
1	What could women do to have greater economic opportunities in this area?	More skills and more business and more political representations can let women be more active and also there is need of unity among women to help each and other put own in power.
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 but some of the participants mentioned having accounts in local banks citing like Dahabshil and Amal bank. Some have small businesses and maintain own investments but others don't and have to rely on their husbands or relatives for living.
3	Does your family receive support from remittance or other support from family members working elsewhere?	Yes, 3 of the participants mentioned receiving remittance from relatives abroad.
Section F: Land Use		
1	What the main land based activities that women undertake? <u>Please complete the seasonal calendar at the back of the form.</u>	Mostly house chores are the main activity but some also do businesses like teashops, shops and some are selling miraa others are employed in companies and government offices and even some working in organizations. Women are different but all of them do house chores as one common work
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?	Women don't do farming in Puntland
3	What are the main animals that people keep in the community? Is this a subsistence activity or an income-generating activity?	Some keep few goats but being a city it is difficult to maintain them. Some sell milk and meat from the goats or say animal products
4	Do you collect natural resources (eg timber, herbs, firewood and roofing, fruits, etc) for subsistence and domestic use? Where do you get these from? Explain the uses. Explore issues related to charcoal production as well as commercial extraction of natural resources	No, none of the participants collects firewood or other times of timber but some people in the country side may rely on that here it is a big city and not possible to do that. Charcoal production is done by men women don't do it but sell it in town, however, none of the participants was charcoal dealer.
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 meat and vegetable market in Gaalkacyo that people sell or buy vegetable, meat and other animal products. The market known as INJI is at the centre of Gaalkacyo in Eng Khalid road. There are also other small markets in the town. People use tuk-tuk to go the market for shopping.
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 land related conflict is very common. Mostly disputed plots of land leads to armed conflict and other confrontations and is a common thing that leads to many deaths
7	<u>If a fishing community/coastal region</u> - Are women involved in fishing, fish processing or trading of fish?	None

	What role do women play in fishing related activities?					
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 is fine. All children go to school but education is costly and privately owned schools are more expensive than public ones. Some of the schools are far others are near like Dayah primary school, Altowba, Aflah primary school, Hormud and many other schools are there.				
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.	Most women didn't go to school but some females attend primary school, but dropout rates are high after that. Factors preventing continued education include early marriage, household responsibilities, and cultural norms prioritizing boys' education but many girls are also in school these days Few women have completed vocational trainings. Those who have usually study subjects like nursing or teaching, cooking,				
3	Can girls/women in the community generally read and write?	Literacy rates among women are low. Many still don't read and right.				
Section H: Health						
1	How and where do you access healthcare?? Do the services available meet your needs?	There are many hospitals private and public like Gaalkacyo regional hospital, Arafat hospital and many other small privately owned hospitals but health services in private expensive and not in good quality and only after money and public hospital is not that good and also some primary healthcare centers run by NGOs that provide some small services but not enough. Many people are sick and do not have money for hospitals				
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?	There are different problems like pneumonia, flue, urinary track infections, gastritis. These happen anytime and not specific to certain period in the year.				
3	Are there any environmental issues that affect health in the community (e.g. water quality, sanitary conditions etc) Please explain	Water in Gaalkacyo is hard and not good for drinking and fresh water is expensive and this impacts health				
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 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	
2	Do you face any challenges regarding access to power? Please explain?	It is expensive and not available in some parts of the town and you have to purchase the meter and lots of other obstructions and then sometimes the meter has a problem you pay much.		
Section L: Transport and Communication				
1	What are the main forms of transportation used within the community? Please describe the quality/accessibility of transportation in the community	Vehicles, tuktuk there is no problem of accessibility about it		
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				
Please take some pictures of the meeting with a <u>description below each photo</u> :				



ANNEX II.4. FOCUS GROUP DISCUSSIONS – ATTENDANTS LISTS



SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SESRP)
 ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED HYBRID POWER PLANT FOR NEPCO, GAALKACYO.

ATTENDANCE LIST

Date : 03-Sep-2021
 Venue : Hotel Saabir.

#	Name	Organization/title	Signature
1	Lyman Siyaadaxmed	SAN/Parow	
2	Khaciro Aadan Farah	26 June	
3	Amal Omar Osman	26 June	
4	Nasir Ali Abdirisak Mohamud	Dallada Dhiyaan	
5	Abdirisak Ahmed Said	bahada wabadiya	
6	Ali Maxamed Siciid	Social activists	Ali
7	Abdulla Maxid	structure Eng	
8	Muhamad Ali	moderator environmental engineering	
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SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SESRP)
ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED HYBRID POWER PLANT FOR NEPCO, GAALKACYO.

ATTENDANCE LIST

Date : 30-09-2024

Venue : Jabir Hotel.

#	Name	Organization/Title	Signature
1	Hamdi, Abdilatif Mohamed	Nursing/Sheho hospital	Hamdi
2	Hyso Alwadif Mohamed	Sonnet/philanthropic care	Hyso
3	Samirah Sami Ali	Receptionist/Sheho hospital	Samirah
4	Sundus Alwali Mohamed	Drs	Sundus
5	Adna Jamae Ismail	Drs.	Adna
6	Xaawo Abdirahman Jamae	Community leader/Local Government	Xaawo
7			
8	Sabax Siid Mohamed	Drs	Sabax
9	Kawsal Ali Mohamed	Waxbaa'imo	Kawsal
10		Bosaso Local Government	
11			
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SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SESRP)

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

ATTENDANCE LIST

Date : 30-09-2024

Venue : Jabir Hotel

#	Name	Organization/Title	Signature
1	Mohamed Cllachisala	Qout4.org	
2	Abdisamed Abdulahi	yabarow constr	Abdisamed
3	Abdiasis saad	Surad com	
4	Abdirahman mohidmomin	Civil Eng	
5	Abdullahi warsame jama	Chairman of EAU student	
6	Abdirachad Osman Ismail	Eng Electricity	
7	yahye farah isse	ENG	
8	Salmaan marxud yuseen	Social activities	
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