



ENVIRONMENTAL AND SOCIAL IMPACT ASSESSMENT FOR THE PROPOSED BECO HYBRID POWER PLANT, DAYNIILE, SOMALIA



PROJECT

Somali Electricity Sector Recovery Project (SESRP) (P173088)

ELECTRICITY SERVICE PROVIDER



Benadir Energy Company

JANUARY 2025

DRAFT ESIA REPORT

DISCLAIMER:

This ESIA document is a draft version and is still undergoing an internal quality review before its official adoption as the final document. Contractors are hereby urged to fully understand and appraise themselves with its content. Any amendment to the draft shall be adopted and implemented by the contractor without any additional cost to the employer.

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 ASSESSMENT REPORT FOR THE PROPOSED BECO HYBRID POWER PLANT, DAYNIILE, MOGADISHU, SOMALIA
Revision	:	04
Path/Filename	:	BECO-DAYNIILE ESIA-202501301600
Submission Date	:	30.01.2025

Content

CONTENT	III
ACKNOWLEDGEMENT	XI
ACRONYMS AND ABBREVIATIONS	XII
EXECUTIVE SUMMARY	XIV
1.0. INTRODUCTION	1
1.1. PROJECT BACKGROUND.....	1
1.1.1. Component 2: Hybridization and BESS for Mini-grid.....	2
1.1.2. Justification for the ESIA	2
1.2. OBJECTIVES OF THE ESIA.....	2
1.3. SCOPE OF THE ESIA STUDY	3
1.4. TERMS OF REFERENCE FOR THE ESIA	3
1.5. ESIA APPROACH AND METHODOLOGY.....	4
1.5.1. Key Activities Undertaken During the ESIA.....	4
1.5.2. Desk Study and Literature Review.....	5
1.5.3. Environmental and Social Baseline Assessments.....	6
1.5.4. Public Consultations.....	6
1.5.5. Assessment of Physical and Chemical Parameters.....	6
1.6. TARGET GROUP FOR THE ESIA REPORT	6
1.7. KEY ASSUMPTIONS	7
2.0. PROJECT DESCRIPTION AND CONTEXT	8
2.1. OVERVIEW	8
2.2. LOCATION OF THE SITE	8
2.3. PROJECT SITE AND SURROUNDINGS DESCRIPTIONS.....	9
2.4. DESCRIPTION OF THE PROPOSED POWER PLANT	9
2.4.1. Overview	9
2.4.2. Proposed Power Generation Capacity	10
2.4.3. Architecture and Basic Design Specifications	11
2.4.4. Placement of the Solar PV Arrays.....	11
2.4.5. Powerhouse.....	12
2.4.6. Multi-mode Inverter.....	12
2.4.7. Battery.....	12
2.4.9. Power Evacuation and Distribution.....	12
2.5. THE PROJECT SITE.....	13
2.5.1. Site Ownership.....	13
2.5.2. Access to the Project Site.....	13
2.6. PROJECT ACTIVITIES	14
2.6.1. Construction Phase Activities.....	14
2.6.1.1. Outline of the construction activities.....	14
2.6.1.2. Construction materials, equipment and services.....	14
2.6.1.3. Input materials and equipment & machinery	15
2.6.1.4. Use of services and resources.....	15

2.6.1.5. Construction supervision and safety.....	16
2.6.2. Operation Phase Activities	16
2.6.3. Decommissioning Phase Activities.....	16
3.0. POLICY, LEGAL AND REGULATORY FRAMEWORK	17
3.1. OVERVIEW.....	17
3.1. NATIONAL LAWS AND REGULATORY FRAMEWORK.....	17
3.1.1. Provisional Constitution of Somalia.....	17
3.1.2. Federal and State Regulations on Environmental, Health, and Safety.....	18
3.1.3. Somalia’s Ninth National Development Plan.....	18
3.1.4. Environmental Protection and Land Use Policy and Regulation.....	19
3.1.5. Labour and Employment Law.....	19
3.1.6. Policy and Law on Gender Equality and GBV.....	19
3.1.7. Somalia’s Power Master Plan, 2018.....	20
3.1.8. Energy Policy and Regulations.....	20
3.1.9. Somalia’s Intended Nationally Determined Contributions (INDCs), 2015.....	21
3.1.10. Customary Legal System and Sharia law.....	21
3.2. BENADIR ADMINISTRATIVE REGION BY-LAWS AND GUIDELINES.....	22
3.2.1. Overview.....	22
3.2.2. Benadir Administrative Region Waste Management Policy (2016).....	22
3.2.3. Benadir Administrative Region Interim Legal Framework on Employment and Livelihoods.....	23
3.2.4. Benadir Administrative Region Road, Sewage and Drainage Works Guidelines.....	24
3.2.5. Benadir Administrative Region Urban Planning and Engineering Guidelines.....	24
3.2.6. Benadir Administrative Region Health Management Guidelines.....	25
3.3. THE WORLD BANK ESS AND GUIDELINES.....	25
3.3.1. World Bank ESS and Relevance to the Project.....	25
3.3.2. Resettlement Policy Framework (RPF) for SESRP Projects.....	27
3.3.3. Comparison between the World Bank and FGS Legislations Relevant to the Project.....	27
3.4. INTERNATIONAL CONVENTIONS/AGREEMENTS RATIFIED BY THE FEDERAL REPUBLIC OF SOMALIA (FRS).....	29
3.4.1. The United Nations Convention on biological diversity (CBD), 1992.....	29
3.4.2. The UN Framework Convention on Climate Change (UNFCCC) (ratified in 2009).....	29
3.4.3. The UN Convention to Combat Desertification (UNCCD) (ratified in 2002).....	30
3.4.4. Convention on the Conservation of Migratory Species of Wild Animals (ratified 1985).....	30
3.4.5. Protocol Concerning Regional Cooperation in Combating Pollution by Oil and other Harmful Substances in Cases of Emergency (ratified 1988).....	30
3.4.6. Sustainable Development Goals (SDGs) and Agenda 2063 in Africa.....	31
3.4.7. International Labour Organization Agreements.....	31
4.0. ANALYSIS OF ALTERNATIVES	32
4.1. OVERVIEW.....	32
4.2. RELOCATION OPTION.....	32
4.3. ZERO OR NO PROJECT ALTERNATIVE.....	32

4.4. ALTERNATIVE SOURCES OF ENERGY	33
4.4.1. Thermal Power Generation.....	33
4.4.2. Wind Power Generation.....	33
4.5. ANALYSIS OF ALTERNATIVE CONSTRUCTION MATERIALS AND TECHNOLOGY	34
4.6. SOLID WASTE MANAGEMENT ALTERNATIVES	34
4.7. SELECTED ALTERNATIVES	34
5.0. ENVIRONMENTAL AND SOCIAL BASELINE	35
5.1. LOCATION	35
5.2. ENVIRONMENTAL SETTING.....	35
5.2.1. Climatic Information.....	35
5.2.1.1. Rainfall.....	35
5.2.1.1. Temperature	35
5.2.1.2. Air Quality	36
5.2.1.3. Topography and Features	37
5.2.1.4. Geology and Soils	37
5.2.1.5. Water Resources and Hydrology.....	37
5.2.2. Biophysical Environment.....	38
5.2.2.1. Flora and fauna.....	38
5.2.2.2. Vulnerability to Climate Change.....	39
5.2.2.3. Waste Management.....	39
5.2.2.4. Water Scarcity and Flood Risk	40
5.2.2.5. Agricultural Land Soil Contamination	40
5.2.2.6. Land Use and Land Cover Characterization.....	41
5.2.2.7. Protected Areas and Sensitive Habitats.....	41
5.2.2.8. Environmental Management Challenges.....	41
5.3. SOCIO-ECONOMIC SETTING	42
5.3.1. Overview.....	42
5.3.2. Population.....	42
5.3.3. Gender-based Violence	43
5.3.4. Administration and Ethnic Groups.....	44
5.3.5. Economy and Poverty	45
5.3.5.1. Local Economy.....	45
5.3.5.2. Poverty and Social Services.....	45
5.3.5.3. Productive Sector (Agriculture, Livestock, Commerce and Trade)	46
5.3.5.4. Health Sector	46
5.3.5.5. Road Transport Sector.....	46
5.3.5.6. Housing Sector	47
5.3.5.7. Information, Communication and Technology	47
5.3.5.8. Education	47
5.3.5.9. Water, Sanitation and Hygiene	49
5.3.6. Energy Sector and Electricity Generation Status.....	51
5.3.7. Law and Order	51
5.3.8. Proposed Project Impact on the Local Economy	52
6.0. ASSESSMENT OF IMPACTS	53
6.1. OVERVIEW	53
6.2. THE ENVIRONMENT AND SOCIAL COMPONENTS AFFECTED BY THE PROJECT.....	54

IMPACTS DURING CONSTRUCTION PHASE	54
6.2.1. Positive Impacts.....	54
6.2.1.1. National, Local and Regional Economy.....	54
6.2.1.2. Employment and Other Economic Opportunities	55
6.2.2. Negative Impacts.....	55
6.2.2.1. Impacts on Biophysical Environment.....	55
6.2.2.1.1. Landscape and Visual	55
6.2.2.1.2. Soil, Groundwater and Surface Water Contamination.....	56
6.2.2.1.3. Flood Risks.....	56
6.2.2.1.4. Air Quality.....	57
6.2.2.1.5. Noise and vibrations	58
6.2.2.1.6. Biodiversity.....	58
6.2.2.1.7. Soil Erosion.....	59
6.2.2.1.8. Wastes	59
6.2.2.2. Impacts on Infrastructure and Utilities	60
6.2.2.2.1. Water Consumption	60
6.2.2.2.2. Energy Consumption.....	61
6.2.2.3. Impacts on Social Environment.....	61
6.2.2.3.1. Impact to Livelihoods from Agricultural and Grazing Land Access Restrictions	61
6.2.2.3.2. Archaeology and Cultural Heritage.....	61
6.2.2.3.3. Trespassing of Unauthorized Personnel	62
6.2.2.3.4. Worker Influx – Incoming Workforce	62
6.2.2.3.5. Gender-based Violence	62
6.2.2.3.6. Labour Disputes.....	63
6.2.2.3.7. Child and Forced Labour	63
6.2.2.3.8. Security	64
6.2.2.3.9. Occupational Health and Safety.....	64
6.2.2.3.10. Community Health and Safety Risks.....	65
6.2.2.3.11. Fire Hazards	65
6.3. IMPACTS DURING OPERATION PHASE	66
6.3.1. Positive Impacts.....	66
6.3.1.1. Employment Creation.....	66
6.3.1.2. Reduction of Pollution Associated with Thermal Power Generation.....	66
6.3.1.3. Improved Quality of Life.....	66
6.3.2. Negative Impacts.....	66
6.3.2.1. Impacts on Biophysical Environment.....	66
6.3.2.1.1. Landscape and Visual	66
6.3.2.1.2. Soil, Groundwater and Surface Water Contamination.....	67
6.3.2.1.3. Flood Risks.....	67
6.3.2.1.4. Air Quality.....	68
6.3.2.1.5. Noise and vibrations	68
6.3.2.1.6. Biodiversity.....	69
6.3.2.1.7. Soil erosion.....	70
6.3.2.1.8. Wastes	72
6.3.2.2. Impacts on Infrastructure and Utilities	73
6.3.2.2.1. Water Consumption	73
6.3.2.2.2. Energy Consumption.....	73
6.3.2.3. Impacts on Social Environment.....	73
6.3.2.3.1. Impact to Livelihoods from Agricultural and Grazing Land Access Restrictions	73
6.3.2.3.2. Trespassing of Unauthorized Personnel	74

6.3.2.3.3. Worker Influx – Incoming Workforce	74
6.3.2.3.4. Gender-based Violence	75
6.3.2.3.5. Labour Disputes.....	75
6.3.2.3.6. Child and Forced Labour	75
6.3.2.3.7. Risks Related to Poor or Inadequate Stakeholder Engagement (Conflict).....	76
6.3.2.3.8. Occupational Health and Safety.....	76
6.3.2.3.9. Community Health and Safety Risks.....	77
6.3.2.3.10. Fire Hazards	77
6.4. KEY IMPACTS DURING THE DECOMMISSIONING	78
6.4.1. Positive Impacts.....	78
6.4.1.1. Employment Opportunities.....	78
6.4.1.2. Site Rehabilitation.....	78
6.4.2. Negative Impacts.....	78
6.4.2.1. Impacts on Biophysical Environment.....	78
6.4.2.1.1. Impacts on Landscape and Visual.....	78
6.4.2.1.2. Impacts on Biological Environment	79
6.4.2.1.3. Solid Waste Generation	79
6.4.2.1.4. Noise and Vibration	80
6.4.2.2. Impacts on Infrastructure & Utilities.....	80
6.4.2.2.1. Water Resources.....	80
6.4.2.3. Impacts on Social Environment	80
6.4.2.3.1. Impacts on Occupational Health and Safety.....	80
6.4.2.3.2. Impact to Livelihoods from Grazing Land Access Restrictions.....	81
6.4.2.3.4. Trespassing of Unauthorized Personnel	81
6.4.2.3.5. Worker Influx – Incoming Workforce	81
6.4.2.3.6. Gender-based Violence	82
6.4.2.3.7. Labour Disputes.....	82
6.4.2.3.8. Child and Forced Labour	82
6.4.2.3.9. Security	83
6.4.2.3.10. Community Health and Safety Risks.....	83
6.4.2.3.11. Fire Hazards	84
6.5. SUMMARY OF THE IMPACTS.....	85
6.5.1. Construction Phase.....	85
6.5.2. Operation Phase.....	86
6.5.3. Decommissioning.....	87
6.6. ASSESSMENT OF CUMULATIVE IMPACTS	89
6.7. PROJECT VULNERABILITY TO NATURAL/CLIMATE-RELATED HAZARDS AND THE PROPOSED MITIGATION MEASURES	90
7.0. MITIGATION, MONITORING AND REPORTING	92
8.0. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN.....	115
8.1. THE ESMP IMPLEMENTATION TOOLS	115
8.1.1. Construction Phase.....	115
8.1.1.1. Construction Management Plan.....	115
8.1.1.2. Rehabilitation and Site Closure Plan	116
8.1.1.3. Local Recruitment Plan	116
8.1.1.4. Workplace Health and Safety Plan	116
8.1.1.5. Community Health and Safety Plan	116
8.1.1.6. Emergency Preparedness and Response Plan.....	117

8.1.1.7. SEA/SH Prevention and Response Plan	117
8.1.1.8. Stakeholder Engagement Plan.....	117
8.1.1.9. Grievance Redress Mechanism	117
8.1.1.10. Labour Influx Management Plan	119
<i>8.1.2. Operation Phase.....</i>	<i>120</i>
<i>8.1.3. Decommissioning Phase.....</i>	<i>120</i>
8.2. MONITORING	121
8.3. THE ESMP IMPLEMENTATION ARRANGEMENTS	150
9.0. STAKEHOLDER ANALYSIS, PUBLIC CONSULTATIONS AND DISCLOSURE.....	152
9.1. OVERVIEW	152
9.2. OBJECTIVES OF THE STAKEHOLDERS' CONSULTATIONS.....	152
9.3. SUMMARY OF KEY FEEDBACKS FROM STAKEHOLDERS	153
9.4. EXPECTED COMMITMENTS BY BECO	154
9.5. CONCLUSION.....	155
10.0. CONCLUSION AND RECOMMENDATIONS.....	156
10.1. CONCLUSION	156
10.2. RECOMMENDATION	156
10.3. AUTHORIZATION OPINION	157
11.0. ANNEXES	158
ANNEX 11.1. LAND OWNERSHIP DOCUMENT FOR THE PROPOSED PROJECT SITE.....	158
ANNEX 11.2. PUBLIC CONSULTATION QUESTIONNAIRES	159
ANNEX 11.3. FOCUS GROUP DISCUSSIONS	160
ANNEX 11.4. STAKEHOLDERS' CONSULTATIONS ATTENDADANCE LISTS.....	168
ANNEX 11.5. STAKEHOLDERS' ENGAGEMENT PHOTO LOGS.....	170

List of Figures

FIGURE 1-1: SUMMARY OF ESIA PROCEDURE ADOPTED FOR THE PROPOSED HYBRID POWER PLANT.....	5
FIGURE 2-1(A): THE LOCATION OF DAYNIILE DISTRICT IN BENADIR ADMINISTRATION REGION, SOMALIA	8
FIGURE 2-2(B): LOCATION OF THE PROJECT BECO DAYNIILE HYBRID POWER PLANT SITE IN THE NORTH- WESTERN OUTSKIRTS OF MOGADISHU CITY, SOMALIA	9
FIGURE 2-3: SCHEMATIC ILLUSTRATION OF THE PROPOSED BECO DAYNIILE HYBRID POWER PLANT	11
FIGURE 2-4: ILLUSTRATION SKETCH OF THE PROPOSED TILT ANGLE OF THE SOLAR PANELS PLACEMENT AT THE POWER PLANT	12
FIGURE 5-1: THE PROJECTED TEMPERATURE AND PRECIPITATION IN SOMALIA, INCLUDING THE BENADIR ADMINISTRATIVE REGION.....	36
FIGURE 5-2: AIR QUALITY STATUS (PM 2.5 AND PM10) SAMPLED FROM DIFFERENT LOCATIONS WITHIN DAYNIILE DISTRICT, BENADIR ADMINISTRATIVE REGION.....	37
FIGURE 5-3: OVERVIEW OF WATER RESOURCES AND HYDROLOGY OF DAYNIILE DISTRICT, BENADIR ADMINISTRATIVE REGION.....	38
FIGURE 5-4: LAND COVER TYPES IN DAYNIILE DISTRICT, BENADIR ADMINISTRATIVE REGION, SOMALIA.....	41
FIGURE 5-5: BRA POPULATION DISTRIBUTION BY AGE AND SEX	43
FIGURE 5-6: ADMINISTRATIVE DISTRICTS OF BRA.....	45
FIGURE 5-7: STATUS OF WATER ACCESS IN THE BRA, INCLUDING DAYNIILE DISTRICT	50
FIGURE 5-8: CHARACTERISTIC HOUSEHOLD SANITATION FACILITIES IN THE BRA, INCLUDING DAYNIILE DISTRICT	51

List of Tables

TABLE 1-1: SUMMARY OF SESRP AND ASCENT PROJECTS COMPONENTS.....	1
TABLE 3-1: THE ESS TRIGGERS AND RELEVANCE TO THE PROPOSED HYBRID POWER PLANT	25
TABLE 3-2: COMPARISON BETWEEN THE KEY WB ENVIRONMENTAL AND SOCIAL FRAMEWORK RELEVANT TO THE PROJECT AND THE FGS LEGISLATIONS	27
TABLE 5-1: PERCENTAGE OF WOMEN AGED 15-49 YEARS WHO HAVE EXPERIENCED PHYSICAL VIOLENCE SINCE THE AGE OF 12 IN THE BRA.....	44
TABLE 5-2: OVERALL EDUCATION ATTAINMENT BY HOUSEHOLDS POOLED BY AGE IN THE BRA	48
TABLE 5-3: OVERALL EDUCATION ATTAINMENT OF MALE BY HOUSEHOLDS POOLED BY AGE IN THE BRA.....	49
TABLE 5-4: OVERALL EDUCATION ATTAINMENT OF FEMALE BY HOUSEHOLDS POOLED BY AGE IN THE BRA	49
TABLE 5-5: TREATMENT OF HOUSEHOLD DRINKING WATER BY HOUSEHOLDS IN THE BRA	50
TABLE 6-1: CATEGORIES OF SIGNIFICANCE	53
TABLE 6-2: OVERALL SIGNIFICANCE CRITERIA FOR ENVIRONMENTAL IMPACTS	54
TABLE 6-3: ENVIRONMENTAL AND SOCIAL COMPONENTS LIKELY TO BE AFFECTED BY THE PROPOSED PROJECT ...	54
TABLE 6-4: SUMMARY OF KEY IMPACTS DURING THE CONSTRUCTION PHASE OF THE SOLAR PLANT.....	85
TABLE 6-5: SUMMARY OF KEY IMPACTS DURING THE OPERATION PHASE OF THE SOLAR PLANT	86
TABLE 6-6: SUMMARY OF KEY IMPACTS DURING THE DECOMMISSIONING PHASE OF THE SOLAR PLANT.....	87
TABLE 6-7: SUMMARY OF KEY CUMULATIVE IMPACTS FOR THE PROPOSED POWER PLANT PROJECT.....	89
TABLE 7-1: MITIGATION MEASURES, MONITORING AND REPORTING DURING THE CONSTRUCTION, OPERATION AND DECOMMISSIONING PHASES FOR THE PROPOSED BECO HYBRID POWER PLANT	93
TABLE 8-1: THE ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN (ESMP) FOR THE PROPOSED BECO DAYNIILE HYBRID POWER PLANT – DAYNIILE DISTRICT, BRA.....	122
TABLE 8-2: THE ESMP IMPLEMENTATION ARRANGEMENTS FOR THE PROPOSED BECO HYBRID POWER PLANT- MOGADISHU.....	150

TABLE 9-1: SUMMARY OF FEEDBACKS FROM STAKEHOLDERS ENGAGED DURING THE ESIA STUDY FOR THE
PROPOSED BECO HYBRID POWER PLANT, MOGADISHU.....153

Acknowledgement

Horizon Development (HD, the consulting firm) is grateful to the project proponent for commissioning this Environmental and Social Impact Assessment for the proposed hybrid power plant in Dayniile, Mogadishu by Benadir Energy Company (BECO). BECO is one of the leading electricity service providers (ESP) based in Benadir Administrative Region and a participant in the Somali Electricity Sector Recovery Project. We would like to acknowledge with great appreciation BECO management, the local communities and other stakeholders in Benadir Administrative Region, and the Federal Republic of Somalia (FRS), who were involved in the public participation and consultation process, for their cooperation throughout the exercise. We further acknowledge the support, either direct or indirect, from other various parties who assisted the HD ESIA experts' team towards the successful completion of the ESIA and production of this report. Finally, the HD wishes to acknowledge and appreciate the efforts and inputs by the SESRP Project Implementation Unit (PIU) and the Ministry of Energy and Water Resources (MoEWR) for their valuable support, inputs, and co-operation during the entire exercise.

Acronyms and Abbreviations

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

NT	:	Near-threatened
OHS	:	Occupational Health and Safety
PAP	:	Project Affected Persons
PIU	:	Project Implementation Unit
PMP	:	Power Master Plan
PPE	:	Personal Protective Equipment
PV	:	Photovoltaic
PWD	:	People with Disability
RAP	:	Resettlement Action Plan
REF	:	Renewable Energy Factor
RPF	:	Resettlement Policy Framework
SCADA	:	Supervisory Control and Data Acquisition
SDG	:	Sustainable Development Goal
SEA/SH	:	Sexual Exploitation and Abuse and Sexual Harassment
SEP	:	Stakeholder Engagement Plan
SESRP	:	Somali Electricity Sector Recovery Project
SME	:	Small and Medium Enterprise
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) The Somali Electricity Sector Recovery Project (SESRP) and Accelerating Sustainable and Clean Energy Access Transformation in Somalia (ASCENT) are the projects implemented by the Ministry of Energy and Water Resources (MoEWR). SESRP aims to increase access to lower cost cleaner electricity supply and to re-establish electricity supply industry while ASCENT aims to increase access to sustainable and clean energy through private sector participation in Somalia. Benadir Energy Company (BECO) is one of the electricity services providers (ESP) participating in the SESRP project, and intends to establish a new hybrid power plant in Dayniile District, approximately 26km from Mogadishu City.
- (ii) The SESRP and ASCENT have the following 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.

 - ASCENT *Component 1* : Distributed Renewal Energy (DRE) with Solar PV (SPV) and Battery Energy Storage Systems (BESS) in the capital city of Mogadishu and other major load centers in the Federal Members States (FMS).
 - Component 2* : Electricity Distribution Network Rehabilitation and Reinforcement of the mini grids serving the Mogadishu capital city area and other FMS major load centers.
 - Component 3* : Sector Capacity and Institution Enhancement and Project Implementation Support.
- (iii) BECO currently has an installed capacity of 175MW, made up of 62% from diesel generators, 31% from solar PV, and 7% from BESS. Under the proposed SESRP arrangement, BECO will build a new and modern hybrid power plant in Dayniile District, while the MoEWR will provide overall project coordination and oversight during the planning and implementation phases, including environmental and social safeguards due diligence and implementation. The combined technical committee (BECO and MoEWR) will be in charge of implementing the project during the building and operation phases.
- (iv) The main objective of this ESIA was to examine both positive and negative effects of the proposed hybrid power plant in Dayniile District on the people, their property and the environment particularly in the Project Area, 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 (2°09'22.3"N, 45°11'5.82"E) in the north-western part of Benadir Administration Region within Dayniile District; neighboring Lower Shabelle. The proposed project site is approximately 103.04ha in Dayniile District. The area is sparsely populated, relatively flat land and is renowned for agricultural activities involving cultivation of different crops.

The feasibility study recommends solar PV modules of 610W (211,575 pcs), inverter transformers (330kVA (371pcs), power conditioning units for batteries (bi-directional) (330kVA (256pcs), BESS (4.45MVA, 79pcs), step up transformers on PV side (6.8MVA, 21 pcs), and step up transformers on BESS side (6.8MVA, 15 pcs). The transmission line will be connected to an existing BECO substation in Jabad Geele to provide power evacuation from the proposed Dayniile Power Plant. The plant is expected to operate for 25 years, and shall be decommissioned thereafter. Given the functionality of the BESS will expire after 17 years, to ensure continued BESS functionality, a battery replacement plan will be implemented, including procuring and installing new batteries, recycling expired batteries, and allocating funds for replacement. This will be coordinated with routine maintenance to minimize downtime and allow for the adoption of newer, more efficient technologies.

Legal and Regulatory Framework

- (i) The Federal Government of Somalia (FGS) has lacks of well-developed environmental laws due to political instability over many decades. 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) is meant to spearhead environmental management in the Federal Republic of Somalia (FRS). Additionally, the FRS is in the process of developing several other regulations under the environmental protection law. From the reviews, the proposed power plant does not conflict with any of the existing legal and regulatory frameworks of the FRS.
- (ii) The BRA has several By-laws that govern the region's administrative, legal, and regulatory framework, addressing urban planning, environmental management, infrastructure development, public health, and security, promoting sustainable development and quality of life. The by-laws would be relevant in all phases of the proposed project from construction, operation to decommissioning phases. From the analysis, the proposed project does not conflict with any of the existing by-laws of the BRA.
- (iii) The World Bank's latest environmental and social standards (ESS) and guidance notes were analyzed to determine if a proposed project triggered any other ESS. The ESIA aimed to provide guidance for environmental and social assessment of WB-financed projects, improve decision-making, ensure sustainable options, and properly consult affected people. The ESIA revealed that the proposed project would have both negative and

positive impacts on the environment and social spheres, highlighting the importance of sound and sustainable project options. From the analysis, the proposed project will not trigger ESS5 and ESS7. However, ESS6 and ESS8 would be relevant. For instance, for ESS6 the proposed project would be located in an area that is less than 7km from the course of River Shebelle – an area that occasionally hosts different species of fauna, including migratory species. The ESS8 would be relevant to the project because of chance find that could require the development of appropriate guidelines. The project is expected to comply with ESS1, ESS2, ESS3, ESS4 and ESS10 at different stages during the project cycle.

- (iv) 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 in Jabad Geele and the proposed new site in the nearby Dayniile District. The analysis of alternatives compared Jabad Geele power plant, which lacks adequate space for the proposed new hybrid power infrastructure, with the proposed new site located in Dayniile District (approximately 5km away from Jabad Geele Power) that offers sufficient space for expansion. While the Jabad Geele location would leverage existing infrastructure and minimize relocation costs, space constraints could limit future growth and operational efficiency. On the other hand, the new site provided ample room for investment, allowing for optimized layout and future scalability, though it would involve additional costs in terms of infrastructure development, and possibly increased transmission losses due to the distance. Careful consideration of long-term benefits, costs, and operational efficiency were crucial in determining the best option for sustainable power generation. It is in this regard that the proposed new site in Dayniile District was selected.
- (ii) The proposed project's site was selected based on a number of factors, including high solar irradiation levels, proximity to grid infrastructure, and land that is flat, stable, and free of environmental or legal conflicts. The proposed site is also aligned with energy demand centers in Mogadishu, and this would minimize transmission losses. Socioeconomic aspects, such as community acceptance and minimal impact on local livelihoods were crucial, alongside regulatory compliance and potential government incentives. Lastly, logistical ease, economic viability, and environmental sustainability would ensure the site's long-term success.
- (iii) The No Project Option was deemed least preferred due to socio-economic and environmental factors. It would continue diesel generator-based electricity generation (currently standing at over 60%), 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 Benadir Administrative Region and FRS from meeting energy requirements, thereby affecting the overall socio-economic status of target communities.

Environmental and Social Baseline

- (i) The Dayniile District of BRA and its surrounding areas are classified as arid to semi-arid, with long periods of drought and minimal rainfall. Like the rest of Benadir Administrative Region, the Dayniile District is not particularly diverse in diverse topography. The Region is located in the coastal lowland, with average elevation of only nine meters above the sea level and extensive flat areas rising gently from the sea level and inland. The Region is part of the "central coastal basin" which is mainly recharged through direct rainfall. The coastal belt comprises a variety of rocks including limestone, sandstone, marls and clay, sand, coral limestone, and sandstones, as well as a wide system of coastal sand dunes with the soil closest to the shore being pure loose marine sand. Permeability of the soils is generally high. These also describe geological characteristics of the Dayniile District.

Land Use Land Cover (LULC) changes in the Benadir region are rapidly changing because of the increasing interaction of human activities with the environment as the population increases. However, there is no published evidence on this phenomenon.

- (ii) The general area has the potentials to be rich in biodiversity because of its proximity to a critical habitat (River Shebelle), which is less than 7km away, but the species assemblages in the District and along the lower sections of River Shebelle have not been documented. No designated protected conservation area is within radius of 10km of the project's footprint and as such, the project's impact on flora and fauna in the area would not be significant. The flora species such as Egyptian Thorn (*Vachellia nilotica*), Gum Arabica (*Acacia Senegal*), Umbrella Thorn (*Acacia tortilis*), and various seasonal and perennial shrubs and undergrowth exist in and around the proposed hybrid Power Plant site. Faunal species such as Giant Leopard Tortoise (*Stigmochelys pardalis*), Guenther's dik-dik (*Madoqua guentheri*), African Hare (*Lepus microtis*) and Unstriped Ground Squirrel (*Xerus rutilus*) occur in the area. Based on analysis of fauna and flora species whose distribution ranges fall within Dayniile District of Somalia, none of the species is listed in the International Union for the Conservation of Nature (IUCN) threat categories as critically endangered (CR), endangered (EN), near-threatened (NT) or vulnerable (VU). Some herbaceous plants and grasses thrive during short rainy seasons, providing fodder for livestock.
- (iii) The Dayniile District – the proposed hybrid power plant location is a significant economic hub with diverse activities, and an increasing population. The land tenure and ownership systems are characterized by a mix of informal and formal systems, with a few social amenities within a 5km radius. The Dayniile District has a sizable informal economy, small-scale traders, and informal service providers, contributing significantly to the local economy. Despite socioeconomic challenges like poverty, unemployment, and inadequate infrastructure, efforts are underway to rebuild and develop the District, with international aid and development initiatives playing a crucial role. Social infrastructure (e.g., healthcare and education facilities) in the proposed project area would be served effectively by the proposed project.

Assessment of Impacts

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
Construction Phase	
Landscape and visuals	<ul style="list-style-type: none"> Erect a fence around the power plant.
Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> 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 drained into approved drainage facilities No vehicle maintenance and service shall be done at project site Scoop and correctly dispose contaminated soil.
Air quality (Dust)	<ul style="list-style-type: none"> Burning of woody debris & construction waste to be prohibited. Cover construction trucks moving materials to prevent material dust emissions. Ensure all the personnel use PPEs. Keep stockpiles compacted and re-vegetate as soon as possible. Restrict speed on loose surface roads during dry or dusty conditions Stockpiles of excavated soil should be palliated dry or windy conditions. Suppress dust during dry periods by use of water sprays.
Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Sensitize drivers to avoid/minimize vehicle idling to lower emissions. Maintain all machinery order to minimum emissions of CO NO₂, SO₂, PM
Noise & vibration	<ul style="list-style-type: none"> Train workers on the importance of noise control and best practices on noise. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Provide appropriate PPEs to workers during construction activities. Inform nearby communities in advance about scheduled high-noise activities. Establish a monitoring program to regularly measure noise and vibration levels. Establish a GRM for community to report noise or vibration disturbances. Ensure regular maintenance of machinery to reduce noise emissions. Employ modern equipment fitted with noise-reduction technologies
Biodiversity (Fauna)	<ul style="list-style-type: none"> Site clearing work/earthwork shall be carried out during the dry season. Limit all vehicle movements to designated roads with speed of 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 Undertake a supplementary biodiversity assessment on fauna in the area An ecologist shall be hired to coordinate the fauna monitoring.
Biodiversity (Flora)	<ul style="list-style-type: none"> Ensure proper demarcation of the project site for all construction works. Designate access routes and parking areas Re-vegetation including planting of trees around the plant/facility
Soil erosion	<ul style="list-style-type: none"> Avoid ground-breaking during the seasons of high rainfall to avoid erosion. Monitoring of areas of exposed soil during rainy seasons. Use silt traps where necessary Monitor exposed soils to ensure that any incidents of erosion are controlled. Ensure spoil from excavations is arranged according to the various soil layers.
Wastes (Solid wastes)	<ul style="list-style-type: none"> Handle and label all hazardous products properly to avoid ground contacts 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 materials to avoid regular replacements – avoid waste generation 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 Manage all the wastes in accordance with internationally accepted standards.
Wastes (Liquid wastes)	<ul style="list-style-type: none"> All chemicals should be stored within the bunded areas and clearly labelled. Create awareness for the employees on procedures of dealing with spills/leaks Develop and implement a detailed Spill Prevention Plan (SPP) Disposal of waste through septic tanks Store all hazardous materials in compliance with local regulations. Develop and implement spill management plan with clear procedures

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<ul style="list-style-type: none"> Scoop all top soils for disposal in case of leaks. Install oil-water separators in drainage systems to remove oil from stormwater. Keep accurate documentation of fuel and oil storage volumes/transfer activities. Ensure proper training for staff on handling and use of oils. 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 to avoid leaks.
Water consumption	<ul style="list-style-type: none"> 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 all project phases
Energy Consumption	<ul style="list-style-type: none"> Ensure responsible electricity use through staff sensitization of staff. Ensure proper planning of transportation of materials for efficient fuel usage Monitor all energy usage during construction and set reduction targets.
Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> Coordinate with the local herders and farmers to grazing routes or areas. Regularly engage the local community and address any emerging concerns. Provide alternative water points for livestock near the construction area. Establish a grievance redress mechanism to address any conflicts or complaints
Archaeology and cultural heritage	<ul style="list-style-type: none"> Develop and implement a Chance Finds Procedures Engage a qualified archaeologist for any early identification of chance finds. Establish a clear protocol for halting construction activities upon a chance find. Ensure proper documentation of all chance finds.
Trespassing of unauthorized personnel	<ul style="list-style-type: none"> 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
Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Raise awareness among local community and workers on cordial working relation Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM accessible to community members. Respect for community values/culture. Prompt payment of workers as per the contractual agreements/terms.
Gender-based violence	<ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Implement a code of conduct signed by all those with physical presence on site. Establish Workers GRM with multiple channels including SEA/H channels. Ensure that Code conducts are signed by all employers in the contracts.
Labour disputes	<ul style="list-style-type: none"> Ensure full compliance with local labor laws. Ensure that all workers receive clear contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. Establish mechanisms to guarantee fair/timely payment of wages and benefits. Establish worker welfare systems to represent concerns & promote dialogue. Implement non-discrimination policies to ensure equal treatment for all. Set up a transparent GRM to handle all complaints/disputes in a timely manner.
Child and forced labour	<ul style="list-style-type: none"> 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 all the ESS 2 provisions and FRS Employment Act on forced labour. Report any form of forced labour at the site.
Security risks	<ul style="list-style-type: none"> Conduct a comprehensive risk assessment to identify specific security threats. Engage all stakeholders to understand and address local security concerns. Collaborate with local law enforcement/security agencies to enhance security. Hire licensed security to provide 24/7 site surveillance, patrols, and monitoring. Use surveillance systems/CCTV cameras to monitor critical areas in real-time. Implement strict access control protocols, including sign-in procedures. Provide workers with ID badges and restrict entry to authorized personnel only. Develop a security incident response plan including emergencies procedures. Provide workers with security training and response protocols to threats.

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<ul style="list-style-type: none"> Maintain constant with local authorities on security updates in the area. Have security response teams on standby to address any security emergencies.
Occupational Health and safety Impacts	<ul style="list-style-type: none"> Develop and implement a comprehensive OHS plan before the commencement of the project Use skilled personnel for activities which demand skills/technical tasks Workers coming to the site should be knowledgeable on safety precautions Provide appropriate PPE to all workers. Undertake risk assessment 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
Community health and safety risks	<ul style="list-style-type: none"> Allowing migrant workers time to be with their families Create awareness to the community on risks associated with construction works. 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. Provide awareness materials on HIV/AIDS transmission and prevention.
Fire Hazards	<ul style="list-style-type: none"> 'No smoking' signs shall be posted at the construction site A fire risk assessment/evacuation be prepared and posted across site. 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.
Traffic risk	<ul style="list-style-type: none"> Develop and implement a Traffic Management Plan (TMP). Use traffic signs, barriers, and cones to guide construction and local traffics. Enforce strict speed limits for vehicles within the site and designated routes. Install speed bumps/ traffic-calming measures on roads near the site. Engage with local communities to raise awareness about safety measures. Erect temporary road signs warning local road users near the site. Designate safe parking and loading zones for all construction vehicles.
Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Update the existing SEP and make it more relevant to the subproject and to the identified stakeholders. In line with the SEP, undertake adequate consultations prior to construction. Prepare and implement a GRM to deal with grievances. The grievance redress committee to include representatives from the community. Sensitize stakeholders on SEP and GRM.
Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee in consultation with stakeholders Implement a workers and community GRM. Ensure proportionate representation of VMGs in the local grievances committee. Provide for confidential reporting under the GRM
Operation Phase	
Landscape and visual	<ul style="list-style-type: none"> Fence off the power plant.
Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> Ensure proper design of drainage system to minimize contaminated run-off. Develop and implement oil-spill containment plan as part of the EPRP. No vehicle maintenance and service shall be done at project site Ensure that potential sources of petro-chemical pollution protected from leaks.
Flood risks	<ul style="list-style-type: none"> Ensure drainage channels are free of any obstruction at all times. Construct more channels and or expand existing ones Raise foundations of the solar panels and ensure well designed concrete base Create flooding diversions and or spill ways to divert water from the plant
Air quality (Dust)	<ul style="list-style-type: none"> Plant trees around the plant to act as wind breakers/decrease dust pollution Ensure planting of grass around and within the facility compound
Air quality (Vehicle and exhaust emissions)	<ul style="list-style-type: none"> Maintain all machinery in good to minimum emissions of CO, NO2, SO2. Regularly monitor and report emissions data as part of EHS compliance.
Noise & vibration	<ul style="list-style-type: none"> Use quieter, high-efficiency fans and cooling systems with lower noise outputs. Equip the BESS unit with vibration isolators to reduce vibrations/noise

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<ul style="list-style-type: none"> • Install sound barriers or walls around the BESS unit to deflect or absorb noise. • Use sound-absorbing materials within the BESS housing units. • Regularly service and maintain fans, inverters, and other equipment
Biodiversity (Fauna)	<ul style="list-style-type: none"> • Undertake a supplementary biodiversity assessment and develop BMP • 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. • Undertake regular monitoring and report on biodiversity
Biodiversity (Flora)	<ul style="list-style-type: none"> • Re-vegetation including planting of trees around the plant/facility • Develop and implement an invasive species management plan.
Soil erosion	<ul style="list-style-type: none"> • Monitor exposed soil during rainy seasons for proper erosion control. • Landscape the power plant with grass in all open areas • Construct the drainage system in a way to follow natural water channels • Concrete only the required area and leave the rest of the land with grass • Construct rain water harvesting system on buildings and install adequate storages
Wastes (Solid)	<ul style="list-style-type: none"> • 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 <p><i>Damaged solar panels and hazardous wastes</i></p> <ul style="list-style-type: none"> • Ensure segregation from other waste streams • Ensure proper labelling and handling of all hazardous products/wastes. • Dispose hazardous waste through a approved waste handler
Wastes (Liquid)	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> • Provide adequate sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> • Refuelling and maintenance of vehicles will not take place at the construction site. • Create awareness for the employees on procedures of handling spills and leaks • All vehicles and equipment must be kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> • Ensure quick response to hazardous materials' spill by a trained response team. • Install oil-water separators in drainage systems to manage oil 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.
Water consumption	<ul style="list-style-type: none"> • Ensure prudent use of water. • Install water-conserving automatic taps. • Any water leaks through damaged pipes and faulty taps should be fixed promptly.
Energy consumption	<p><i>Lightings</i></p> <ul style="list-style-type: none"> • 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. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar and BESS.
Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> • Continue consultations with local communities to assess 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.

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<ul style="list-style-type: none"> Establish and maintain a grievance redress mechanism Conduct regular monitoring of the livelihoods of affected pastoralists.
Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Fencing off the facility to keep of illegal access to the power plant. Ensure controlled access to the site only with prior approval Maintain records of any person who comes to site
Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Prioritize the hiring of local workers to reduce the need for incoming workforce. Establish and enforce a strict code of conduct for incoming workers. Design separate worker accommodations for local and incoming workers. Encourage use of local suppliers of good and services to support local economy. Develop and implement waste management systems in all accommodation areas. Ensure both the workforce and the local community have access to GRM. Maintain links with local communities to address any concerns on worker influx.
Gender-based violence	<p><i>GBV- SEA and SH</i></p> <ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Develop and implement 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 all employees sign Code conducts on GBV in employment contracts. <p><i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i></p> <ul style="list-style-type: none"> Ensure VMGs individuals have to ensure they equally benefit from the project.
Labour disputes	<ul style="list-style-type: none"> Ensure all employees have clear and legally binding employment contracts. Establish an accessible and transparent GRM for all workers' 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 hiring practices. Set up a monitoring system to track and evaluate labor relations. Conduct regular worker feedback surveys to understand any emerging disputes.
Child and forced labour	<ul style="list-style-type: none"> Ensure compliance with the national labor laws management practices. Put visible signage on site "No Jobs for children" "Do not allow children". Adhere to the ESS 2 provisions and FRS Employment Laws. Report any form of forced labour at the site.
Risks related to poor or inadequate stakeholder engagement (Conflict)	<p><i>Risks related to Inadequate stakeholder engagement</i></p> <ul style="list-style-type: none"> Update the existing SEP and make it more relevant to the subproject and to the identified stakeholders. Ensure timely and prior disclosure of project all project information. Prepare and implement a GRM to deal with all grievances. The grievance redress committee to include representatives from the community. Sensitize stakeholders on SEP and GRM. <p><i>Inadequate grievances management</i></p> <ul style="list-style-type: none"> Employ from the community to the extent possible Engage the community members and other stakeholders in a timely manner 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	<ul style="list-style-type: none"> Develop and implement a comprehensive OHS plan before the commencement of the project Ensure only qualified staff are employed to work in the facility All workers operating the project site must be equipped with appropriate PPEs. Ensure all operators are skilled on firefighting management Annual EHS audits should be done
Community health and safety risks	<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> Informing workers on local cultural values and health matters. Allowing migrant workers time to be with their families Ensure equal treatment of workers.

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<p><i>Shocks and electrocutions</i></p> <ul style="list-style-type: none"> • Inspect the wiring of the houses before connecting power • Undertake safety awareness campaigns to the community • 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 • Develop and implement a reporting system for all safety risk and incidences. <p><i>Public Health Impacts –HIV/AIDS</i></p> <ul style="list-style-type: none"> • Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community • Allowing migrant workers time to be with their families
Fire hazards	<ul style="list-style-type: none"> • Install and ensure the facility has proper and well-serviced firefighting equipment. • Install detection/alarm systems that can detect fire should be and installed • Develop and create awareness on fire management and response plans • 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 shall be identified and clearly marked at the facility
Security risks	<ul style="list-style-type: none"> • Monitor local security developments and adjust security protocols accordingly. • Maintain a secure perimeter with robust fencing of the site. • Ensure proper access control measures - only allowing authorized personnel. • Deploy trained security personnel to guard the site 24/7. • Continue engaging local communities to minimize any emerging hostility. • Maintain and regularly update a comprehensive security incident response plan • Maintain close coordination with local law enforcement and security agencies • Implement a vetting process for all employees to minimize risk of insider threats. • Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters.
Decommissioning Phase	
Impacts on landscape and visual	<ul style="list-style-type: none"> • Create a decommissioning plan that includes minimizing any visual impacts. • Implement a revegetation plan using native plants and vegetation. • Ensure proper management of all waste materials to prevent visual pollution. • Conduct regular cleanup to remove any unsightly materials. • Install informational signs explaining the decommissioning process. • Provide regular updates to stakeholders on decommissioning progress.
Impacts on biological environment	<ul style="list-style-type: none"> • Develop habitat protection plans to protect sensitive habitats, such as wetlands. • Implement erosion control measures to prevent sediment runoffs. • Undertake habitat restoration using native plants to promote ecosystem recovery. • Monitor and manage invasive species to prevent their spread in disturbed areas. • Implement noise control measures to minimize disturbance to local wildlife. • Ensure proper disposal of waste materials to prevent any harmful pollution. • Work with environmental specialists to implement effective mitigation measures. • Develop and implement detailed site restoration plans.
Solid Waste Generation	<ul style="list-style-type: none"> • Demolition contractor to adhere to the various manufacturer's guidelines. • Ensure proper segregation of waste streams - hazardous and non-hazardous. • Ensure proper handling and storage of all demolition materials. • Ensure 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)	<ul style="list-style-type: none"> • Conduct a comprehensive assessment to identify/categorize all liquid waste. • Develop a detailed liquid waste management plan outlining all procedures. • Establish temporary storage facilities for all liquid wastes to prevent leaks/spills. • Use environmentally friendly materials that generate less hazardous liquid wastes. • Ensure that all liquid wastes are disposed by licensed waste disposal facilities. • Provide training for staff on liquid waste handling to minimize risks. • Identify opportunities for the reuse or recycling of liquid waste materials. • Maintain accurate records of liquid waste management and disposals. • Establish an emergency contact list and response procedures. • Maintain an inventory of chemicals and hazardous substances.

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
Noise and Vibration	<ul style="list-style-type: none"> • Use quiet equipment (i.e., equipment designed with noise control elements). • 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.
Air quality (dust)	<ul style="list-style-type: none"> • Use water sprays or misting systems to dampen surfaces and reduce dust. • Implement soil stabilization techniques to minimize dust from disturbed areas. • Enforce speed limits for vehicles to reduce dust emissions from vehicle traffic. • Engage with local communities to inform them about decommissioning activities. • Conduct regular inspections to identify potential sources of dust emissions. • Plan for site restore vegetation restoration to prevent dust generation.
Air quality (vehicle fumes)	<ul style="list-style-type: none"> • Implement a regular maintenance schedule for all vehicles to minimize emissions. • Train drivers/equipment operators on practices that limit emissions. • Conduct scheduled checks to ensure emission controls. • Establish a reporting system for emissions data to track progress.
Water Resources	<ul style="list-style-type: none"> • Conduct assessment to evaluate water needs & identify reduction opportunities. • Develop a water management plan that minimize water consumption. • Implement systems to recycle and reuse water for various tasks. • Provide training for personnel on water conservation practices. • Use temporary storage solutions to manage water supplies and reduce waste. • Implement measures to prevent leaks and spills from water storage.
Impacts on Occupational health and safety	<ul style="list-style-type: none"> • Develop and implement a comprehensive OHS plan before the commencement of the project • Conduct a thorough occupational health and safety risk assessment. • Ensure that all workers are equipped with appropriate PPE. • Conduct regular safety inspections to address potential hazards promptly. • Establish EPRP 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.
Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> • 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. • Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation.
Trespassing of unauthorized personnel	<ul style="list-style-type: none"> • Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. • Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. • Define and communicate restricted access hours during which the site is closed to unauthorized personnel. • Hold regular community engagement meetings to discuss security concerns and gather feedback on improving site safety.
Worker influx – Incoming Workforce	<ul style="list-style-type: none"> • Tap into the local workforce to the extent possible to reduce labour influx. • Consult with and involve local community in the decommissioning activities. • Sensitize workers regarding engagement with local community. • Establish and operationalize an effective GRM 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.
Gender-based violence	<ul style="list-style-type: none"> • Update the existing SEA/SH Prevention/Response Action Plan, to manage SEA/SH risks that are relevant to the subproject. • Implement a code of conduct signed by all those with physical presence on site.

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<ul style="list-style-type: none"> • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts on GBV are signed by all employers.
Inadequate grievances management	<ul style="list-style-type: none"> • Constitute a Local Grievances Committee in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. • Implement a worker's grievances mechanism. • Ensure proportionate representation of VMGs in the local grievances committee.
Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> • 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. • Collaborate with local leaders and community organizations to facilitate trust-building and effective engagement with the community. • Provide regular updates and reports to stakeholders on the progress of decommissioning activities and how stakeholder feedback has influenced decisions. • Ensure that women and vulnerable groups are actively involved in stakeholder engagement processes, addressing any barriers they may face in participation.
Child and forced labour	<ul style="list-style-type: none"> • Adhere to the ESS 2 provisions and ILO Employment Laws. • 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".
Security risks	<ul style="list-style-type: none"> • Conduct a thorough security risk assessment to identify potential threats. • 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. • Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. • Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities.
Community health and safety risks	<ul style="list-style-type: none"> • Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the decommissioning process. • 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.
Fire hazards	<ul style="list-style-type: none"> • Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. • Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. • Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. • Ensure the availability of adequate firefighting equipment, such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. • Store flammable materials in designated, secure areas away from ignition sources, following appropriate storage guidelines. • 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

DESCRIPTION	RECOMMENDED MITIGATION MEASURES
	<p>waste removal process.</p> <ul style="list-style-type: none"><li>• Establish communication and coordination with local fire services to ensure a rapid response in case of a fire emergency.<li>• Ensure an adequate supply of water is readily available for firefighting purposes, including water tanks or ponds if necessary.

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 224,900. 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

All the stakeholders engaged expressed strong support for the proposed hybrid power plant, acknowledging its potential to drive sustainable development in an area with significant agricultural potential. Generally, the project is viewed as a critical intervention to improve energy access and stimulate economic growth in both the district and the entire BRA, which could enhance the region's overall productivity and livelihoods. However, participants emphasized the importance of strictly adhering to the Environmental and Social Management Plan (ESMP) to mitigate potential negative environmental impacts and ensure that the project aligns with sustainability principles.

A recurring theme during the consultations was the demand for prioritizing local employment opportunities. Stakeholders underscored the need to ensure that the community benefits from the project's job creation potential, advocating for capacity-building initiatives to equip locals with the necessary skills. This preference reflects a broader desire to ensure inclusive economic benefits, fostering local ownership and reducing potential conflicts over workforce decisions.

Furthermore, stakeholders called on the investor to extend support toward improving physical and social infrastructure within the community. Recommendations included contributions to better roads, schools, and healthcare facilities, which are essential for maximizing the project's overall socio-economic impact. By addressing these community priorities, the project has the potential to gain even greater local buy-in, creating a model for sustainable and socially responsible energy investments.

Conclusion and recommendations

Conclusion

- This study found that negative social and environmental impacts can be mitigated, while positive impacts benefit the community. The project proponent, implementing entity, and contractor must adhere to environmental and social management plans, obtain permits, and have qualified personnel. ESIA proposes adequate mitigation measures.
- The ESIA analysis shows that the proposed power plant will have positive impacts on the FGS, BRA Region governments, and residents, including increased clean energy, employment, investment, and improved living standards. However, it also poses potential negative impacts like noise, dust, soil erosion, and increased resource demand.
- The Environmental and Social Management Plan (ESMP) has been developed to ensure sustainability of project activities from construction to decommissioning. It provides a general outlay of activities, associated impacts, mitigation action plans, and monitorable indicators. Implementation timeframes and responsibilities are defined, and cost estimates for recommended measures are provided. A monitoring plan highlights environmental

performance indicators, allowing for continuous review of operational and maintenance activities to identify trends in degradation or improvement and propose mitigation measures.

- The ESIA indicates that the proposed project will yield significant socio-economic benefits, a significant improvement over the "NO development option." Stakeholders agree it's overdue, and potential adverse impacts can be mitigated. The project will adhere to industry norms and standards, ensuring environmental sustainability. Mitigation measures will be integrated to comply with national and World Bank requirements.

Recommendations

The MoEWR and BECO are advised to implement the ESMP, conduct statutory EHS Audits during all the phases of the project, including regular evaluation of the project site's environmental performance against the recommended measures and targets outlined in this report. On the basis of the findings from this ESIA, the following specific recommendations can be made:

- 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.
- Undertake a supplementary biodiversity assessment and develop a biodiversity management plan (BMP) to be implemented during the full project cycle
- Contractor to ensure grievance redress mechanism is established and operational before commencement of the operation.
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders.
- Diligence on the part of the contractor and proper supervision by the MoEWR and BECO is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.
- EHS Audits shall be carried annually or as prescribed by the FGS Authority during the operational phase.
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt out
- Stakeholder engagement to be carried out throughout the construction and operation and decommissioning phases.
- The BECO and the contractor shall adhere to relevant legal and regulatory framework to ensure compliance and success of the project.

Authorization opinion

The Horizon Development (HD) believes that this ESIA report provides enough information for decision-making on the project. It has been shown that the proponent's preferred alternatives and technological alternatives are generally acceptable. The ESIA has also identified essential mitigation measures to limit project impacts. The HD believes that the applicant's proposal should be approved on environmental grounds, provided essential mitigation measures are implemented. The HD believes that the anticipated negative impacts can be effectively mitigated, and that the proposed project does not pose a significant threat to environment and social aspects. The project should therefore be allowed to proceed. It is also expected that the proponent (MoEWR/BECO) will own this ESIA and ensure its full implementation during all phases of the project, including monitoring and reporting.

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 national 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 and ASCENT projects. The SESRP and ASCENT Development Objectives are to increase access to lower cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry in different load centres within the Federal Republic of Somalia". The Ministry of Energy and Water Resources (MoEWR) with a designated Project Implementation Unit (PIU) coordinate the SESRP and ASCENT projects. Overall, SESRP and ASCENT projects aim to support the Federal Government of Somalia (FGS) initiative of ensuring increased electricity access to the citizens.

The SESRP and ASCENT projects align 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. In particular, 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 and ASCENT will help to reduce reliance on expensive imported fossil fuels, increase energy security, and promote environmental sustainability. The SESRP and ASCENT also support 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. Table 1 summarizes the components of SESRP and ASCENT projects.

Table 1-1: Summary of SESRP and ASCENT projects 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.
ASCENT	Component 1: Distributed Renewal Energy (DRE) with Solar PV (SPV) and Battery Energy Storage Systems (BESS) in the capital city of Mogadishu and other major load centers in the Federal Members States (FMS).
	Component 2: Electricity Distribution Network Rehabilitation and Reinforcement of the mini grids serving the Mogadishu capital city area and other FMS major load centers.

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>

Component 3: Sector Capacity and Institution Enhancement and Project Implementation Support.

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

This component under SESRP 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. BECO is one of the key ESPs participating in Component 2 of the project and has made progress towards meeting the general requirements for enhanced production of clean and affordable electricity. For instance, BECO has already undertaken relevant feasibility studies and acquired adequate space to set up a hybrid power plant in Dayniile District in BRA, and approximately 26km in the outskirts of Mogadishu 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. BECO will be responsible for the implementation of the project during construction, operation and decommissioning phases.

An Environmental and Social Impact Assessment (ESIA) study is necessary under SESRP and ASCENT to ensure compliance with international and national environmental and social safeguards. The ESIA study is meant to evaluate potential impacts on the environment, communities, and local economies, identifying risks such as pollution, land use conflicts, biodiversity loss, and social concerns like labour conditions and community health and safety. Given the World Bank's stringent environmental and social standards, the ESIA ensures that the project adheres to best practices for mitigating negative impacts while enhancing positive outcomes, such as improved energy access and economic development. Additionally, the ESIA facilitates stakeholder engagement, ensuring that the concerns of local communities and other stakeholders are considered throughout the project lifecycle.

1.1.2. Justification for the ESIA

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

1.2. OBJECTIVES OF THE ESIA

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

- Present an outline of the project background,

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

1.3. SCOPE OF THE ESIA STUDY

The ESIA scope largely covered the following areas:

- Baseline Conditions: Environmental setting (climate, topography, geology, hydrology, ecology, water resources, sensitive areas, baseline information, etc.); socio-economic activities in the surrounding areas (land use, human settlements, economic activities, institutional aspects, water demand and use, health and safety, public amenities, etc.), and infrastructural issues (roads, water supplies, drainage systems, power supplies, etc.).
- Legal and policy framework: Focusing on the relevant national and WBG's EHS in general and those relevant to power generation and supply in particular. The analysis further focused on the review of FGS and BRA laws and regulations relevant to the proposed project.
- 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 HD was 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 and the financiers in deciding on the project. The report is also in meant to ensure compliance with the World Bank's ESF - the proponent's development partners. The ESIA experts conducted the study guided by the following terms of reference:

- Establish the suitability of the proposed site/location to set up the hybrid power plant.
- A concise description of the legal and regulatory frameworks relevant to the project, description of the technology, procedures and processes to be used, in the implementation of the project.
- A description of the potentially affected environment/social economic and cultural setting of the project area.
- Consultation with stakeholders including the potentially project affected persons (PAPs).
- A description of positive and negative impacts of the project on the environmental, health, safety and social cultural aspects of the community
- Analysis of alternatives including project site, design and technologies

- Identification of the most appropriate mitigation measures/interventions against negative impacts during construction, operation and decommissioning.
- Development of an Environmental and Social Management Plan proposing the measures for eliminating, minimizing or mitigating adverse impacts on the environment and society, including the cost, timeframe and responsibility to implement the measures.

1.5. ESIA APPROACH AND METHODOLOGY

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

1.5.1. Key Activities Undertaken During the ESIA

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

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

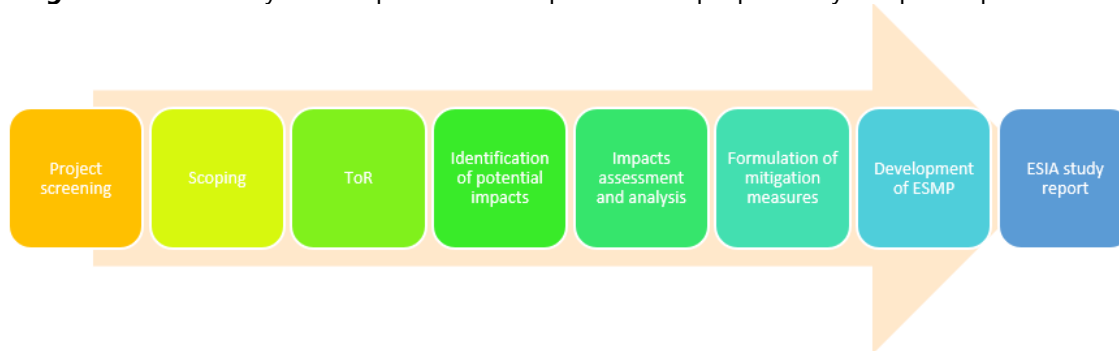
- Physical inspections of the proposed project area and site
- Literature review of relevant documents
- Stakeholder consultations with different stakeholders and project-affected persons
- Gathering environmental and socio-economic data of the area by use of checklist
- Continuous discussions with the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

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

- Step 1: Project concepts: The project details regarding; scope, design, implementation, tests, commissioning were first analysed. A feasibility study report was obtained and analysed.

- *Step 3: Project Screening:* Details about baseline conditions and potential environmental and social impacts were collected through desktop study, stakeholder consultations, site visits, photography, and inductive methods.
- *Step 4: Identification of Potential Environmental and Social Impacts:* The Potential Environmental impacts were identified, Classified and magnitude determined.
- *Step 5: Impact Assessment and Consultations:* The Environmental and Social Impacts were analysed, assessed and discussed in details involving consultations with the BECO 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 BECO 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 Mogadishu 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 BECO 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:

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, BRA, 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>

- 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 Benadir Administrative Region 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 BECO and the Contractor will implement the measures in the proposed ESMP
- The BECO will undertake monitoring to track the implementation of the ESMP to ensure that management measures are effective to avoid, minimize and mitigate impacts and that corrective action will be undertaken to address shortcomings and/or non-performances.

2.0. Project Description and Context

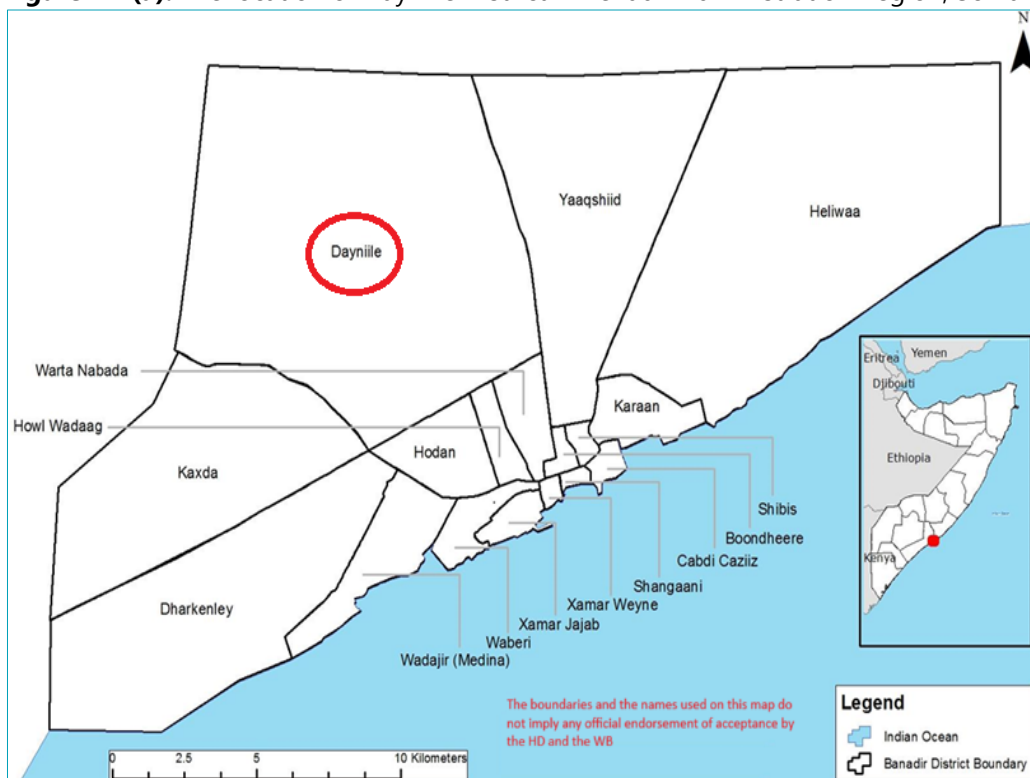
2.1. OVERVIEW

This section provides an overview of the proposed BECO Dayniile Hybrid Power Plant in the north-western outskirts of Mogadishu City within Dayniile District 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 BECO and MoEWR.

2.2. LOCATION OF THE SITE

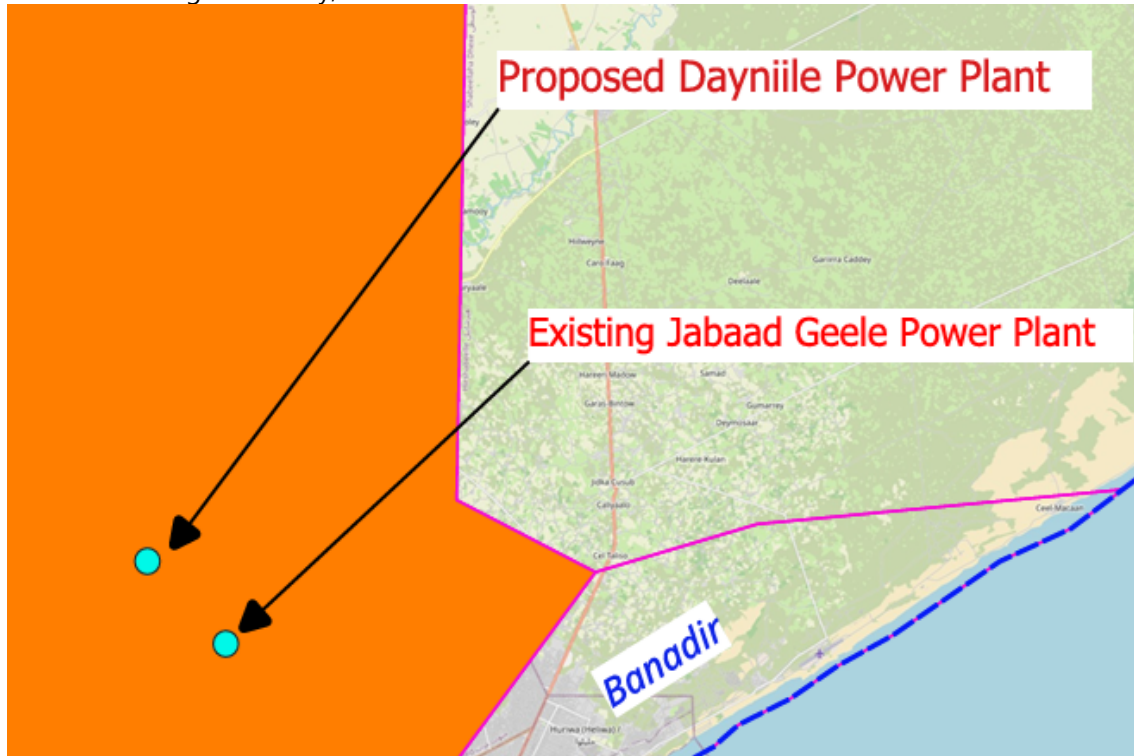
The proposed BECO Dayniile Hybrid Power Plant ($2^{\circ}09'22.3''\text{N}$, $45^{\circ}11'5.82''\text{E}$) shall be located in the north-western outskirts of Mogadishu City within the Dayniile District of the Benadir Administrative Region (Figure 2.1). The project site is in an open area with sparse settlements in the immediate vicinity with 103 ha piece of land acquired by BECO for the project. Dayniile is located in the north-western part of Benadir region; neighboring Lower Shabelle region. It borders Kaxda District in the western part of Benadir region. The two districts host the largest number of IDPs in Benadir region, estimated at 220,000 persons¹¹. The Project Site is located approximately 5 km to the north of the current BECO Jabad Geele Power Plant. The proposed power plant will have both direct and indirect impacts on the environment and communities. Overall, the direct and indirect areas of influence is expected to be 2km and 5km radius respectively.

Figure 2-1(a): The location of Dayniile District in Benadir Administration Region, Somalia



¹¹ Lüscher, T. F. (2019). Back to square one. *European Heart Journal*, 40(13), 1031–1033. <https://doi.org/10.1093/eurheartj/ehz094>

Figure 2-2(b): Location of the project BECO Dayniile Hybrid Power Plant site in the north-western outskirts of Mogadishu City, Somalia



2.3. PROJECT SITE AND SURROUNDINGS DESCRIPTIONS

Consultations with the local community indicated that the land is solely owned by BECO 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 BECO 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. The proposed site for the hybrid power plant will be located in a sparsely populated area characterized by vast open spaces. The landscape is largely undeveloped but is predominantly used for crop farming benefiting mainly from the nearby River Shebelle. The proposed project could promote local socio-economic opportunities, and will necessitate careful planning to balance community needs, land use priorities, and environmental management.

2.4. DESCRIPTION OF THE PROPOSED POWER PLANT

2.4.1. Overview

BECO is the largest Electricity Service Provider in Somalia, and the largest operator in Mogadishu City. It operates as vertically operated utility company integrating and offering all services required in delivering the electricity to the end user. It runs Generations, Transmission, Distributions, Retail segment, System operation and Maintenance of the entire supply chain of the power system. It powers major critical and sensitive installations including Airports, Ports, Hospitals, Factories, Government institutions, Diplomatic missions and embassies. The company has set clear plans (2024-2033) which covers various aspect of the power systems and in response to the ever-changing system dynamics particularly load demand behavior side. Under the plan, the company envisions to have cumulative installed capacity of 227MW by 2033 with strategic focus on

renewable energy sources, i.e., BESS & PV solar. Additionally, the company intends to upgrade its transmission network voltage configuration from current 33kV to 132kV to enhance power transfer capability from source to the load centers and improving reactive power stability of the network. This will again involve adding several hundreds of kilometers of distribution.

Based on power generation data provided by the company for the period from January 2021 to December 2023, Diesel based source of generation is the most prevailing and dominant source of power accounting about 71% followed by 28% of Solar PV and approximately 1% of BESS.

The proposed BECO Dayniile Hybrid Power Plant fits in the strategic vision of the company, and is expected to contribute to the current power generation mix by injecting additional power from the renewable energy sources. Under the proposed new hybrid power plant, BECO will require a new Supervisory Control and Data Acquisition (SCADA) system to control and monitor the operations of the plant. The new SCADA system shall be able to give preference to the generation sources to supply the load in the order of priority starting with solar PV (first priority) and batteries (second priority).

Our analysis indicates that ESS5 and ESS7 will not be triggered by the proposed investment in the new site. However, ESS6 and ESS8 may be relevant to the project because the project is within a 5km radius from a critical habitat – the River Shebelle, apparently attracting different species of fauna. ESS8 would be relevant, 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.

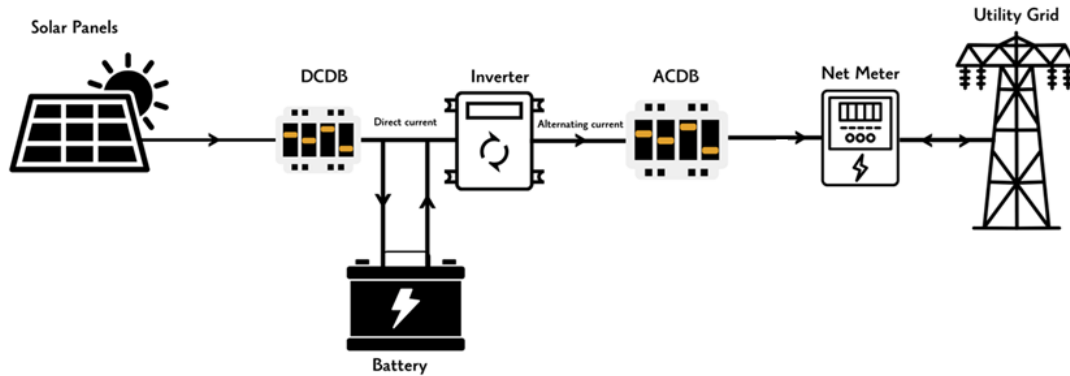
Overall, it would be important that the proposed project comply with ESS1, ESS2, ESS3, ESS4, ESS6, ESS8 and ESS10 guidelines during all the project phases from construction, and operation to decommissioning. In addition, compliance with the Federal State of Somalia and by-laws for the BRA need to be complied with in this new venture. Based on 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

A hybrid power plant consisting of solar PV and battery storage is proposed for the WB financing. The feasibility study recommends solar PV modules of 610W (211,575 pcs), inverter transformers (330kVA (371pcs), power conditioning units for batteries (bi-directional) (330kVA (256pcs), BESS (4.45MVA, 79pcs), step up transformers on PV side (6.8MVA, 21 pcs), and step up transformers on BESS side (6.8MVA, 15 pcs). The transmission line will be connected to an existing BECO substation in Jabad Geele to provide power evacuation from the proposed Dayniile Power Plant. The existing sub-stations in BECO Jabad Geele will be upgraded to accommodate the additional power supply from Dayniile site. Under the proposed arrangement, the project financing from the WB will not focus on any kind of diesel generators as a source of power generation. The Dayniile power plant

is expected to operate for a period of twenty-five (25) years, after which it shall be decommissioned. The design for power evacuation and transmission from the proposed power plant has been completed.

Figure 2-3: Schematic illustration of the proposed BECO Dayniile Hybrid Power Plant



2.4.3. Architecture and Basic Design Specifications

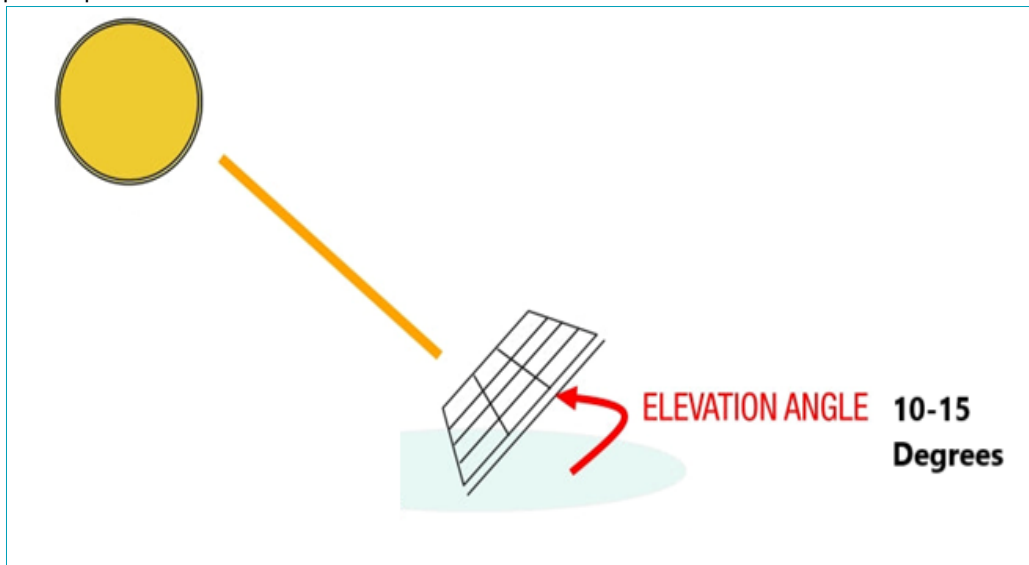
The proposed BECO Dayniile Hybrid Power Plant will be built to comply the International Electro technical Commission (IEC) standards. It will have an installation of solar panels and BESS. The solar panels will have a connection to the batteries through underground cables. The PV plant and the battery capacity will be sized according to the solar resources. In addition to this Design architecture, the project site shall have a site office that shall also have a Control Room adjacent as well as a guardhouse. The Solar PV hybrid system will be based on a centralized photovoltaic plant connected to a 3-phase 400V AC busbar line, where the multi-mode battery inverters are also connected.

2.4.4. Placement of the Solar PV Arrays

The PV array module support structure shall be ground-mounted on arid soil with a base made of concrete. The support shall have a tilt angle between 10°-15° from the horizontal (Figure 2.4). The support frame shall be of either lightweight aluminium or galvanized steel and it shall be easy for installation, maintenance and disassembly at the end-of-life cycle. Cables used within the solar PV shall have a voltage rating; have a temperature rating higher than 40°C above ambient temperature; they will be UV-resistant; water resistant and it is recommended that they be flexible (multithreaded). The PV inverter shall be of type current source grid-tied to convert DC to an AC Sinusoidal current¹². String inverters shall be installed indoors or outdoors with a cover and suitable for desert conditions with high ambient temperatures and dust.

¹² <http://www.osti.gov/bridge/servlets/purl/463622-TtEMSp/webviewable/463622.pdf> OSTI

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).

2.4.9. 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) and distribution lines (DL). The TL from the Dayniile site will be trunked and terminated at the BECO Jabad Geele Hybrid Power Plant's GIS sub-station, which will then

evacuate the power through the existing double circuit overhead lines (OH), and a double circuit underground lines (UG) into the distribution sub-stations (Macow and Hamaryweyne) located in the heart of Mogadishu City. Every possible measures will be taken to ensure that the TL and DL associated with the Dayniile Site do not trigger ESS5. For safety, transmission line shall 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 103 ha piece of land located approximately 5km to the north of the BECO Jabad Geele Hybrid Power Plant. The proposed project site is under the legal ownership of BECO. No compulsory land acquisition, displacement or resettlement is anticipated.

2.5.2. Access to the Project Site

It is proposed that the power plant shall have one access road to be used during construction and operation phases. It is advisable that BECO constructs and maintains a new road to the Dayniile site to enhance access.

2.6. PROJECT ACTIVITIES

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

2.6.1. Construction Phase Activities

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

2.6.1.1. Outline of the construction activities

Construction activities will involve the following:

- The contractor shall perform site investigations in good time to ensure appropriate designs and construction is done on a sound engineering basis.
- Site preparation (ground-breaking, clearance of vegetation, preparation of a site office and stores, fencing to avoid intrusion)
- Disposal of any soil that could is not required, excavations/earth moving, filling and foundation laying
- Procurement of construction materials and delivery of the same to the site
- Storage and utilization of materials
- Civil, mechanical, and electrical works
- Building works, trampling and removal of construction wastes
- Construction of fuel storage tank
- Cabling
- Installation of the solar panels
- Completion of the plant
- Post construction clean-up, restoration and landscaping of site
- Load testing
- Remedying of defects after functional tests
- Solid waste collection and commissioning of the plant.

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

2.6.1.2. Construction materials, equipment and services

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

2.6.1.3. Input materials and equipment & machinery

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

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

2.6.1.4. Use of services and resources

- *Water:* Water is key in the construction of this project. Water will be required for potable use and in the construction of the foundations, and any other works. The contractor will source water from elsewhere rather than the community water resources. One key option would be for contractor to sink a borehole to supply water during all phases of the project – construction, operation and decommissioning phases. The water demand during construction activities is not expected to be significant, and will mainly be used for sanitary support services (especially for workers), cleaning, palliating soil piles to suppress dust, drinking, amongst others. On average, cleaning solar panels typically requires about 2-4 litres of water per panel. For the proposed solar farm, the number of panels can vary based on the panel specifications, but a rough estimate can be made. For the proposed 211,575 panels (3,500,000 watts / 300 watts per panel) translating to approximately 803,985 litres per cleaning session.
- *Labor:* The size and the composition of the workforce will be at the discretion of the contractor(s). The contractors will adhere to all the relevant employment legislations in the FGS, and ensure compliance with the World Bank's ESS2. It is recommended that the contractor seek unskilled labour from the surrounding areas.
- *Sewerage:* A negligible sewerage flow is anticipated for the duration of the construction period. On-site sanitation will comprise of serviceable facility to be serviced periodically.

- *Electricity:* Electricity will be essential for the proposed project both during construction and operation. The contractor will have to have portable diesel generators during construction for fabrication and welding where necessary but BECO will provide electricity for operations.

2.6.1.5. Construction supervision and safety

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

2.6.3. Decommissioning Phase Activities

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

- Removal of Solar panels and their associated switching equipment's
- Given that the lifetime of a lithium-ion battery is expected to expire after 17 years yet the power plant is to operate for 25 years, a replacement plan will be implemented to ensure continued functionality. This shall include procuring and installing new batteries or upgraded storage technologies, safely recycling or disposing of expired batteries in line with environmental regulations, and allocating funds for the replacement. Battery replacement shall be coordinated with routine maintenance to minimize downtime. Additionally, this shall present an opportunity to adopt newer, more efficient technologies that could enhance the plant's performance for the remainder of its operational life.
- Removal of electrical fittings, bus bars and steel poles/structures
- Demolish and carefully handle components that contain oil and fuels
- 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. Due to FRS's political instability, there is a lack of well-developed environmental laws and administrative frameworks. As a result, environmental and natural resources management matters have been managed using existing statutes. FRS is now working on strengthening its environmental management systems. For instance, a draft environmental and social impact assessment and audit regulations has been finalized¹³. Despite recent constitutional reforms defining natural resources and ecosystem services as public assets, significant gaps remain in environmental legislation implementation in the FRS. Based on evaluations and reviews, several federal and BRA by-laws were relevant and will apply to the project. Additionally, the WB ESS applicable to the project were reviewed and their relevances described.

3.1. NATIONAL LAWS AND REGULATORY FRAMEWORK

3.1.1. Provisional Constitution of Somalia

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

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

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

- According to Article 11, "all citizens shall have equal rights and duties before the law, regardless of sex, religion, social or economic status, political opinion, clan, disability, occupation, birth, or dialect." In addition, it says that "even if the actor did not intend this effect, discrimination is deemed to occur if the effect of an action impairs or restricts a person's rights." It further states that the official on the grounds of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, handicap, religion, political opinion, occupation, or wealth shall subject no one to discrimination and that this prohibition applies to all official programs.
- "A person may not be subjected to slavery, servitude, trafficking, or forced labour for any purpose," according to Article 14.

¹³Ministry 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.

- Every person has the right to physical integrity, security, and personal liberty, according to Article 15. "The prohibition of all forms of violence, including any form of violence against women, torture, or inhumane treatment" is one of the provisions that falls under this category.
- Article 24 states that "all workers, particularly women, have a special right of protection from sexual abuse, segregation, and discrimination in the workplace." It also enshrines everyone's right to fair labour relations. All labour laws and practices must adhere to the principle of gender equality in the workplace. It also guarantees every worker the freedom to organize and become a member of a trade union, to go on strike, and to negotiate collectively with employers, trade unions, and employees on labour-related matters.
- Every person's access to clean, drinkable water, healthcare, social security, and the realization of their constitutional rights is upheld by Article 27. Additionally, it says, "It shall be ensured that minorities who have long faced discrimination, women, the elderly, and people with disabilities get the necessary support to realize their socio-economic rights."

Relevance

The proposed project aligns with Somalia's Provisional Constitution by proposing mitigation measures for social, health, safety, and environmental issues for sustainable development. It aims to produce clean, reliable electricity, enhancing the FRS objectives of reducing global warming through reduced greenhouse gas emissions in electricity generation.

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

Somalia is developing its environmental laws and policies, with a National Environmental Policy and National Environmental Act drafted by the FGS and approved by the Cabinet in February and November 2020 respectively. These documents require Parliament authorization and have no set schedule. The MoECC is drafting national environmental policies, regulations, and laws, including Environmental Quality Standards, Sectoral Environmental Assessments, Environmental Impact Assessments, and Environmental Audits, to coordinate ESIA activities in the FRS. There is consensus at both national and state levels that international standards and best practices should serve as a foundation for conducting ESIA.

Relevance

BECO and contractors are required to adhere to environmental and quality standards as per the draft national environment act. They must develop and implement a formal construction health and safety plan, establish a health and safety committee, ensure workers undergo medical examinations, and ensure equipment is serviced properly. They must also conduct a fire risk assessment, develop an emergency preparedness and response plan (EPRP), implement mitigation measures to prevent nuisance dust impact on neighbouring properties, and observe existing provisions in the FRS on traffic management of construction vehicles as guided by the ESMP. These measures are crucial to ensure the safety and quality of the project.

3.1.3. Somalia's Ninth National Development Plan

Somalia's ninth National Development Plan (NDP-9)¹⁴, 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

¹⁴The NDP-9 is available here: <http://mop.gov.so/wp-content/uploads/2019/12/NDP-9-2020-2024.pdf>

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 been developed, but standards and regulations for 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.

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 must adhere to the Labour Code (1972), ILO conventions, and the Provisional Constitution during construction and operation phases. BECO and contractors must follow existing labor laws, including amendments, and ensure employee management. They must maintain insurance, conduct accident investigations, and conduct pre-employment and medical examinations. They must also prevent child labor and abuse.

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 girls¹⁵. For example, a recent study on GBV in Somalia¹⁶ found out that 18.5% of the women and girls in the IDP camps

¹⁵ file:///C:/Users/pc/Downloads/GBV%20Bulletin%20Apr%20-%20Jun%202018%20Final-1.pdf

¹⁶ 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>.

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.

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

Relevance

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

3.1.7. Somalia's Power Master Plan, 2018

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

Relevance

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

3.1.8. Energy Policy and Regulations

Currently, the FGS 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 Power Master Plan (PMP), and a number of laws and rules are being developed. Currently, 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. 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 little mechanism to vet and enforce ESP services quality, health and safety standards. This is

¹⁷ See UNDP, UN Women, and UNFPA, 2018. Somalia Gender Justice and the Law. Available at https://www.undp.org/content/dam/somalia/docs/Project_Documents/Womens_Empowerment/Gender%20in%20Somalia%20Brief%20202.pdf for a review of the Penal Code (1962) provisions relevant to GBV.

further compounded by the limited capacity of federal and state institutions to develop, enforce and monitor the sector. Currently, the Federal and State MoEWR are mandated to issue operating licenses to power plant. However, there are no licensing guidelines and there is not yet any legal basis to regulate their operations once licenses are granted.

Relevance

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

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

Somalia, despite the prolonged civil conflict and least development status, has a great potential to achieve sustainable development and to contribute in the reduction of Green House Gases (GHG). There are already signs of recovery that could utilize renewable energy, including solar, wind, hydropower and geothermal energy resources. There are some development initiatives in solar energy utilization in the capital Mogadishu and some cities in Puntland and Somaliland. In addition, there are considerable renewable energy potential throughout Somalia as indicated by a recent report of Federal Government of Somalia (FGS) and the African Development Bank (AfDB), (FGS, AfDB, 2015). The solar energy potential ranges from 5 to 7 kWh/day with over 310 sunny days in a year, which amounts to 2500 to 3000 hours of sunshine per annum.

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

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

tolerated¹⁹. Numerous cultural and institutional barriers limit women's access to justice, including fear of punishment, reprisals and harassment for reporting GBV incidents, and social stigma²⁰.

Relevance

- *The power plant is required to operate under the existing customary laws within the states where their projects are located. They are further expected to respect the existing customary laws in handling their relationships with all the stakeholders they engage in their areas of operation.*
- *The land proposed for the project has been legally acquired by BECO under willing buyer-willing seller. Additionally, the land's tenure falls under customary land rights. BECO 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. Benadir Administrative Region By-Laws and Guidelines

3.2.1. Overview

Benadir Regional Administration (BRA) is a local government entity, established in law and enshrined in clause 1(b) of article 48 of the Constitution of the Federal Republic of Somalia, which relates to the structure of the state. Benadir is one of the 18 administrative divisions of Somalia established at independence in 1960. Benadir itself is comprised of 17 administrative districts that make up the city of Mogadishu, which is also capital of the federal republic. The BRA bears the dual responsibility of managing the affairs of the region as well as the municipality of Mogadishu. Thus, its administrative head is also the governor of the region as well as mayor of the city. Law Number 6 relates to local government and its older version, Law 19, clearly defines the mandates to provide basic services to the city of Mogadishu, including health services. The BRA has established environmental management guidelines to promote sustainable development and safeguard natural resources. These guidelines encompass the supervision of waste management systems, including landfill operations, and the efficient transportation of waste to prevent contamination of air, land, and water sources. They also involve the development and implementation of new waste disposal schemes, ensuring compliance with current legislation, and engaging with residents and community groups to address waste management concerns. Additionally, the BRA has set up a public complaints committee to handle environmental and waste-related issues and has formulated environmental policies to govern the management of the environment.

3.2.2. Benadir Administrative Region Waste Management Policy (2016)

The BRA Waste Management Policy (2016) provides a comprehensive framework aimed at addressing waste management challenges in BRA, 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. The functions of this policy law include:

- Supervision of waste management schemes, such as at landfill sites;

¹⁹See 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.

²⁰UNDP, UN Women, and UNFPA, 2018.

- Supervision of the transportation of waste to ensure that it takes place efficiently without contaminating air, land or water sources;
- Assistance with the development, promotion and implementation of new waste disposal schemes;
- Ensuring compliance with current legislation in the transportation, handling and disposal of waste;
- Consultations with residents, community groups, housing associations and traders' associations about waste management issues, identify their requirements and provide appropriate solutions
- Establishment of a public complaints committee that deals with environmental and waste complaints;
- Establishment and implementation of environmental policies that govern management of 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.

3.2.3. Benadir Administrative Region Interim Legal Framework on Employment and Livelihoods

The framework was developed through close collaboration with a wide range of stakeholders, including the Mayor and Vice-mayor of Mogadishu; the President's Office; the Prime Minister's Office; the Ministries of Justice, Public Works, and Natural Resources; technical experts in urban planning, engineering, and law; and representatives from civil society. The stakeholders agreed on five priority components that support SECIL's main aims (employment generation and improved livelihoods in Mogadishu):

- Investment, business, and employment law
- Urban services and standards law
- Good governance laws and rights
- Building regulations
- Civil society and professional associations law

These five legal instruments present a sound legal framework that strengthens investment, business, and employment law and enables the regional administration to apply and enforce laws that positively influence investment and development in the Benadir Region. The ratification and endorsement of this new legal framework increases the accessibility of the laws and ensures that they are equitable and benefit the general populace. The participatory approach adopted throughout the development of these laws has increased ownership and acceptance, allowing these basic principles to serve as a springboard for the establishment of further national-level laws and regulations.

Relevance

This framework emphasizes job creation, equitable hiring, and compliance with labour standards, ensuring that employment opportunities generated by the project benefit local communities. The power plant can align with these guidelines by prioritizing local hiring, adhering to fair wages, and offering skills development programs, thereby fostering economic growth and reducing unemployment in the region. Furthermore, compliance with the framework will strengthen community relations and ensure the project contributes positively to regional development objectives.

3.2.4. Benadir Administrative Region Road, Sewage and Drainage Works Guidelines

In the Benadir Region of Somalia, policies and regulations governing roads, the Benadir Regional Administration (BRA) primarily manages sewage, and drainage systems. The Department of Roads, Sewage and Drainage Works oversees the infrastructure development, including roads, and has established strategic plans to guide these efforts. This department is tasked with the daunting responsibility of Roads, Sewerage and Drainage works, including mapping of the road sewerage and drainage reserves; construction and maintenance of roads sewerage and drainage; and maintenance of water flows systems in the city. However, there is a noted lack of comprehensive regulations specifically addressing sanitation and sewage systems within the city. Although the BRA's Environment & Waste Management Department supervises waste management schemes and enforces environmental policies, but challenges persist due to limited technical capacity and resources. Additionally, the Somali National Infrastructure Strategy (2019–2063) acknowledges the absence of sewerage systems in urban areas, including the seventeen districts within BRA, highlighting the need for substantial improvements in infrastructure to meet the demands of a growing population.

Relevance

These guidelines provide a framework for constructing and maintaining access roads, managing stormwater, and addressing waste disposal, which are essential for the power plant's operational efficiency and environmental compliance. Proper road infrastructure will facilitate the transportation of construction materials and maintenance equipment, while effective drainage and sewage systems will mitigate flooding risks and environmental pollution. Aligning with these regulations will enhance the project's sustainability, minimize community disruptions, and support the broader infrastructural goals of the Benadir Region.

3.2.5. Benadir Administrative Region Urban Planning and Engineering Guidelines

The Benadir Regional Administration (BRA) governs urban planning and engineering in the Benadir Region through policies and by-laws designed to promote sustainable urban development and efficient land use. The Urban Planning and Engineering Department oversees land surveying, GIS mapping, and the implementation of spatial land use strategies, the formulation, review and implementation of the national spatial land use and management policy and strategies; the preparation and reviewing of the Regional Districts physical development plan; renewable energy generation; energy regulation and reticulation; electricity and gas reticulation, amongst others. More importantly, the department ensures that the infrastructure projects align with regional development goals and policies. These policies emphasize coordinated development to avoid land-use conflicts and support renewable energy initiatives, making them particularly relevant to the proposed hybrid power plant in Dayniile District. By aligning with BRA's urban planning frameworks, the project can ensure compliance with zoning regulations, minimize disruptions to local communities, and contribute to sustainable energy solutions that integrate with the region's broader urban and industrial development objectives.

Relevance

These guidelines provide a framework for land use planning, zoning, and the integration of infrastructure within the broader urban fabric, ensuring that developments align with regional growth objectives. For the hybrid power plant, adherence to these guidelines will help prevent land-use conflicts, ensure the project's compatibility with existing and future infrastructure, and minimize environmental and social impacts. By aligning with these standards, the project can support sustainable urban development while addressing the region's energy needs.

3.2.6. Benadir Administrative Region Health Management Guidelines

The Benadir Regional Administration (BRA) oversees health policies and regulations in the Benadir Region, focusing on formulating health policies, regulating health services, and managing national referral health facilities. The Health Directorate is responsible for implementing these policies, ensuring the provision of quality healthcare services to the population. The Directorate of Health performs three key functions namely: formulation of a health policy, health regulation and national referral Health facilities. The proposed hybrid power plant in Dayniile is pertinent to these health policies, as reliable electricity is essential for the operation of health facilities, including hospitals and clinics. Improved power supply can enhance healthcare delivery by ensuring consistent lighting, refrigeration for vaccines and medicines, and the operation of medical equipment, thereby supporting the BRA's objectives to improve health services and outcomes in the region.

Relevance

These guidelines emphasize the importance of managing environmental and health risks, promoting sanitation, and ensuring access to healthcare services in development projects. For the hybrid power plant, adherence to these guidelines is essential to mitigate potential health risks such as air quality impacts, noise pollution, and waste management during construction and operation. Additionally, the project can contribute positively by enhancing healthcare infrastructure through improved electricity reliability, supporting local health facilities, and aligning with regional health objectives to safeguard the well-being of workers and surrounding.

3.3. THE WORLD BANK ESS AND GUIDELINES

3.3.1. World Bank ESS and Relevance to the Project

The World Bank is implementing Environmental Social Frameworks (ESF) to promote green, resilient, and inclusive development. The ESF emphasizes environmental and human rights protections, labor, inclusion, gender, climate change, biodiversity, community health, and stakeholder involvement. It uses a risk-based approach, allowing for more monitoring and resources for complex projects. 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 referred to the latest environmental and social standards for new projects. 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.

ESS	Triggered?	Relevance
ESS4: Community Health and Safety	Yes	Predicated on the assumption that the proposed project and its associated activities such as power transmission, construction and the associated equipment and exposure to local community are expected to have potential hazards with impacts of different strengths on community health and safety. The proponent will be required to comply with all the provisions of ESS4
ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement	No	ESS5 ensures that any land acquisition or restrictions on land use for the solar plant are conducted in a manner that minimizes displacement and provides fair compensation and resettlement assistance to affected communities. By adhering to ESS5, the project proponents can mitigate social risks, ensure the equitable treatment of displaced persons, and align the project with international best practices for social sustainability. This helps in fostering community acceptance and reducing potential conflicts, thereby contributing to the overall success and long-term viability of the proposed solar PV project. However, this would only be possible once the transmission and access roads associated with the project are demarcated.
ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources	Yes	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, given its proximity—less than 7 km—from a critical habitat, the River Shebelle. ESS6 emphasizes the need to avoid or mitigate adverse impacts on biodiversity and critical habitats. Adhering to ESS6 helps ensure that the solar PV project contributes positively to environmental sustainability while meeting energy needs, and it supports compliance with global environmental standards, thereby enhancing the project's long-term feasibility and community support. For the power plant, compliance with ESS6 will involve developing strategies to minimize habitat disturbance, managing construction activities responsibly, and ensuring ongoing monitoring of ecological impacts. This alignment will safeguard biodiversity while meeting the energy needs of the region in an environmentally sustainable manner.
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

ESS	Triggered?	Relevance
		planning and preparation stages is integral to fostering a collaborative and inclusive project environment.

3.3.2. 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.

3.3.3. Comparison between the World Bank and FGS Legislations Relevant to the Project

The World Bank and the Federal Government of Somalia aim to ensure sustainable development through environmental and social governance in power energy projects. However, their frameworks differ in scope and enforcement mechanisms. The World Bank's Environmental and Social Framework (ESF) provides comprehensive guidelines, such as Environmental and Social Standard 1 (ESS1), which mandates detailed environmental and social assessments (ESIAs) to identify, evaluate, and mitigate risks. Somalia's environmental legislation is relatively nascent and focuses on national priorities under frameworks like the BRA Environmental Policy and Environmental Management Acts. The World Bank's standards often act as a complement, setting higher benchmarks and providing funding-linked compliance incentives. This comparison aims to identify gaps and propose recommendations.

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	<ul style="list-style-type: none"> The environmental law requires screening of project to determine level of environmental and social assessment to be done An ESIA is required once determination is done ESIA is needed once determination had been established and should be prepared identifying all environmental and social impacts and mitigation measures proposed to address the impacts 	<ul style="list-style-type: none"> Similar both require screening Similar-both require ESIA depending on the project impacts 	Screening has been done and the project is established as medium risk which requires and ESIA ESIA is prepared in line with ESIA regulations and refers to WB safeguard policies

World Bank ESFs	FRS laws	Comparison	Recommendation
<p>identifying all environmental and social impacts and mitigation measures proposed to address the impacts</p>			
<p>ESS5 Land Acquisition and Involuntary resettlement should be avoided wherever possible or minimized and exploring all alternatives</p>	<ul style="list-style-type: none"> • Somalia's transitional constitution emphasizes that Land shall be held, used and managed in an equitable, efficient, productive and sustainable manner. The Federal Government shall develop a national land policy, which shall be subject to constant review. That policy shall ensure: <ol style="list-style-type: none"> (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. 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). 	<ul style="list-style-type: none"> • Similar- displacement in projects should be avoided to the extent possible by exploring alternatives. 	<p>WB policy is more elaborate than the FRS Law.</p>
<p>ESS7 on indigenous people seeks to promote the inclusion of these group in development project and especially through consultation to ensure they also share in the project benefits and ensure negative impacts do not disproportionately fall on them</p>	<ul style="list-style-type: none"> • Article 11 of the Constitution regarding nondiscrimination and equality sets forth that ' All citizens, regardless of sex, religion, social or economic status, political opinion, clan, disability, occupation, birth or dialect shall have equal rights and duties before the law. Discrimination is deemed to occur if the effect of an action impairs or restricts a person's rights, even if the actor did not intend this effect. The State must not discriminate against any person on the basis of age, race, colour, tribe, ethnicity, culture, dialect, gender, birth, disability, religion, political 	<ul style="list-style-type: none"> • Similar-both seek to promote inclusion of these group so that they do can share the projects benefits and ensure that negative impacts of the project do not fall on them disproportionately • WB needs a social assessment to be conducted 	<p>WB policy more elaborate and the two are being used to compliment</p>

World Bank ESFs	FRS laws	Comparison	Recommendation
The policy requires these groups to be consulted separately to enhance their participation	<p>opinion, occupation, or wealth. All State programs, such as laws, or political and administrative actions that are designed to achieve full equality for individuals or groups who are disadvantaged, or who have suffered from discrimination in the past, shall be deemed to be not discriminatory'(Art. 11). It is also stated in Article 27 regarding economic and social rights that 'it shall be ensured that women, the aged, the disabled and minorities who have long suffered discrimination get the necessary support to realize their socio-economic rights'.</p> <ul style="list-style-type: none"> No provisions regarding indigenous rights. 		
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	<ul style="list-style-type: none"> Article 26 regarding the right to property states that every person has the right to own, use, enjoy, sell, and transfer property. The state may compulsorily acquire property only if doing so is in the public interest. Any person whose property has been acquired in the name of the public interest has the right to just compensation from the State as agreed by the parties or decided by a court. 	<ul style="list-style-type: none"> Both are similar 	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

Hybrid power plants, while promoting renewable energy and reducing emissions, can pose risks to local biodiversity. Compliance with the Convention on Biological Diversity (CBD) requires assessing and mitigating these impacts, ensuring sustainable energy development and habitat protection.

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

The primary objective of the Convention is to stabilize greenhouse gas concentrations "at a level that would prevent dangerous anthropogenic (human induced) interference with the climate system." Somalia submitted its new climate action plan (Intended Nationally Determined

Contribution) to the UNFCCC in 2015. Somalia has also developed the National Adaptation Program of Action on Climate Change (NAPA), which includes a climate risk assessment²¹.

Relevance

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

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

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

Relevance

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

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

This Convention aims to protect those species of wild animals that migrate across or outside national boundaries from becoming endangered. The Convention on the Conservation of Migratory Species of Wild Animals (CMS), ratified by Somalia in 1985, is highly relevant to the proposed hybrid power plant in Dayniile District, particularly due to its potential impacts on migratory species in the region. The CMS aims to conserve migratory species and their habitats across borders, promoting sustainable development while minimizing threats to these species. Given the proximity of the proposed power plant to critical River Shebelle, the project must ensure that it does not disrupt migratory routes or degrade habitats used by these species. Adherence to the CMS requires implementing mitigation measures to safeguard migratory species. This will ensure that the power plant development aligns with international conservation commitments while supporting regional biodiversity protection efforts.

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

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

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

The proposed hybrid power plant, despite generating clean energy, may involve pollution risks due to machinery use, hazardous substance transportation, and spills. The project will align with protocol by developing contingency plans and implementing best practices to minimize environmental risks, promoting regional cooperation and environmental stewardship.

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 Benadir Administrative Region 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

The project will follow ILO conventions ratified by Somalia, ensuring equal opportunities, non-discriminatory employment practices, workplace health and safety standards, and compliance with local and international practices. Contractors and suppliers will also have a human rights policy and standard employment terms for casual and temporary workers.

4.0. Analysis of Alternatives

4.1. OVERVIEW

This chapter discusses the numerous alternatives open to the project. The alternatives include the "no-go/do nothing" option, alternative construction materials and technology, alternative sites, and alternative energy sources uncovered throughout the ESIA process. Environmental assessment relies heavily on identifying and evaluating alternatives. It supplies decision-makers with knowledge that allows them to fully examine the best solutions to development plans. Alternatives demonstrate and contrast the environmental implications and repercussions of several approaches for achieving the same goal.

4.2. RELOCATION OPTION

The proposed project's site was selected based on a number of factors, including high solar irradiation levels, proximity to grid infrastructure, and land that is flat, stable, and free of environmental or legal conflicts. The proposed site is also aligned with energy demand centers in Mogadishu, and this would minimize transmission losses. Socioeconomic aspects, such as community acceptance and minimal impact on local livelihoods were crucial, alongside regulatory compliance and potential government incentives. Lastly, logistical ease, economic viability, and environmental sustainability would ensure the site's long-term success.

Relocation option to a different site is an option available before the project implementation. However, at present BECO 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 Mogadishu 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 for the planned project indicates that the status quo is preserved. This is the best option from an extreme environmental standpoint because it ensures no impact with existing conditions. This approach, however, will result in significant losses for both BECO and the growing number of customers in Mogadishu City and the neighbouring areas. The target majority of consumers will lack access to a clean and stable electrical supply, and the FGS's goals of providing dependable, clean, and affordable electricity to stimulate economic growth, investment possibilities, and improved public services may not be realised. 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 BRA 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 BECO to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to Mogadishu City and surrounding areas.

4.4. ALTERNATIVE SOURCES OF ENERGY

4.4.1. Thermal Power Generation

Improving and expanding current thermal power by installing more diesel gensets is one possibility for providing power to Mogadishu and the neighbouring territories. However, this would necessitate the use of more diesel; now, around 250-300 litres of Industrial Diesel Oil (IDO) are burned everyday to create the targeted 50kWp of energy at BECO electricity producing plants. Thermal power generation has significant negative environmental consequences, including increased greenhouse gas emissions. This strategy will contradict the FRS goals for attaining 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 Benadir Administrative Region. Wind energy is more variable and unpredictable because wind speeds tend to fluctuate significantly within short time frames, leading to inconsistent power generation^{23,24,25,26}. Wind turbines can have a greater visual and noise impact on the landscape, leading to community resistance, particularly in populated areas. They can also pose risks to wildlife, especially birds and bats. Wind turbines generally have higher initial capital costs due to the complexity of the technology and the need for substantial infrastructure, such as tall towers and foundations, and require regular maintenance, particularly in harsh environments, to ensure reliable operation^{27,28,29}. Wind power generation often requires more sophisticated grid management due to its variability and the potential need for energy storage or backup systems

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

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

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

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

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

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

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

to ensure a stable power supply. Finally, wind farms require large tracts of land, which can lead to land use conflicts.

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

Many solid wastes will be generated from the proposed project. An integrated solid waste management system is recommendable. First, the proponent (BECO) 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 BECO will need to establish partnership with waste handlers in Mogadishu 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 contrasted the present power plant location in Jabad Geele for a new hybrid power infrastructure to a new site about 5 kilometres away that provides ample space for expansion. The current location would reduce relocation costs and capitalise on existing infrastructure, but space limits may limit future growth and operating efficiency. The new site provides an optimised layout and future scalability, although it may incur greater expenditures and higher transmission losses. The transmission line was chosen based on variables such as distance, cost, grid stability, capacity requirements, terrain, geographical limits, and technological complexity. For dependable and predictable energy supply, a hybrid energy system was preferred over a pure solar power plant. The BESS maximises renewable energy utilisation while maintaining grid stability and dependability by utilising existing infrastructure.

Conclusion

A hybrid power plant was located approximately 9km from the existing BECO Dayniile Hybrid Power Plant was selected for consideration. It is therefore imperative for BECO to establish a new Hybrid Power Plant at the proposed site and supply clean and affordable electricity to Mogadishu 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 BECO Dayniile Hybrid Power Plant (2°09'22.3"N, 45°11'5.82"E) shall be located in the north-western part of Benadir Administration Region within Dayniile District; neighboring Lower Shabelle. The project site is in an open area with sparse settlements in the immediate vicinity with 103ha piece of land acquired by BECO for the project.

5.2. ENVIRONMENTAL SETTING

5.2.1. Climatic Information

5.2.1.1. Rainfall

The climate in the Benadir Administrative Region is tropical arid to dry and sub-humid, and is influenced by the north-easterly and south-easterly air flows of the Intertropical Convergence Zone (ITCZ) over the Ethiopian highlands³⁰. North-easterly and south-easterly air masses meet in the Intertropical Front (ITF) and raise air upwards to produce rain. The annual movements of the ITCZ from north to south across Africa and back again, give rise to four different seasons in the State like rest of Somalia, comprising two distinguishable rainy seasons alternating with two marked dry seasons³¹, as follows:

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

Rainfall in the region is erratic, with a bimodal pattern except in the northern riverine areas close to the coast where some showers may occur even during the Xagaa. Peak rainfall months are centred around Gu season, March to June (MAMJ) and Deyr Season, September to December (SOND). Rainfall amounts and intensity in BRA is generally 200mm – 300mm annually. However, some parts of Ceel D Heer receive between 300mm - 400mm of rainfall annually. Intense, short rainstorms characterize rainfall. 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 Benadir Administrative Region 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).

5.2.1.1. Temperature

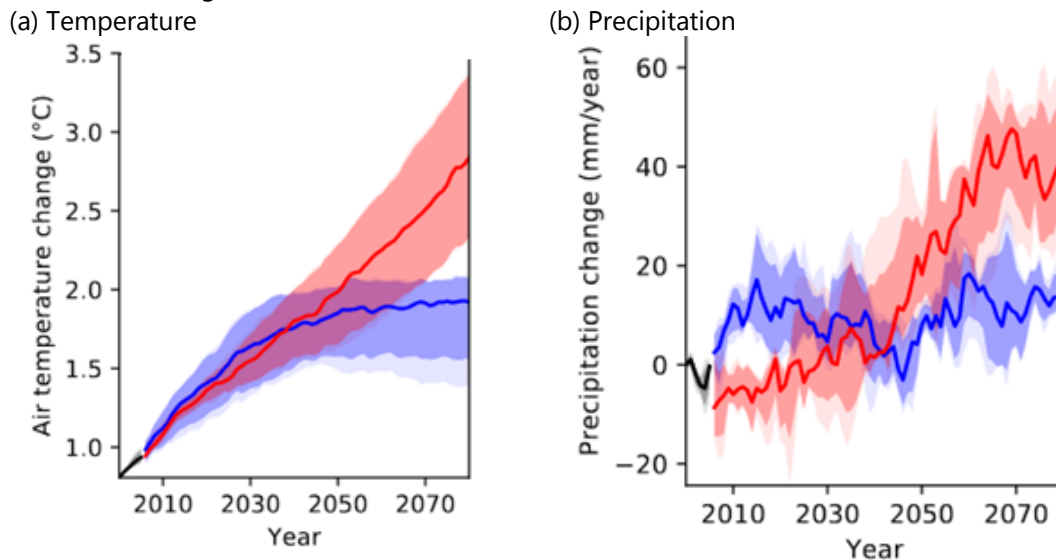
The climatic conditions of Dayniile District (Benadir Administrative Region) in Somalia are influenced by its geographic location and topography, resulting in a semi-arid to arid climate. BRA experiences high temperatures throughout much of the year. The hottest months are

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

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

typically from May to September, with temperatures often exceeding 35°C during the day³². Cooler temperatures are observed from December to February, but even then, daytime temperatures can still be warm. As a result of increasing greenhouse gas (GHG) concentrations, air temperature over much of Somalia, including Benadir Administrative Region is very likely to rise by 1.4 to 3.4°C by 2070 relative to the year 1876, depending on the future GHG emissions scenario³³ (Figure 5-1a).

Figure 5-1: The projected temperature and precipitation in Somalia, including the Benadir Administrative Region



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

5.2.1.2. Air Quality

Air pollution is on the rise majorly because of the encroachment on the environment and from the different dangerous GHG emissions released by the different industries around Benadir Region, especially Mogadishu³⁴. Overall, the environmental management in Benadir Region is not to the best standards, and has over the years been neglected leading to increased levels of air pollution and negative climate change in the country³⁵. The prevailing environmental health situation in the Region that is associated with high levels of household air pollution is linked to absence of a very strong government to enforce or implement different legislations aimed at managing air pollution in the city. In Daynile District (Figure 5-2), air pollution is not a major issue of concern, especially about PM2.5 and PM10.

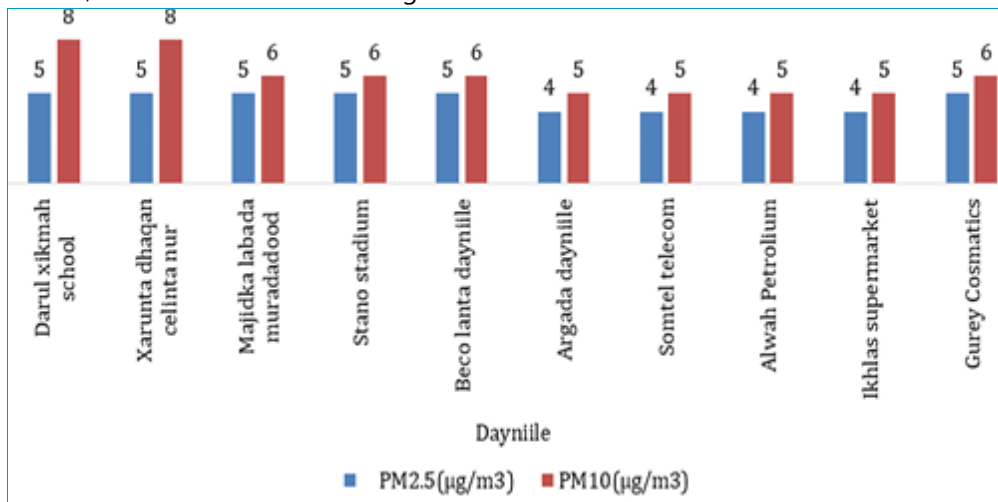
³² International Institute of Tropical Agriculture, "Agroecological Zones," 2024. [Online]. Available: <https://csi.maps.arcgis.com/apps/MapSeries/index.html?appid=7539d22ab46147ce9888589aea4b1a11>. [Accessed May, 30 2024].

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

³⁴ Abdulshakur, A.D, Mohamed M.G., Abdisalam A.A. & Nur R.A. (2022). Monitoring and Evaluation of Air Quality: A Case Study of Mogadishu, Somalia. International Journal of Research and Innovation in Applied Science (IJRIAS) Volume VII, Issue IX, 31-35.

³⁵ Gatari, M. J. (2019). First WHO Global Conference on Air Pollution and Health: A Brief Report. Clean Air Journal, 29(1), 77.

Figure 5-2: Air quality status (PM 2.5 and PM10) sampled from different locations within Dayniile District, Benadir Administrative Region



Source: Abdulshakur et al. 2022. Monitoring and Evaluation of Air Quality: A Case Study of Mogadishu, Somalia. International Journal of Research and Innovation in Applied Science (IJRIAS) Volume VII, Issue IX, 31-35.

5.2.1.3. Topography and Features

The topography of Dayniile District is primarily flat, with the altitude at the power plant standing at approximately 90 meters above sea level, gently sloping towards the south. Large expanses of flat or gently rolling plains characterize much of the District. These plains are often arid or semi-arid, supporting sparse vegetation such as thorny shrubs and grasslands. Plains are important for pastoralism and irrigation agricultural activities using mainly the water from the River Shebelle. Additionally, the area experiences erosion caused by both wind and runoff. The geology and soils in and around the proposed BECO Dayniile Hybrid Power Plant like in the entire Dayniile District of Somalia are diverse and dynamic, reflecting the complex geological history and environmental conditions of the area. The geology comprises of sand dunes and beach deposit. The major soil types characterizing the District include sandy, clayey, alluvial and volcanic soils known for coastline areas of eastern Africa, especially in areas with low vegetation cover, sandy soils are well-draining but often low in fertility and organic matter.

5.2.1.4. Geology and Soils

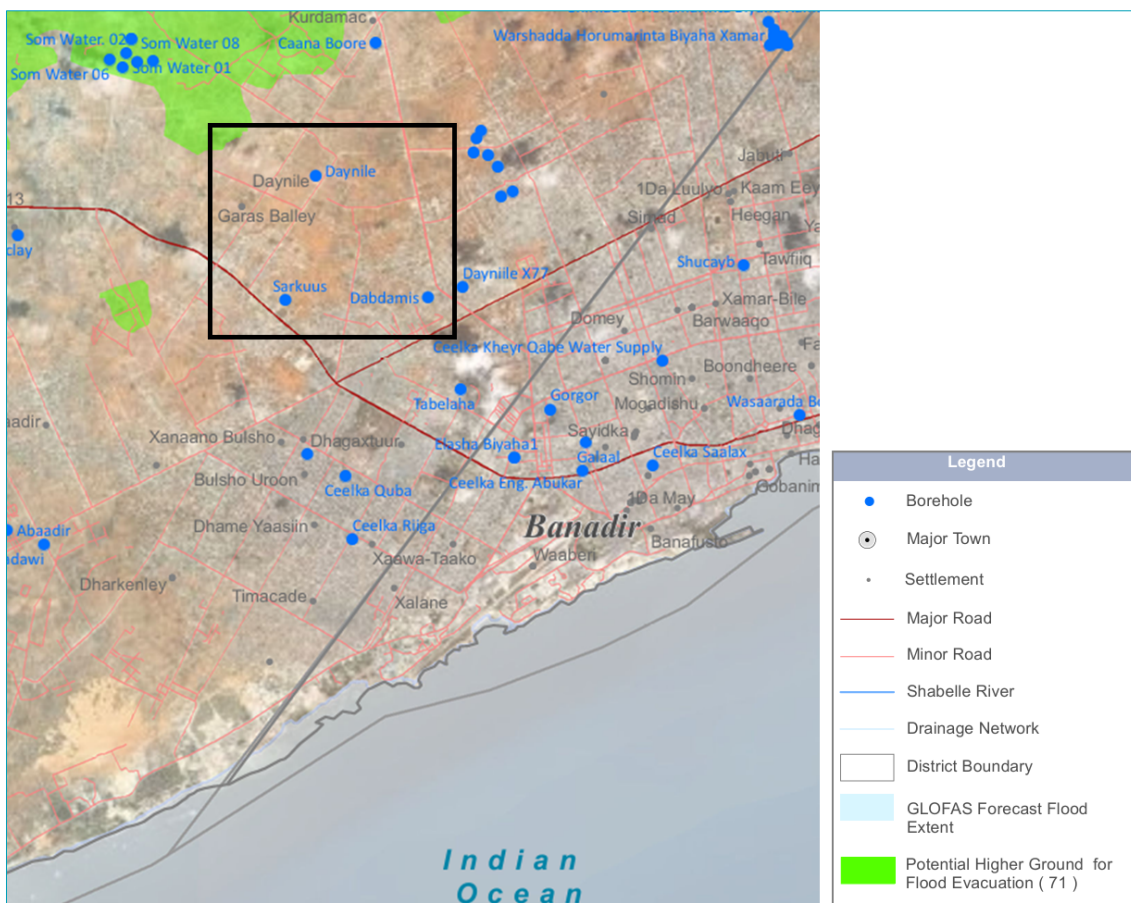
The Benadir Region of Somalia, including Dayniile District, is characterized by sedimentary formations, particularly limestone, which is primarily of coral origin. This limestone forms a significant portion of the coastal terrain and reflects the region's marine sedimentary history. The limestone formations are porous and permeable, contributing to groundwater storage but also making the region susceptible to karst processes like sinkhole formation. The soils in the Benadir Region are predominantly sandy, low in fertility, but suitable for specific types of agriculture when irrigation is provided. However, the region's arid climate and sparse vegetation cover contribute to soil erosion and limits natural soil development. Despite these constraints, the soils support urban settlements and limited agricultural activities where water resources are accessible.

5.2.1.5. Water Resources and Hydrology

The Benadir Region of Somalia, including Dayniile District, relies on limited and variable water resources due to its arid to semi-arid climate and low annual rainfall, which averages 400-500 mm per year. River Webi Shebelle, one of Somalia's perennial rivers, runs through the area approximately, 5 kilometres to the north of the proposed BECO Dayniile Hybrid Power Plant site. The primary sources of water are shallow groundwater aquifers, replenished mainly by seasonal rainfall and influenced by the permeability of the region's underlying limestone geology. These

aquifers are highly vulnerable to over-extraction, salinization, and contamination, particularly in coastal areas where seawater intrusion is a growing concern. Surface water is virtually absent in the region, with no permanent rivers or lakes; however, temporary streams and runoff during the rainy season provide short-lived water resources. Hydrologically, the Dayniile District depends heavily on rainwater harvesting and wells for domestic and agricultural needs, as no major perennial rivers flow through the area (Figure 5-3). The Shabelle River, located further inland, is a critical water source, especially for irrigation agriculture, livestock and even domestic uses. Urban expansion and increased water demand in Benadir Region have strained existing resources, with limited infrastructure for water supply and sanitation exacerbating challenges. Efforts to manage water resources sustainably are essential to address the risks of water scarcity, pollution, and the impacts of climate change, which further threaten the region’s fragile hydrological balance.

Figure 5-3: Overview of water resources and hydrology of Dayniile District, Benadir Administrative Region



Modified from: SOM_WATER_AFGOOYE_EVACUATION_SITES_SWALIM_02102023_A3. The Somalia Water and Land Information Management Project (SWALIM).

5.2.2. Biophysical Environment

5.2.2.1. Flora and fauna

The proposed project site for BECO Dayniile Hybrid Power Plant is not particularly rich in biodiversity. However, due to the proposed site being near the River Shebelle (approximately 5km to the north-west). The riparian ecosystem sustains native plant species such as *Acacia nilotica*, *Tamarindus indica*, and various shrubs that form essential habitats for wildlife. Bird

species, including migratory waterfowl and other terrestrial birds potentially thrive along the riverbanks, while the surrounding grasslands and scrublands could serve as grazing lands and migration corridors for terrestrial species such as small mammals and reptiles. This biodiversity highlights the ecological significance of the district and its reliance on the health of the River Shebelle ecosystem. The proposed hybrid power plant to be situated approximately 5km from River Shebelle has the potential to trigger the World Bank's Environmental and Social Standard 6 (ESS6), which emphasizes biodiversity conservation and the sustainable management of living natural resources. ESS6 identifies critical habitats as areas requiring heightened protection due to their importance for endangered or endemic species and ecosystem services. The project's proximity to the River Shebelle raises concerns about potential impacts such as habitat degradation, pollution, or water resource depletion, which could disrupt the ecological balance. Construction activities could fragment habitats, alter hydrological patterns, and introduce pollutants into the river system, affecting both terrestrial and aquatic species. To comply with ESS6, the project must conduct a thorough biodiversity assessment and implement mitigation measures, including buffer zones, habitat restoration, and ongoing ecological monitoring, to prevent adverse effects and ensure sustainable coexistence with the district's biodiversity.

5.2.2.2. Vulnerability to Climate Change

Most of the Benadir Region, including Daynile District 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 Benadir Administrative Region. Each year, by the 2030s, the region could experience between 4 and 30 days of temperatures exceeding this threshold, predominantly during February-April^{36,37}.

5.2.2.3. Waste Management

Waste management in BRA, Somalia, is characterized by informal and underdeveloped systems, reflecting broader challenges in infrastructure and governance. While some pilot initiatives have explored sustainable approaches towards solid waste management, most are characterized by informal dumpsites, and the absence of sustainable solid waste collection systems and facilities. Generally, the BRA has limited human and technical capacity and skills to carry out sustainable and systematic solid waste collection and management. 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. Addressing these challenges requires improved infrastructure, policy enforcement, and community engagement. Private companies are involved in waste collection and disposal but contracts with the authorities are often of short duration, hindering larger investments in technical

³⁶Gutiérrez, 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/>.

³⁷World Bank. (2024). Health and Climate Change. <https://www.worldbank.org/en/topic/health/brief/health-and-climate-change>

equipment. Overall, waste, drainage, and sewage systems in the BRA while some businesses have made private waste collection agreements with companies at a fee³⁸. While the BRA is tasked with collection and disposal of waste from the city, the Ministry of Natural Resources oversees dumping sites. Only two official dumping sites are known in the BRA: Qashinweyne in Karan and Kaawo in Madina³⁹. The provision of waste management services in the BRA follows the pattern of a stratified organization of the society in the BRA, where wealth and social status are key determinants of access to waste disposal. Private companies charge up to USD 7 for collection and disposal of waste – a fee much above the reach of the urban poor and displaced communities, corresponding to roughly a month's rent⁴⁰.

5.2.2.4. Water Scarcity and Flood Risk

Dayniile District in the Benadir Region of Somalia faces a dual challenge of water scarcity and flood risks, reflecting the region's vulnerability to climate variability. The district experiences a predominantly arid to semi-arid climate, characterized by erratic and insufficient rainfall, which significantly affects water availability for both domestic and agricultural use. Groundwater resources, often accessed through shallow wells, are limited and prone to over-extraction, exacerbating water scarcity during prolonged dry spells. Additionally, the River Shebelle, located approximately 5 kilometers from the district, serves as a vital water source. However, its flow is seasonal and heavily reliant on upstream rainfall, further compounding the uncertainty of water availability for Dayniile's residents. Paradoxically, despite its water scarcity, Dayniile District is also susceptible to flood risks, particularly during the Gu (April to June) and Deyr (October to December) rainy seasons. Heavy rainfall in the Ethiopian highlands, which feed the River Shebelle, can lead to riverine flooding that inundates low-lying areas. Such floods disrupt livelihoods, damage infrastructure, and heighten the risk of waterborne diseases due to contamination of drinking water sources. The district's lack of adequate flood management infrastructure, combined with poor drainage systems, exacerbates the impact of these events. This complex interplay between water scarcity and flood risks necessitates integrated water resource management approaches that address both the need for sustainable water access and flood resilience in Dayniile District.

5.2.2.5. Agricultural Land Soil Contamination

Dayniile District relies heavily on small-scale agriculture, primarily focusing on subsistence farming. Farmers cultivate crops like maize, sorghum, and vegetables, relying on fertile alluvial soils. Livestock rearing, particularly goats and cattle, supports local livelihoods. However, challenges like erratic rainfall, limited irrigation infrastructure, and overgrazing reduce productivity over time. The region's reliance on rain-fed farming and lack of access to modern farming techniques further limit agricultural activities. Soil contamination, caused by untreated industrial and household waste, introduces harmful substances like heavy metals, chemicals, and plastics into the soil. Improper disposal of agricultural inputs, such as pesticides and herbicides, further exacerbates soil degradation. Contaminated soils can reduce crop yields, pose health risks to humans and livestock, and disrupt local ecosystems. The proximity of agricultural areas to settlements and potential industrial activities heightens the risk of soil contamination. Addressing these issues requires integrated soil management practices, improved waste disposal systems, and monitoring programs to ensure long-term sustainability.

³⁸World Bank, Somalia Urbanization Review (2021:88)

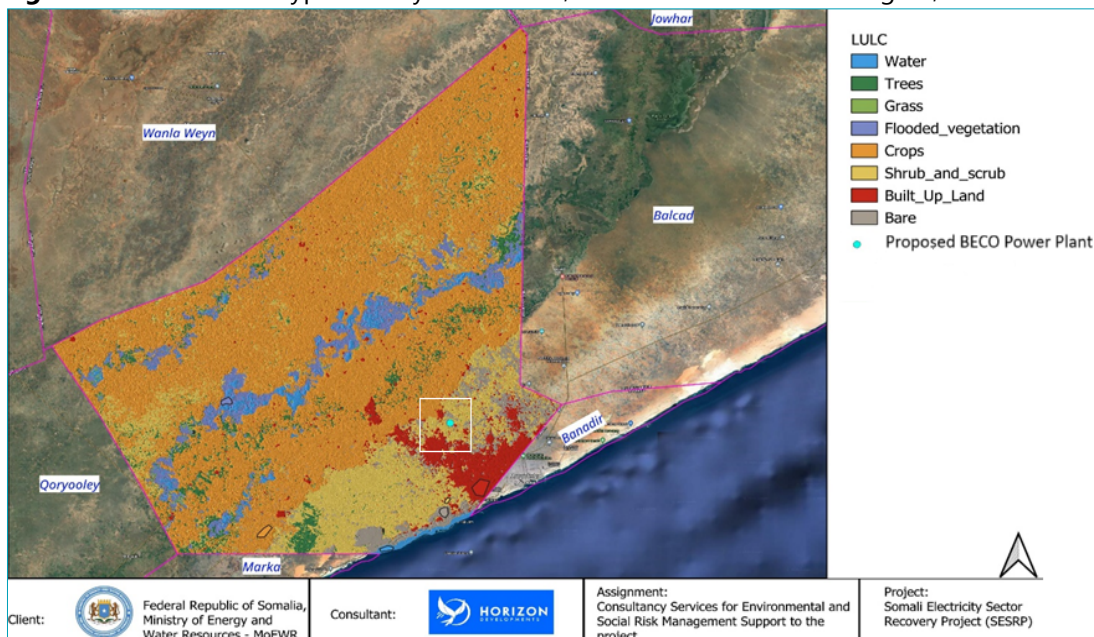
³⁹Abdikadir Ahmed Omar, Md. Sahadat Hossain and Mst. Mahmuda Parvin (2018:22-26) Study on Knowledge, Attitude and Practices towards the Solid Waste Management in Karan District, Mogadishu Somalia.

⁴⁰Tana and IIED, Shelter Provision in Mogadishu: Understanding Politics for a More Inclusive City (2019:29)

5.2.2.6. Land Use and Land Cover Characterization

Diverse land use and land cover, reflecting socio-economic activities and ecological characteristics (Figure 5-4), characterizes Land use and land cover in Dayniile District in Somalia. The district is primarily arid and semi-arid, with agricultural land used for subsistence farming near the River Shebelle. Rural landscapes are dominated by pastoralism, with open grasslands used for livestock grazing. Urban and peri-urban areas have seen significant growth, often encroaching on traditional grazing and agricultural lands. Land cover is undergoing significant changes due to population growth, urbanization, and environmental pressures. Overgrazing and unsustainable farming practices have led to soil erosion. Urban expansion and informal settlements have converted natural and agricultural land into built-up areas, reducing green spaces and altering the hydrological balance. Effective land use planning and management strategies are crucial for sustainable development.

Figure 5-4: Land cover types in Dayniile District, Benadir Administrative Region, Somalia



5.2.2.7. Protected Areas and Sensitive Habitats

Dayniile District does not contain officially designated protected areas. However, the proximity to the River Shebelle, located approximately 5 kilometers from the proposed BECO Dayniile Hybrid Power Plant site, highlights the presence of a potentially sensitive habitats. The river and its surrounding riparian zones possibly support a diverse range of flora and fauna, which rely on the habitat for ecological functions. Additionally the river offers ecosystems services to the residents. This riparian ecosystem is critical for maintaining biodiversity and providing essential ecological services such as water purification and flood regulation. Given the ecological significance of the River Shebelle, any nearby development, such as the proposed power plant, must carefully consider potential impacts to this sensitive habitat to prevent degradation and ensure the preservation of biodiversity in the area.

5.2.2.8. Environmental Management Challenges

Like all other regions in Somalia, the Dayniile District of Benadir Administrative Region experiences environmental management challenges. The region faces numerous environmental challenges that are exacerbated by rapid urbanization, climate change, and limited environmental management infrastructure. One of the most significant challenges is water scarcity. Over-reliance

on the River Shebelle for water supply, along with the depletion of groundwater resources, has led to increased competition for water, affecting both domestic use and agriculture. Additionally, the lack of adequate waste management systems has resulted in widespread pollution, including the contamination of water resources and soil, which further threatens public health and the environment. The district is also vulnerable to soil erosion and desertification, particularly in rural areas, due to overgrazing, and unsustainable agricultural practices. These land degradation processes are intensified by the increasing frequency of droughts and floods, which disrupt both agriculture and livelihoods. Urban expansion has led to the conversion of otherwise natural habitats and agricultural land into built-up areas, further reducing green spaces and increasing the risk of flooding during heavy rains due to inadequate drainage systems. These environmental challenges, coupled with limited capacity for environmental governance, require urgent attention to implement sustainable practices and infrastructure that can help mitigate the impacts of climate change and improve the quality of life for residents in Dayniile District.

5.3. SOCIO-ECONOMIC SETTING

5.3.1. Overview

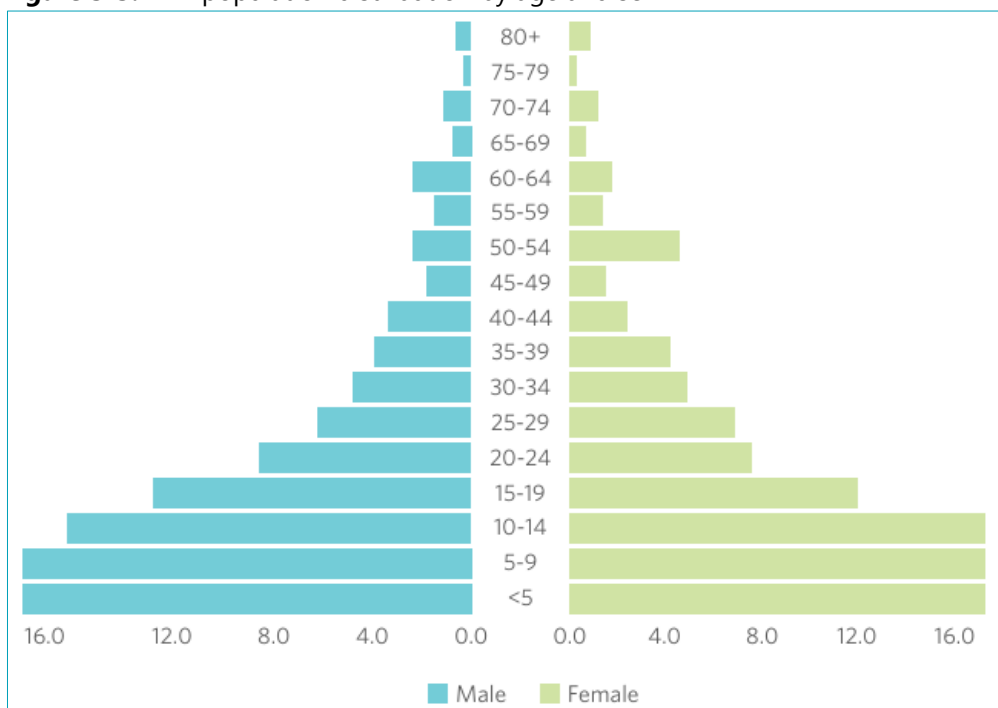
Benadir Region, encompassing the capital city Mogadishu, is the economic and administrative hub of Somalia, with a diverse socioeconomic landscape shaped by rapid urbanization, trade, and services. Dayniile District, located within Benadir, is primarily a residential and peri-urban area, with its population engaged in a mix of activities, including subsistence farming, livestock rearing, and small-scale trade. While agriculture is important, the district faces challenges due to water scarcity, land degradation, and limited infrastructure. Many households rely on informal economies, and the district is also impacted by the larger economic dynamics of Mogadishu, which is a center for commerce, remittances, and international aid. The population in Dayniile, like much of Benadir, is highly dependent on remittances from the Somali diaspora abroad, which plays a crucial role in sustaining local livelihoods. Despite these challenges, Dayniile is seeing gradual urban growth, with expanding commercial areas and basic services, contributing to its socio-economic development, though significant gaps in infrastructure and employment opportunities remain.

5.3.2. Population

Benadir Administrative Region, including Dayniile District has a total estimated population of 3,171,391 people⁴¹. In Dayniile District, the population is dynamic and diverse area with a rapidly growing population due to urbanization and migration from rural areas. The population is predominantly composed of ethnic Somali clans, with a mix of pastoralists, small-scale farmers, traders, and laborers. This part of the BRA has seen a rise in informal settlements. Sixty-four percent of Benadir's population is below 20 years of age and 78 percent are below the age of 30. Youth between 15-29 years of age constitute 26 percent of household members, while older people (65 years and above) constitute only 3 percent of the household members (Figure 5-5).

⁴¹<https://fsnau.org/downloads/Somalia-2024-Post-Gu-Acute-Food-Insecurity-Rural-Urban-and-IDP-Population-Stressed-Crisis-and-Emergency-%28Projection-Oct-Dec-2024%29.pdf>

Figure 5-5: BRA population distribution by age and sex



Source: Somalia National Bureau of Statistics (Formerly Directorate of National Statistics, Federal Government of Somalia), Benadir Regional Report 2020, Somali Health and Demographic Survey (SHDS)

5.3.3. Gender-based Violence

Gender-based violence (GBV) in Benadir Region, remains a significant and pervasive issue, exacerbated by ongoing conflict, displacement, and socio-cultural factors. Women and girls are particularly vulnerable to various forms of violence, including domestic abuse, sexual violence, and harmful traditional practices such as female genital mutilation (FGM). The breakdown of social structures due to prolonged conflict has led to the erosion of protective mechanisms for women, while gender inequalities and poverty further exacerbate the risk of violence. Displacement caused by insecurity has placed many women and children in vulnerable living conditions, often in overcrowded settlements with limited access to legal support or healthcare.

Despite progress in women's political representation in the FRS, 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. Table 5-1 presents women (15-49 years of age) who had experienced physical violence since the age of 12 and those that reported they experienced physical violence in the 12 months preceding the survey. It shows that 15 percent of women aged 15-49 in BRA, have experienced physical violence since the age of 12, while 8 percent reported experienced physical violence often or sometimes in the 12 months preceding the survey.

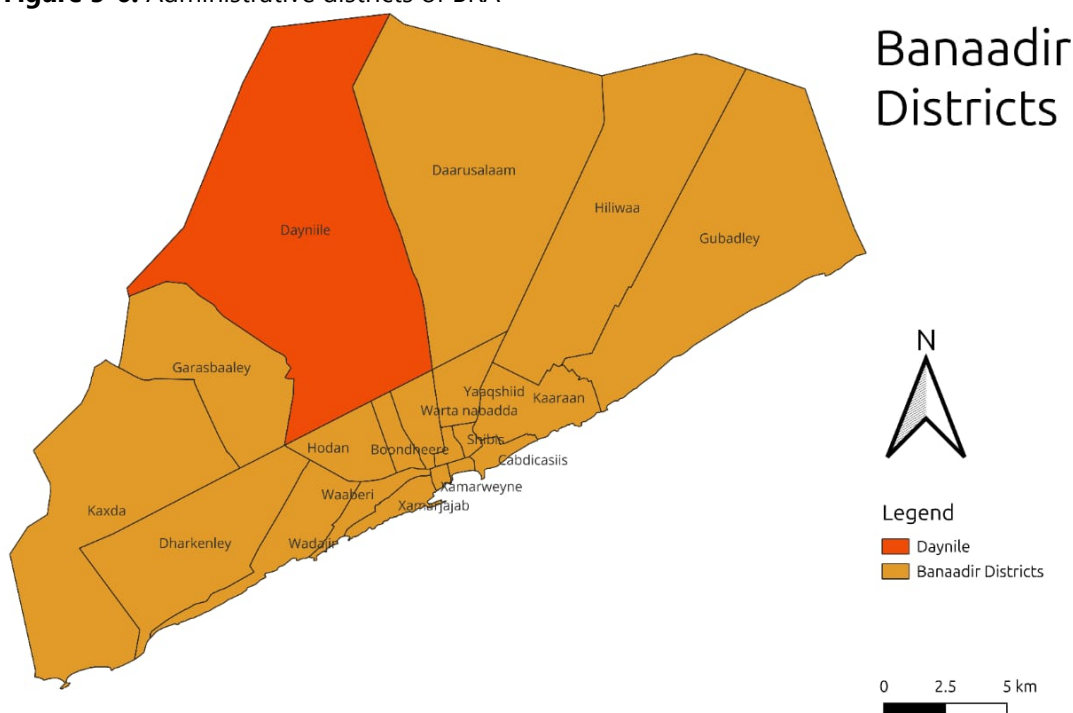
Table 5-1: Percentage of women aged 15-49 years who have experienced physical violence since the age of 12 in the BRA

Background characteristic	Percentage who have ever experienced physical violence since age 12	Often	Sometimes	often or sometimes	Total number of Women
Age					
15-19	14.4	4.9	3.5	8.4	651
20-24	15.2	4.0	4.4	8.4	429
25-29	15.7	4.4	3.6	8.0	413
30-34	14.5	1.7	5.3	6.9	303
35-39	15.9	1.7	6.4	8.2	233
40-44	14.3	2.1	4.3	6.4	140
45-49	17.4	1.2	3.5	4.7	86
Current marital status					
Never-married	3.5	1.2	0.8	2.1	641
Married	9.7	2.0	3.0	4.9	1,313
Divorced	1.5	0.3	0.4	0.6	234
Widowed	0.4	0.1	0.1	0.2	67
Education					
No Education	16.3	3.5	4.8	8.3	1,473
Primary	16.5	4.3	4.3	8.6	303
Secondary	11.5	3.8	2.9	6.7	312
Higher	8.4	1.8	3.0	4.8	167
Wealth quintile					
Lowest	26.8	6.4	8.6	15.0	220
Second	11.0	2.2	3.6	5.8	417
Middle	15.4	3.8	3.8	7.5	637
Fourth	13.0	3.0	3.0	5.9	539
Highest	15.2	3.8	5.2	9.0	442
Total	15.1	3.5	4.3	7.8	2,255

5.3.4. Administration and Ethnic Groups

BRA comprises the 17 administrative districts of the capital Mogadishu, which make it, by far, the most populated administrative region in Somalia. The seventeen (17) districts include: Cabducasiis; Daarusalaam; Dayniile; Dharkenley; Garasbaaley; Gubadley; Haliwaa; Hodan; Kaaraan; Kaxda; Shibis; Waaberi; Wadajir; Warta Nabadda; Xamarjajab; Xamarweyne; and Yaaqshiid. In terms of sizes, Dayniile, Daarusalaam, Haliwaa, Gubadley, Garasbaaley, Kaxda and Dharkenley are the largest districts while Xamarweyne is the smallest (Figure 5-6). The dominant clan family is the Hawiye, with several sub-clans. Other Somali clans also reside in the city, although with the 'status of guests and limited rights', and several mixed neighbourhoods exist. The Darood clan family – which dominates over some neighbourhoods - and minorities such as Dir, Digil-Mirifle, Yibr (Sab) and Sheikhal, for example, are present. The significant number of IDPs has contributed to the heterogenic ethnic make-up of the city.

Figure 5-6: Administrative districts of BRA



5.3.5. Economy and Poverty

5.3.5.1. Local Economy

Trade, services, and informal sectors, with agriculture and livestock also playing a significant role, primarily drive the local economy of Benadir Region, with a special focus on Dayniile District. Dayniile, a largely residential and peri-urban area, is influenced by its proximity to Mogadishu, the capital and commercial hub of Somalia. The district's economy is characterized by small-scale farming, particularly subsistence crops like maize and sorghum, alongside livestock rearing, which are vital for local livelihoods. Trade and small businesses, including retail shops and local markets, contribute to the district's economic activity, serving the daily needs of the growing population. Additionally, remittances from the Somali diaspora provide a significant source of income for many households, supporting consumption and investments in education and healthcare. While urbanization is on the rise, infrastructure challenges, limited industrialization, and the impact of environmental factors such as water scarcity and land degradation continue to affect economic development in Dayniile. Despite these obstacles, the district benefits from its proximity to Mogadishu, offering opportunities for economic growth through informal trade and services.

5.3.5.2. Poverty and Social Services

Poverty remains a significant challenge in Benadir Region, including Dayniile District, where many households face limited access to basic services and economic opportunities. The district, like much of Somalia, struggles with high unemployment rates, especially among youth, and a heavy reliance on informal economies such as small-scale agriculture, livestock, and trade. Many residents live in poverty, with inadequate access to clean water, sanitation, healthcare, and education. Dayniile's rapid urbanization, compounded by population growth and displacement, has stretched existing social services, leaving a gap in essential infrastructure and public service delivery. Although there have been efforts from local and international organizations to improve conditions, including initiatives for healthcare and education, these services remain insufficient to meet the needs of the population. Vulnerable groups, such as women and children, are

disproportionately affected by poverty and lack of social support, making the need for improved public services and poverty alleviation measures in Dayniile particularly urgent.

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

The productive sector in Dayniile District is characterized by a mix of agriculture, livestock, and commerce, though it is shaped by both opportunities and challenges. Agriculture in Dayniile is primarily subsistence-based, with small-scale farmers cultivating crops such as maize, sorghum, and vegetables, often reliant on water from the nearby River Shebelle for irrigation. Livestock farming, especially goats and cattle, is also a key component of the district's economy, providing income and food security for many families. In addition, trade and commerce are increasingly important, driven by the district's proximity to Mogadishu, Somalia's economic hub. Dayniile is home to small retail shops, local markets, and businesses that cater to the needs of its growing population, often engaging in informal trade. Despite these productive activities, the sector faces challenges such as limited infrastructure, water scarcity, and soil degradation, which affect agricultural productivity. However, the district's location within the broader economic dynamics of Benadir Region provides opportunities for growth, especially through trade and services linked to the capital.

5.3.5.4. Health Sector

The health sector of the Benadir region faces significant challenges due to limited infrastructure, and inadequate healthcare facilities. Generally, the healthcare system in the region is underdeveloped, with a shortage of medical professionals and essential resources, resulting in limited access to quality healthcare services for the population. Dayniile District, located in the outskirts of Mogadishu, experiences similar difficulties. The district's healthcare infrastructure is insufficient to meet the needs of its growing population, with only a few health centers offering basic services such as maternal and child health, immunization, and emergency care. Furthermore, the high burden of communicable diseases like malaria, tuberculosis, and cholera, places additional strain on the already overwhelmed healthcare system of the district. However, the health sector in BRA 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 provided by numerous NGOs with funding from various sources have been on the rise. The revised Essential Package of Health Services (EPHS) by the FGS and BRA 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.

5.3.5.5. Road Transport Sector

The road transportation sector in the Benadir region is vital for economic activity and connectivity but faces numerous challenges. The road transportation in the region is characterized by public transportation as the main method of mobility. Intra-city travel (in Mogadishu) is comprised of mainly minibuses, three-wheelers, taxis, among others. The common preferred type is the 14-seater minibuses (locally known as BL) that mostly operate on fixed routes. These minibuses are popularly considered a convenient, affordable, and accessible option. Also preferred are the Bajaj intracity three wheelers, which are available on customer demand and have a wider coverage than the minibuses as they can navigate neighbourhoods with bad road infrastructure. Public transport is dominated by the private sector, in both formal and informal measure. It is essentially self-regulated as private transport associations, cooperatives, and companies, oversee provision and

management of the service. There is no government-run or government-subsidised public transportation system. The Federal government's priority is directed towards aspects such as investments and maintenance, where investment is predominantly directed towards development and rehabilitation of road infrastructure.

The BRA region's road network suffers from poor maintenance, limited infrastructure, and the impact of prolonged conflict, resulting in uneven access to transportation and high travel costs. In Dayniile District, located on the periphery of Mogadishu, road infrastructure is particularly underdeveloped, with unpaved and deteriorated roads dominating the area. This limits mobility for residents, affects trade, and hampers access to essential services like healthcare and education. Seasonal rains exacerbate the situation, often rendering roads impassable and isolating parts of the district. Despite these challenges, ongoing reconstruction efforts in Mogadishu and its surroundings provide an opportunity to extend improvements to Dayniile, ensuring better integration into the regional transportation network and fostering socio-economic development.

5.3.5.6. Housing Sector

The housing sector in the BRA ranges from makeshift shelters in informal settlements to modern urban developments, with significant disparities in quality and access. Dayniile District, located on the outskirts of Mogadishu, has seen an influx of internally displaced persons (IDPs) seeking refuge from conflict and natural disasters, resulting in the proliferation of informal settlements. Many residents in Dayniile live in overcrowded and poorly constructed housing, lacking access to basic utilities such as clean water, sanitation, and electricity. Meanwhile, limited urban planning and weak enforcement of land use regulations have led to unorganized and unsafe residential areas. While efforts by humanitarian organizations have provided some support, sustainable housing solutions and improved infrastructure remain critical to addressing the growing needs of Dayniile's population.

5.3.5.7. Information, Communication and Technology

The ICT sector in the BRA has witnessed remarkable growth over the past decade, driven by private sector innovation and the increasing demand for connectivity in a recovering economy. Mobile telecommunications, internet services, and digital platforms have become integral to commerce, education, and social interaction. However, the development of ICT infrastructure in peripheral areas such as Dayniile District remains limited. While residents have access to mobile networks and basic internet services, coverage can be unreliable, and affordability poses a challenge for many households. The lack of ICT facilities, such as computer labs in schools or public access centers, further hinders digital literacy and innovation in the district. Despite these challenges, the district holds potential for ICT expansion, with increasing interest from private investors and the growing recognition of technology as a catalyst for social and economic development. Addressing infrastructure gaps and promoting digital inclusion in Dayniile could significantly enhance opportunities for its residents.

5.3.5.8. Education

A mix of progress and persistent challenges marks the education sector in the BRA. At large, the Benadir region is served by a combination of formal and informal education systems. Within the formal, there are two education systems which determine the type of education delivered; the 8-4 system⁴², which is formalised and used in public schools², and the 9-3 system³ mainly used by Islamic religious institutions and communities (such as the Quranic schools) and provides religious education for children focused on the study of the Quran and related subjects. As of 2020, the

⁴² 8-4 system: 8 years in primary, 4 years in secondary, 2-4 years post secondary

most attended education facilities in Mogadishu and surrounding areas included, primary mixed school for boys and girls, Quranic school for boys, Quranic school for girls, and secondary mixed school for boys and girl⁴³s. Considerable efforts have been made of the years to rebuild the education system after years of conflicts. This has led to increased school enrolment and the establishment of private and community-based schools leading to an increase in enrolment (Table 5-2). However, access to quality education remains uneven. For example, twenty-four percent of female and 21 percent of male household members have had primary education. Fourteen percent of women have attained secondary education, compared to 17 percent of men (Table 5-3 and Table 5-4). Dayniile District facing significant gaps in educational infrastructure and resources. Schools in Dayniile often lack proper facilities, trained teachers, and essential learning materials, which hampers the delivery of quality education. Many children, especially those in internally displaced persons (IDP) camps, are unable to attend school due to poverty, insecurity, and cultural barriers. Despite these challenges, the district has seen some progress through NGO-led initiatives and government support aimed at improving access to education and promoting literacy. A focus on long-term investment in education infrastructure and teacher training is critical to addressing the growing needs of Dayniile’s population.

Table 5-2: Overall education attainment by households pooled by age in the BRA

Background characteristic	Educational attainment of the household members					Total	Number of household members
	No education	Primary ¹	Secondary ²	Higher education	Don't know		
Age							
6-9	90.0	10.0	0.0	0.0	0.0	100	1,331
10-14	50.3	41.7	7.6	0.0	0.4	100	1,654
15-19	25.8	22.2	37.7	13.4	0.9	100	1,106
20-24	25.8	15.1	22.2	35.9	1.1	100	644
25-29	40.0	17.9	21.5	20.4	0.2	100	442
30-34	47.3	14.9	19.6	16.4	1.8	100	275
35-39	60.9	14.5	15.9	6.8	1.9	100	207
40-44	59.2	15.5	18.3	6.3	0.7	100	142
45-49	49.4	16.9	19.3	12.0	2.4	100	83
50-54	52.7	19.5	20.7	5.9	1.2	100	169
55-59	50.0	12.9	20.0	15.7	1.4	100	70
60-64	64.4	10.3	14.9	9.2	1.1	100	87
65+	74.5	5.1	11.2	8.2	1.0	100	98
Total	52.2	22.3	15.6	9.3	0.7	100.0	6,308
¹ Completed 8 th grade at the primary level							
² Completed 12 th grade at the secondary level							

Source: BHDS (2020)

⁴³MOECH (2015). Federal Government of Somalia National Policy of Education. 2015-2030.

Table 5-3: Overall education attainment of male by households pooled by age in the BRA

Background characteristic	Educational attainment of the male household members					Total	Number of males
	No education	Primary ¹	Secondary ²	Higher education	Don't know		
Age							
6-9	88.8	11.2	0.0	0.0	0.0	100.0	734
10-14	48.8	43.9	7.0	0.0	0.4	100.0	855
15-19	25.3	21.5	37.1	14.9	1.2	100.0	590
20-24	22.5	10.1	25.9	40.0	1.4	100.0	355
25-29	31.4	12.3	27.3	28.6	0.5	100.0	220
30-34	41.5	13.4	20.7	21.3	3.0	100.0	164
35-39	56.5	9.7	20.2	10.5	3.2	100.0	124
40-44	60.0	11.0	19.0	9.0	1.0	100.0	100
45-49	49.0	12.2	22.4	16.3	0.0	100.0	49
50-54	48.8	13.8	27.5	10.0	0.0	100.0	80
55-59	44.9	8.2	22.4	22.4	2.0	100.0	49
60-64	53.2	12.9	19.4	12.9	1.6	100.0	62
65+	71.4	3.2	14.3	9.5	1.6	100.0	63
Total	50.2	21.0	16.7	11.3	0.8	100.0	3,445
¹ Completed 8 th grade at the primary level							
² Completed 12 th grade at the secondary level							

Source: BHDS (2020)

Table 5-4: Overall education attainment of female by households pooled by age in the BRA

Background characteristics	Educational attainment of the female household members					Total	Number of females
	No education	Primary ¹	Secondary ²	Higher education	Don't know		
Age							
6-9	91.5	8.5	0.0	0.0	0.0	100.0	597
10-14	51.9	39.3	8.3	0.0	0.5	100.0	799
15-19	26.4	23.1	38.4	11.6	0.6	100.0	516
20-24	29.8	21.1	17.6	30.8	0.7	100.0	289
25-29	48.6	23.4	15.8	12.2	0.0	100.0	222
30-34	55.9	17.1	18.0	9.0	0.0	100.0	111
35-39	67.5	21.7	9.6	1.2	0.0	100.0	83
40-44	57.1	26.2	16.7	0.0	0.0	100.0	42
45-49	50.0	23.5	14.7	5.9	5.9	100.0	34
50-54	56.2	24.7	14.6	2.2	2.2	100.0	89
55-59	61.9	23.8	14.3	0.0	0.0	100.0	21
60-64	92.0	4.0	4.0	0.0	0.0	100.0	25
65+	80.0	8.6	5.7	5.7	0.0	100.0	35
Total	54.6	23.9	14.3	6.7	0.5	100.0	2,863
¹ Completed 8 th grade at the primary level							
² Completed 12 th grade at the secondary level							

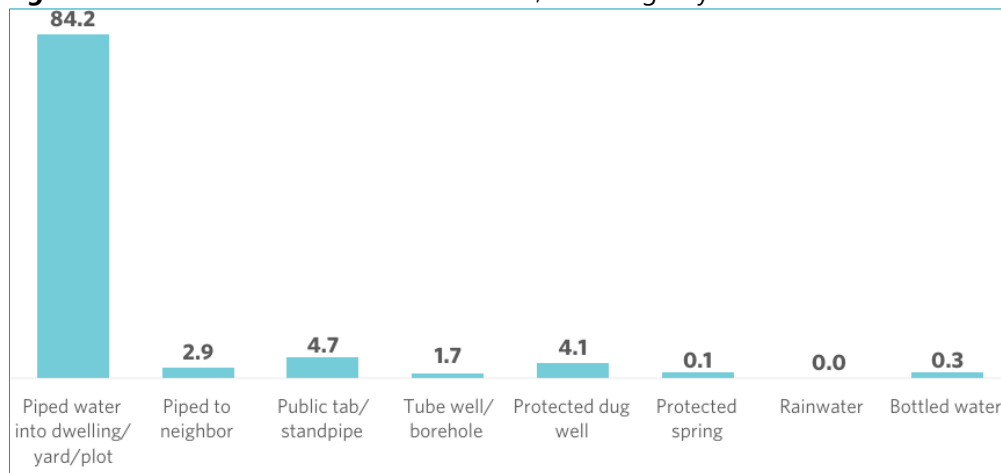
Source: BHDS (2020)

5.3.5.9. Water, Sanitation and Hygiene

Benadir Administrative Region in Somalia faces significant challenges in the WASH (Water, Sanitation, and Hygiene) sector. The BRA has low average rainfall and is highly affected by climate change, leading to recurring droughts, short rainfall seasons, floods, and water scarcity crises. The water and sanitation system in Benadir, including Mogadishu City is old with no recurring funds to ensure maintenance and repair. Currently, eighty-Four percent of population in Benadir have access to piped water into their dwelling, yard or plot (Figure 5-7). One percent of households travel for at least 30 minutes or more to get water. Thirty one (31%) percent (Table 5-5) of the

households in the BRA, including Dayniile District treat their water before drinking it with the most common method of common method of water treatment being bleaching/chlorination, used by thirty percent of households.

Figure 5-7: Status of water access in the BRA, including Dayniile District



Source: BHDS (2020)

Table 5-5: Treatment of household drinking water by households in the BRA

Water treatment method	Households	Population
Water treatment prior to drinking¹		
Boiled	2.7	2.9
Bleach/chlorine added	29.6	30.9
Strained through cloth	0.2	0.2
Ceramic, sand or other filter	0.1	0.1
Solar disinfection	0.2	0.1
Let it stand and settle	0.1	0.1
Other treatment	0.1	0.0
No treatment	68.0	66.6
Don't Know	31.5	32.9
Percentage using an appropriate treatment method	31.2	32.5
Population	1,720	11,985

Respondents may report multiple treatment methods so the sum of treatment may exceed 100 percent.

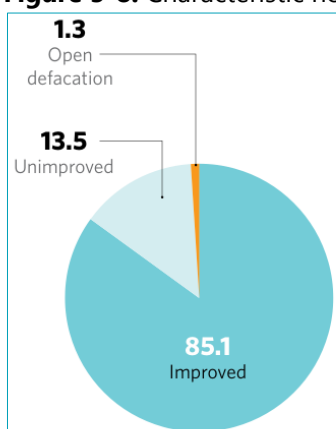
¹ Appropriate water treatment methods include boiling, bleaching, straining, filtering and solar disinfecting

Source: BHDS (2020)

Waste disposal system in the BRA is not well developed with the part of the BRA, especially Mogadishu City sanitation systems owned by BRA. The other part is privately owned and managed⁴⁴. The Federally funded system is marred with minimally coordinated legal, regulatory and policy frameworks, with huge gaps in human, financial and logistical resources. Overall, 85 percent of households in Benadir use sanitation facilities with sanitation services that would be considered as improved toilet facilities (Figure 5-8). However, 51 percent of households have access to basic sanitation services (improved toilet facilities that are not shared with other households).

⁴⁴World Bank, Somalia Urbanization Review, 2021

Figure 5-8: Characteristic household sanitation facilities in the BRA, including Dayniile District



5.3.6. Energy Sector and Electricity Generation Status

Private sector actors, who operate both diesel-powered and hybrid mini grids using a combination of wind and solar energy sources supply over 90% of the energy system in Somalia⁴⁵. Benadir Electric Company (BECO), formed in 2014, is the leading large-scale provider, covering 80% of Mogadishu's electricity needs⁴⁶. BECO is the largest electricity utility in Somalia, created out of 70 independent power producers (IPPs), mostly entrepreneur-owned or NGO-owned diesel-powered minigrids, with a growing focus on renewable energy sources. Other dominant private companies include Blue Sky Energy and Mogadishu Power Supply Company. The UN mandated and international peace support operations offices also play a crucial role in Somalia's energy sector, as they are the largest consumers of energy and generate half of the country's energy. The Ministry of Energy and Water Resources (MoEWR) oversees the maintenance and regulation of the energy sector, but the sector faces challenges such as an unregulated environment, capacity issues, and limited budget. The energy sector in Somalia is highly competitive among commercial service providers. Recently, efforts have been made to improve the regulatory environment through the introduction of national policies such as the Energy Policy (2019) and an Electricity Bill (2020), and an Energy Act, to establish the guidelines to administer regulation, tariff structuring, permit licensing and consumer protection⁴⁷.

5.3.7. Law and Order

Generally, the Somalia's justice sector is pluralistic in nature and encompasses a combination of legal systems that form the basis of legislation, institutions, and justice provision for city residents. The Constitution as a guiding instrument for enactment of legislation regarding the judicial mandates remains ambiguous eight years since drafting. In this absence, member states and Benadir have adopted their own constitutions, Ministry of Justice, legislations and court mandates. Commonly, a three-tiered court structure⁴⁸. Security actor is also considered as justice actors. Institutions such as the police, the army, international actors, private security providers, and neighborhood policing committees are also seen as justice providers.

⁴⁵Energy Sector Needs Assessment', FGS and AfDB, Aug 2015, p.11

⁴⁶Hagmann, T., Sarkar, A., Aboker, A., Mohamed, J., Wasuge, M., Ibrahim, M.H., Mohamed, Y. and Bradbury, M. (2018). Drivers, Governance and Political Economy of Urbanization in Somalia: Review and Research Gaps. Rift Valley Institute.

⁴⁷Abdullahi, M., Githinji, M., Sosis, K. and Kahinga, E. (2021). Stand Alone Solar (SAS): Market Update (2021). Tetra Tech International Development. Pp 10

⁴⁸Heritage Institute for Policy Studies (HIPS) (2021). Rebuilding Somalia's Broken Justice System: Fixing the Politics, Policies and Procedures.p15-6

Security and conflict management in the BRA are complex and influenced by a history of clan rivalries and socio-political tensions. Dayniile District, situated on the outskirts of Mogadishu, is a critical area due to its strategic location. The district has experienced fluctuating levels of insecurity, which disrupt daily life and hinder development efforts. While local administrations and community policing initiatives have made strides in improving security, challenges such as weak governance, limited law enforcement capacity, and the presence of displaced populations continue to strain the district's fragile stability. Strengthening local governance and investing in community-driven conflict resolution mechanisms are essential to fostering long-term peace in Dayniile. Despite the security challenges, the BRA and FGS have made significant progress in addressing insecurity challenges in the BRA, especially Mogadishu. While efforts have been made to reduce security incidents such as clan clashes, criminal activities still pose significant threats. The local police force still faces limitations in terms of personnel and resources, impeding their ability to effectively enhance security throughout the BRA.

5.3.8. Proposed Project Impact on the Local Economy

The proposed BECO Dayniile Hybrid Power Plant in the Benadir region is poised to have a transformative impact on the local economy, particularly in Dayniile District. By integrating solar PV and battery energy storage, the project promises a more stable and reliable power supply, reducing the dependency on costly and inefficient diesel generators. This improved energy access is expected to lower operational costs for small businesses, stimulate entrepreneurship, and attract investment in the not only in the district but also in the wider BRA. Enhanced electricity availability will also support critical sectors such as healthcare, education, and small-scale manufacturing, creating a ripple effect of economic development. Furthermore, the project could generate employment opportunities during its construction and operational phases, providing jobs for local residents and boosting household incomes.

In addition to immediate benefits, the hybrid power plant has the potential to foster long-term economic growth by enabling better access to modern energy solutions. Reliable electricity will enhance living conditions, reduce energy poverty, and support digital connectivity, enabling residents to participate in the growing information economy. The plant's emphasis on renewable energy aligns with global trends toward sustainability, potentially positioning the proposed Dayniile power plant as a model for green energy development in Somalia. However, realizing these benefits will require effective stakeholder engagement, equitable job distribution, and measures to mitigate any adverse social or environmental impacts during the project's implementation. By addressing these considerations, the BECO Dayniile Hybrid Power Plant can become a cornerstone of sustainable economic progress in Dayniile District and beyond.

6.0. Assessment of Impacts

6.1. OVERVIEW

This section explores the interaction between the proposed BECO Dayniile Hybrid Power Plant and various physical, biological, and social environments, as well as infrastructure and utilities, to understand the potential effects on resources and receptors. The interactions are grouped according to the project life cycle phases to better understand the risks and implications. In the context of the assessments, the project site refers to the area where the solar PV field and BESS will be constructed and fenced, while the project area encompasses the project site and its surroundings, and the study area is the wider area of influence, including the entire Dayniile District and the entire BRA.

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 <ul style="list-style-type: none"> • Surface water • Ground water • Air quality and climate • Geology and soils • Noise and vibration • Energy 	Biological <ul style="list-style-type: none"> • Aquatic ecosystem • Terrestrial wildlife • Woodlands • Agriculture and livestock 	Social/human <ul style="list-style-type: none"> • Public health and safety • Occupational health and safety • Labor related issues • Land use and land ownership • Household Income • Landscape and aesthetics • Vulnerable groups • Community stability • Cultural and historical sites

IMPACTS DURING CONSTRUCTION PHASE

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

6.2.1. Positive Impacts

6.2.1.1. National, Local and Regional Economy

The Project will benefit the BRA economy during construction by directly procuring and supplying supplies and services from BRA and FRS-based enterprises. This includes, for example, firms that provide earth-moving equipment, labourers who execute general civil works, logistics services to carry solar panels to the Project site, and the development of a worker accommodation camp. Other companies outside of FRS will contribute solar panel components such as panels,

supporting structures, and wires. The impact is beneficial since construction operations will promote economic growth on a local, regional, and national scale through the procurement of services and materials.

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

5.2.1.2. Employment and Other Economic Opportunities

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

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

6.2.2. Negative Impacts

6.2.2.1. Impacts on Biophysical Environment

6.2.2.1.1. Landscape and Visual

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

Impact	Landscape and visual
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term: The effects will commence from the start of construction and thereafter-permanent changes in visual character will occur, including into operations.
Reversibility	Irreversible until the entire Project infrastructure is decommissioned.
Receptor Sensitivity	Low on the basis that there is no international or national tourism

	receptors in the area, and the land has little, if any aesthetic value.
Magnitude	Low – the changes to the visual condition of the land will occur within the Project Site and will be noticeable across the surrounding area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.1.2. Soil, Groundwater and Surface Water Contamination

The construction phase of a hybrid power plant in Dayniile District, Benadir region, could pose significant risks to surface and groundwater resources if not carefully managed. Activities such as excavation, site grading, and the use of heavy machinery may lead to soil erosion, increasing sedimentation in nearby water bodies and affecting surface water quality. Additionally, the storage and use of construction materials, such as fuels, lubricants, and chemicals, could result in accidental spills or leaks, potentially contaminating both surface and groundwater sources. Increased water demand for construction activities, such as dust suppression and concrete mixing, could strain local water supplies, exacerbating existing water scarcity issues in the district. To mitigate these impacts, it will be essential to implement stringent erosion control measures, establish secure storage facilities for hazardous materials, and adopt efficient water management practices to minimize extraction and ensure sustainable water use throughout the construction phase.

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

6.2.2.1.3. Flood Risks

The construction phase of a hybrid power plant in Dayniile District, Benadir region, could exacerbate flood risks if proper mitigation measures are not in place. Activities such as land clearing, excavation, and site grading may alter natural drainage patterns, leading to increased surface runoff and localized flooding, especially during heavy rains. The removal of vegetation can further reduce the land's ability to absorb water, heightening flood risks in surrounding areas. Improper storage of construction materials and waste may also obstruct drainage channels, compounding the problem. Moreover, inadequate stormwater management systems during construction could result in water pooling and damage to nearby properties and infrastructure.

Impact	Flood Risks
Type of impact	Negative
Type of Effect	Direct
Duration	Long-term if changes to natural drainage patterns are introduced, although this will be avoided to the extent possible.
Reversibility	Reversible: Changes to natural drainage flows are likely to be reversible as they could be restored once the site is decommissioned and restored.
Receptor Sensitivity	Medium – nearby land users that could be impacted from changes

	in drainage flows.
Magnitude	Low as the generation of floodwater is seasonal although could impact receptors outside of the Project Site located within the Project Area.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor.

6.2.2.1.4. Air Quality

Dust

Activities such as land clearing, excavation, and the movement of heavy machinery on unpaved surfaces are primary sources of dust. The dry climate of the region further exacerbates the spread of airborne particles, which can travel to nearby communities, affecting residents, especially those with respiratory conditions. Dust accumulation may also affect local vegetation, reducing photosynthetic activity and potentially harming agricultural activities. Furthermore, excessive dust can impair visibility, creating safety hazards for workers and vehicles on-site.

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

Vehicle exhaust emissions

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

Impact	Air quality (Vehicle exhaust emissions)
Type of impact	Negative
Type of Effect	Direct
Duration	Short term/long-term as it is limited to construction and operation phases.
Reversibility	Irreversible given that air quality will be impacted over a long period of time, especially during operation phase of the project
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.1.5. Noise and vibrations

The use of heavy machinery, equipment such as excavators and generators, and activities like drilling, piling, and material transportation are key sources of noise and vibrations. These disturbances can disrupt the daily lives of nearby residents, particularly in areas with schools, healthcare facilities, or residential zones. Prolonged exposure to high noise levels may lead to stress, sleep disturbances, and other health issues. Vibrations from construction activities can also potentially damage structures, particularly in poorly built or older buildings, and disturb the local fauna.

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

6.2.2.1.6. Biodiversity

Fauna

The disturbance from construction activities, such as land clearing, excavation, and machinery operation, may lead to habitat loss and fragmentation, displacing local wildlife species. The proximity to the River Shebelle raises concerns about potential disruptions to aquatic and riparian species, as changes in water quality, noise pollution, and construction runoff could negatively affect aquatic ecosystems and the animals that rely on them. The increased human activity and associated pollution could also stress nearby wildlife, particularly species sensitive to disturbances.

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.
Receptor Sensitivity	Medium - no known presence of endangered species in the study area
Magnitude	Medium as site construction activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Flora

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

Impact	Flora
Type of impact	Negative

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

6.2.2.1.7. Soil Erosion

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

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

6.2.2.1.8. Wastes

Solid waste generation

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

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect as the project will involve the use of different sets of materials during construction.
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is

	minimized.
Receptor sensitivity	Low
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Liquid waste generation

Wastewater, including black and grey water from toilets and sanitation facilities, is expected to be generated because of workers' sanitation facilities. Sealed septic tanks will be installed at the site and will be evacuated to a wastewater treatment plant for Mogadishu City. Seepage from spilled fuels and oils and leaking machinery can also negatively impact groundwater water which could lead to potential contamination. Generally, due to the localized area of impact, the overall significance of the related impacts, especially on water quality is considered to be minor, provided the necessary mitigation/ management measures are implemented.

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

6.2.2.2. Impacts on Infrastructure and Utilities

6.2.2.2.1. Water Consumption

The demand for water during construction activities, such as dust suppression, concrete mixing, and the operation of machinery, could place additional pressure on the already limited water supplies in the area. Given the semi-arid climate of the region and the proximity to the River Shebelle, over-extraction of water for construction purposes may lead to depletion of local water resources, affecting both the environment and surrounding communities who rely on these resources for drinking, agriculture, and sanitation. Additionally, inefficient water management practices could result in the contamination of surface and groundwater from runoff or wastewater generated during construction.

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, BECO 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 heavy machinery and equipment used for excavation, grading, and other construction activities will require substantial amounts of electricity and fuel, potentially leading to higher demand on the already limited energy resources in the region. This increased energy use may result in the depletion of available energy for local communities, impacting businesses, households, and critical services such as healthcare and education. Additionally, reliance on diesel generators during construction could further exacerbate the region's energy consumption issues, contributing to higher greenhouse gas emissions and local air pollution.

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 BECO 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 Agricultural and Grazing Land Access Restrictions

The solar power facility will be built on 103 ha of private land. This will project will result in a decrease in potential agricultural and grazing lands, 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 Dayniile District and surrounding areas, leading to land degradation and potential loss of grazing livelihoods. However, the proposed project site is privately owned by BECO and no compensatory measures to the livestock herders will be expected from BECO.

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 and agriculture
Receptor Sensitivity	Low as the proposed project site is a private property
Magnitude	Low as the number of pastoralists active is relatively low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.2.2.3.2. Archaeology and Cultural Heritage

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

Impact	Archaeology and cultural heritage
Type of impact	Negative
Type of effect	Direct

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

6.2.2.3.3. Trespassing of Unauthorized Personnel

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

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

6.2.2.3.4. Worker Influx – Incoming Workforce

The anticipated impacts that could be generated by the influx of workers and the construction of the living camp are similar in nature to the impacts assessed during the construction phase. In particular, the influx of workers may create a strain on existing infrastructure, mainly water and sanitation systems, as well as road accidents and other adverse consequences of the increased traffic generated by the project (dust, Noise and vibrations and pollution). In addition, the presence of a large number of workers, mainly men, may lead to an increased spread of communicable diseases, and gender based violence.

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 be engaged directly or indirectly during the construction phase with over 60% being locals.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.2.2.3.5. Gender-based Violence

The construction phase of the proposed hybrid power plant in Daynile could potentially contribute to gender-based violence (GBV) if adequate safeguards are not implemented. The influx of a large, predominantly male workforce could lead to a heightened risk of GBV, particularly for women and girls in nearby communities. The temporary housing of workers in camps or accommodation areas may increase the likelihood of exploitation, harassment, or other forms of violence, especially if there is inadequate security, supervision, or awareness of GBV risks. The

social dynamics associated with a construction project of this scale could also lead to increased tensions, as local women may be marginalized or excluded from economic opportunities, leading to feelings of frustration and power imbalances.

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

6.2.2.3.6. Labour Disputes

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

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

6.2.2.3.7. Child and Forced Labour

Engaging underage and forced labour during construction can have serious consequences for both the project and the local community. Child labour exposes children to hazardous working circumstances, denies them an education, and causes long-term physical and psychological trauma, whereas forced labour exploits vulnerable persons through coercion or threat. These unethical labour practices not only violate human rights, but also create dangerous working conditions, degrade workers' dignity, and contribute to socioeconomic injustice. The presence of such activities can harm the project's reputation, resulting in legal and regulatory consequences, a loss of investor confidence, and community opposition. Additionally, it can cause operational interruptions because labour exploitation frequently promotes discontent and low productivity among the staff.

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

6.2.2.3.8. Security

The security situation in Mogadishu 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. The contractor will be expected to create a comprehensive health and safety plan for construction workers, addressing potential occupational health and safety issues. This includes addressing electrical hazards, fall hazards, environmental and ergonomic risks, and adverse weather conditions. Electrical hazards will require strict protocols, while fall hazards involve proper use of fall arrest systems and safe working heights. Environmental risks including heat stress, exposure to UV radiation, chemical exposure, and ergonomic risks are the other key aspects expected to be addressed in the plan. The plan shall also include provisions for shaded rest areas, hydration schedules, protective clothing, and education on heat-related illnesses. Adverse weather conditions shall also be addressed through weather monitoring systems and implementing relevant contingency plans.

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the construction phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on

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

6.2.2.3.10. Community Health and Safety Risks

The influx of workers, increased traffic, and heavy machinery operations may elevate the risk of accidents and injuries, both on-site and in surrounding areas. Dust, noise, and emissions from construction activities could lead to respiratory issues and other health problems for nearby residents, particularly vulnerable groups such as children, the elderly, and those with pre-existing health conditions. Additionally, the disruption of local infrastructure, such as roads or water supply systems, could hinder access to essential services and worsen public health conditions. The presence of hazardous materials, including fuels, lubricants, and chemicals used during construction, poses a risk of accidental spills or contamination, which could harm the local environment and affect water quality.

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

6.2.2.3.11. Fire Hazards

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

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

6.3. IMPACTS DURING OPERATION PHASE

6.3.1. Positive Impacts

6.3.1.1. Employment Creation

Employment opportunities will be created during the operation phase of the project. Opportunities that will be created include unskilled, semi-skilled to skilled jobs. These will involve security personnel, and staff to operate and maintain the Mini-grid. Employment will increase skill transfers. The impact significance is low as it will employ people to manage the station. The recommended enhancement measures include; BECO 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

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

6.3.1.3. Improved Quality of Life

Access to electricity at the household level and schools will enable children to study longer hours and access education programs through radio and TV channels. This will also allow schools to utilize information technology and communication, which are becoming a part of the education sector. The impact is significant as it will provide power to schools over a long period, allowing for additional study time in the night and morning. Enhancements proposed include connecting more learning institutions with electricity and partnering with the Benadir Administrative Region 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 Mogadishu, Benadir Administrative Region and the FRS. Once operational, household and public institutions, such as dispensaries and shopping centers, will benefit from stable and affordable power supply.

6.3.2. Negative Impacts

6.3.2.1. Impacts on Biophysical Environment

6.3.2.1.1. Landscape and Visual

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

Impact	Landscape and visual
Type of impact	Negative
Type of effect	Direct and Indirect
Duration	Long term as it will be relevant all throughout operation phase
Reversibility	Irreversible as visual impacts will be relevant all throughout the operation phase
Receptor Sensitivity	Low given that the location of the project in an otherwise rural setup with a few settlements.

Magnitude	Low given that project will be visible within immediate vicinity and up to some kilometers
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.3.2.1.2. Soil, Groundwater and Surface Water Contamination

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

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

6.3.2.1.3. Flood Risks

The installation of solar panels and associated infrastructure could alter the natural flow of water across the land, especially if large portions of the site are covered by impermeable surfaces, such as access roads or maintenance areas. In the event of heavy rainfall, water may accumulate in areas where drainage is insufficient, leading to localized flooding. This could cause soil erosion, damage to infrastructure, and potential disruption to the surrounding environment and communities. Additionally, improper management of water runoff from the site could lead to increased flooding in downstream areas, exacerbating the risk of damage to local properties and agricultural land.

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

Significance of the impact with mitigation	Negligible
--	------------

6.3.2.1.4. Air Quality

Dust

During the operation phase of a solar power plant in Dayniile District, dust emissions could be a concern, particularly in the dry, semi-arid climate of the region. The movement of maintenance vehicles, workers, and equipment across unpaved areas surrounding the solar panels may disturb the soil, leading to dust being generated and spread into the surrounding environment. Additionally, if the land between the solar panels remains largely barren or lacks adequate vegetation, it may become more susceptible to wind erosion, further contributing to dust emissions. This could affect air quality, particularly for nearby communities, and could cause respiratory issues for vulnerable populations, such as children and the elderly. To mitigate dust emissions, it is crucial to implement dust control measures such as regular watering of access roads, planting ground cover or vegetation between panels, and maintaining well-designed access routes that minimize soil disturbance.

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.
Receptor sensitivity	Low
Magnitude	Low-to-medium given that the generation of dust is expected to be from extent sources during the operation phase.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

Vehicle and exhaust emissions

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

Impact	Air quality (Vehicles and exhaust emissions)
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to construction phase only
Reversibility	Reversible given that air quality would revert back to baseline conditions.
Receptor Sensitivity	Low given that there are no settlements adjacent to the Project Site.
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.1.5. Noise and vibrations

Noise and vibrations pollution during the operation phase will generally be minimal. However, some Noise and vibrations sources can still affect the surrounding environment. These include the hum of electrical equipment like transformers and inverters, as well as occasional Noise and

vibrations from maintenance activities, such as vehicle movement or cleaning processes. Due to the Project Area's typically quiet, even low-level Noise and vibrations may be noticeable to nearby communities or wildlife. While the Noise and vibrations levels are unlikely to exceed harmful thresholds, implementing sound-dampening measures, scheduling maintenance during daytime hours, and maintaining equipment in good condition can help mitigate any potential disturbances, ensuring the plant operates with minimal impact on local Noise and vibrations levels.

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

6.3.2.1.6. Biodiversity

Fauna

The effects on local fauna can be varied but will generally be minimal. The presence of solar panels will alter the natural habitat by reducing vegetation cover, which may affect wildlife associated with the area. The solar panels themselves can also cause behavioral changes in some animals, as they may reflect light or create temperature differentials, and the "lake effect"^{49,50,51} 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 Mogadishu, 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
---------------	--------------

⁴⁹Barros, 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>

⁵⁰Wiggins, 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>

⁵¹Zeppel, 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>

Type of impact	Negative
Type of effect	Direct and indirect as it will affect fauna/flora
Duration	Long term as impacts will persist throughout the operating period
Reversibility	Irreversible: some species could be displaced from the project site during construction.
Receptor Sensitivity	Low - No NT and VU fauna species in and around the project area.
Magnitude	Low-medium as site operation activities will be restricted only in the project site. Fauna could move away to similar habitats in the adjacent areas while others become habituated.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

Flora

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

6.3.2.1.7. Soil erosion

During the operation phase of a solar power plant in Dayniile District, soil erosion could still be a concern, especially if the land surrounding the solar panels is left bare or poorly managed. While solar panels themselves may cover a significant portion of the land, the areas between the panels may remain exposed to the elements, particularly in regions like Dayniile where the climate is dry and prone to wind and rain. Without adequate vegetation or ground cover to protect the soil, water runoff during rainfall could erode the soil between the panels, leading to the loss of topsoil and degradation of the land over time. Additionally, maintenance activities, such as the movement of vehicles or equipment across the site, could further disturb the soil, increasing erosion risks.

Impact	Soil erosion
Type of impact	Negative
Type of effect	Direct and indirect as the project site is located in an area prone to soil erosion
Duration	Short term as it will likely occur only during construction phase.

Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized. Additionally, the agents of erosion tend to be seasonal and spatial.
Receptor sensitivity	Low – the project site is located in an area with low agricultural activities so eroded soil will not cause eutrophication/alter water quality of any nearby surface water resources in the Project Area.
Magnitude	Low – the solar panels will provide protection by reducing the impact of wind and water on the Project Site's soil surface.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.1.8. Wastes

Solid waste generation

It is expected that solid waste will be generated during operation phase of the project. However, solid waste generation will generally be modest but will require management to minimize environmental impact. The wastes will typically arise from routine maintenance activities, such as the replacement of faulty components like inverters or transformers, and the cleaning of solar panels, which may generate discarded materials or packaging. Additionally, occasional repairs or upgrades to equipment will produce metal, plastic, and electronic waste. To address these waste management challenges, it will be essential to implement a robust waste management plan that includes recycling and proper disposal practices through a waste management plan. Establishing procedures for handling and recycling materials, reducing the use of single-use items, and ensuring regular waste audits will help minimize the impact of solid waste and promote sustainability at the hybrid power plant. Solid waste, including construction and general municipal waste, is expected to be handled by the nearest approved disposal facility.

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect as the project will involve the use of different sets of materials during construction.
Duration	Short term as it will likely occur only during construction phase.
Reversibility	Reversible: Proper mitigation measures will ensure the impact is minimized.
Receptor sensitivity	Low – the project site is located in an area with no adjacent settlements.
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

Liquid waste generation

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

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

6.3.2.2. Impacts on Infrastructure and Utilities

6.3.2.2.1. Water Consumption

During the operation phase, water consumption will be used mainly for operation activities, including cleaning of solar panels. On average, cleaning solar panels typically requires about 2-4 litres of water per panel. For the proposed 211,575 solar panels, over 800,000 litres would be required per cleaning session. In arid regions like Benadir where water resources are scarce, this 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.

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, BECO will invest in its own borehole for the project activities
Magnitude	Low as water requirements are considered relatively low during the operation phase of the project
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.3.2.2.2. Energy Consumption

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

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

6.3.2.3. Impacts on Social Environment

6.3.2.3.1. Impact to Livelihoods from Agricultural and 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. However, the proposed project site is privately owned by BECO and no compensatory measures to the livestock herders will be expected from BECO.

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

6.3.2.3.2. Trespassing of Unauthorized Personnel

The risk of trespassing by unauthorized personnel into the Project Site can pose several challenges, but is expected to be minimal during the operation phase of the Project. Unauthorized access to the site can lead to safety hazards, including potential accidents or injuries due to unfamiliarity with the equipment and operational protocols. Additionally, there is a risk of vandalism, theft, or damage to valuable components such as solar panels and electrical systems.

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

6.3.2.3.3. Worker Influx – Incoming Workforce

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

Impact	Worker influx – Incoming Workforce
Type of impact	Negative
Type of Effect	Direct
Duration	Short term and long-term as some workers are likely to permanently settle in the Project Area
Reversibility	Reversible with proper mitigation measures
Receptor sensitivity	Low because of homogenous nature of the local Somali communities.

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

6.3.2.3.4. Gender-based Violence

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

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

6.3.2.3.5. Labour Disputes

Labor disputes can significantly affect 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 BECO will be required to implement stakeholders' engagements programmes.
Magnitude	Low-to-medium depending on implementation of mitigation measures.
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.3.2.3.8. Occupational Health and Safety

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

Impact	Occupational health and safety
Type of impact	Negative
Type of Effect	Direct

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

6.3.2.3.9. Community Health and Safety Risks

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

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

6.3.2.3.10. Fire Hazards

Fire risks pose a significant threat to the Project Site due to the presence of electrical equipment and dry, arid conditions. Factors such as poor ventilation, inadequate fire suppression systems, and exposure to heat or electrical sparks exacerbate these risks. To mitigate these risks, BECO must implement stringent safety protocols, including proper fuel storage procedures, regular inspections, and well-maintained firefighting equipment. Other measures include regular inspections of electrical systems, installation of fire detection and suppression systems, and clear access for emergency services. Implementing firebreaks and managing vegetation around the plant can further reduce fire risks. The integration of a Battery Energy Storage System (BESS) in the proposed hybrid power plant by BECO-DAYNILE introduces specific safety risks, particularly the potential for "thermal runaway," a scenario in which a battery experiences a rapid release of energy due to internal or external faults, leading to fire or explosion. To mitigate these risks, the contractor must conduct a thorough safety analysis to determine the optimal location for the BESS, ensuring sufficient separation from critical infrastructure and personnel. The analysis should consider factors such as ventilation, fire suppression systems, and thermal management technologies to control overheating. Additionally, the plan should incorporate regular

maintenance protocols, monitoring systems for early detection of faults, and emergency response measures to address incidents swiftly.

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

6.4. KEY IMPACTS DURING THE DECOMMISSIONING

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

6.4.1. Positive Impacts

6.4.1.1. Employment Opportunities

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

6.4.1.2. Site Rehabilitation

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

6.4.2. Negative Impacts

6.4.2.1. Impacts on Biophysical Environment

6.4.2.1.1. Impacts on Landscape and Visual

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

Impact	Landscape and visual
Type of impact	Negative

Type of Effect	Direct
Duration	Short-term: The effects will commence from the start of decommissioning and thereafter permanent restoration in visual character will occur.
Reversibility	Irreversible
Receptor Sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Minor

6.4.2.1.2. Impacts on Biological Environment

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

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

6.4.2.1.3. Solid Waste Generation

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

Impact	Solid wastes
Type of impact	Negative
Type of effect	Direct and indirect as different sets of materials from decommissioning will be available
Duration	Short term as it will likely occur only during decommissioning phase.
Reversibility	Reversible: with proper mitigation measures
Receptor sensitivity	Low
Magnitude	Low-medium
Significance of the impact without mitigation	Moderate

Significance of the impact with mitigation	Minor
--	-------

6.4.2.1.4. Noise and Vibration

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

Impact	Noise and vibrations
Type of impact	Negative
Type of Effect	Direct
Duration	Short term as it is limited to a few occasions associated with particular activities.
Reversibility	Reversible given that Noise and vibrations levels will be temporal and will rapidly revert to baseline conditions.
Receptor Sensitivity	Low
Magnitude	Low given that the generation of Noise and vibrations is likely to be limited to the use of decommissioning machinery and earth movements.
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.2. Impacts on Infrastructure & Utilities

6.4.2.2.1. Water Resources

Water requirements for the decommissioning phase are low and are limited to sanitary use by site personnel (drinking, showering, etc.) and the decommissioning activities such as cleaning of machinery and equipment, dust control, etc. The source of water for the decommissioning phase is likely to be the same as that used for the construction stage.

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

6.4.2.3. Impacts on Social Environment

6.4.2.3.1. Impacts on Occupational Health and Safety

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

Impact	Occupational health & safety
Type of impact	Negative
Type of effect	Direct
Duration	Short Term as it is expected during the decommissioning phase only
Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety s the Project's highest priority.
Magnitude	Low given that it is generally controlled through best practices

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

6.4.2.3.2. Impact to Livelihoods from Grazing Land Access Restrictions

Livestock herders may face severe economic hardships if access to traditional grazing lands is limited or obstructed by decommissioning activities. This can result in reduced livestock productivity, higher costs for feed, and potential conflicts over land use, especially in a region where pastoralism is a key source of income and sustenance. The restrictions can also lead to overgrazing in other areas, degrading the environment and reducing long-term land fertility. To minimize these impacts, it is essential to engage local communities early, provide alternative grazing solutions, and ensure that decommissioning plans include measures to restore and rehabilitate the land for future use. However, the proposed project site is privately owned by BECO and no compensatory measures to the livestock herders will be expected from BECO.

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

6.4.2.3.4. Trespassing of Unauthorized Personnel

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

Impact	Trespassing of unauthorized personnel
Type of impact	Negative
Type of effect	Direct
Duration	Short term
Reversibility	Could be irreversible as it could result in potential permanent health and safety impacts
Receptor Sensitivity	Low
Magnitude	Low
Significance of the impact without mitigation	Minor
Significance of the impact with mitigation	Negligible

6.4.2.3.5. Worker Influx – Incoming Workforce

The decommissioning phase of workforce accommodation can have negative impacts on the local community and environment. The sudden increase in the population can strain resources like water, food, and healthcare services, leading to competition. Temporary accommodation camps may cause environmental degradation, improper waste disposal, and pressure on land use. The social fabric may be disrupted, causing tensions, security risks, and conflicts. Poorly managed worker camps can exacerbate these issues. Proper planning and adequate facilities are crucial to mitigate these negative effects.

Impact	Worker influx
Type of impact	Negative

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

6.4.2.3.6. Gender-based Violence

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

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

6.4.2.3.7. Labour Disputes

Labor disputes during the decommissioning phase can significantly impact the project's completion and the local economy. Workers may face uncertainty about job security, severance pay, or contract termination, leading to disputes over wages, benefits, and working conditions. These disputes can cause delays in decommissioning activities, increase project costs, and disrupt the community. Unresolved disputes can escalate tensions between the workforce, management, and local stakeholders, negatively affecting morale and productivity. Effective conflict resolution and communication strategies are crucial to mitigate these challenges.

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

6.4.2.3.8. Child and Forced Labour

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

young individuals of education and development opportunities, while forced labor violates human rights and dignity. Unethical practices can harm individuals, the project's reputation, and community trust. Strict monitoring and adherence to labor laws and ethical standards are crucial to prevent these issues and ensure a fair and safe working environment.

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

6.4.2.3.9. Security

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

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

6.4.2.3.10. Community Health and Safety Risks

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

Impact	Community health and safety risks
Type of impact	Negative
Type of effect	Direct
Duration	Short-term as it is expected during the decommissioning phase only

Reversibility	Could be irreversible as it could result in potential irreversible risks on health and safety
Receptor Sensitivity	High as safety is the Project's highest priority.
Magnitude	Medium
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.4.2.3.11. Fire Hazards

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

Impact	Fire hazards
Type of impact	Negative
Type of effect	Direct
Duration	Short-term during the decommissioning phase.
Reversibility	Could be irreversible as it could result in potential irreversible risks
Receptor sensitivity	High
Magnitude	Low
Significance of the impact without mitigation	Moderate
Significance of the impact with mitigation	Minor

6.5. SUMMARY OF THE IMPACTS

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

6.5.1. Construction Phase

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Long term	Irreversible	Low	Medium	Minor	Negligible
	Soil, ground and surface water contamination	Direct	Short term	Reversible	Low	Low	Moderate	Minor
	Flood risk	Direct	Long term	Reversible	Medium	Low/medium	Low	Minor
	Air quality (Dust)	Direct	Short term	Reversible	Low	Medium	Moderate	Minor
	Air quality (vehicle exhaust emissions)	Direct	Short-term	Reversible	Low	Medium	Moderate	Minor
	Noise and vibrations	Direct	Short term	Reversible	Low	Medium	Minor	Negligible
	Biodiversity (Fauna)	Direct	Long-term	Irreversible	Low	Low/medium	Moderate	Minor
	Biodiversity (Flora)	Direct	Long-term	Reversible	Low	Low/medium	Moderate	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
	Wastes (solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
Wastes (liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible	
Impacts on infrastructure and utilities	Water consumption	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
	Energy consumption	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
Impacts on social environment	Impacts on livelihoods from agricultural and grazing land access restrictions	Direct	Long term	Irreversible	Low	Low	Minor	Negligible
	Archaeology and cultural heritage	Direct	Short term	Irreversible	Low	Medium	Minor	Negligible
	Trespassing of unauthorized personnel	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Worker influx – Incoming Workforce	Direct	Short term	Irreversible	High	Medium	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Gender-based violence	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Labour disputes	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Child and forced labour	Direct	Short term	Irreversible	High	Medium	Moderate	Minor
	Security	Direct	Short term	Irreversible	Medium	Low	Minor	Minor
	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Community health and safety risks	Direct	Short term	Irreversible	Medium	Low	Moderate	Minor
	Fire hazards	Direct	Short-term	Irreversible	High	Low	Minor	Negligible

6.5.2. Operation Phase

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and Visual	Direct/indirect	Long term	Irreversible	Low	Low	Minor	Negligible
	Soil, groundwater and surface water contamination	Direct	Short-term	Reversible	Low	Low	Minor	Minor
	Flood risks	Direct	Long term	Reversible	Low	Low	Minor	Minor
	Air quality (Dust)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Air quality (Vehicle exhaust emissions)	Direct	Short-term	Reversible	Low	Low	Minor	Minor
	Noise and vibrations	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Biodiversity (Fauna)	Direct/indirect	Long-term	Irreversible	Low	Low	Moderate	Minor
	Biodiversity (Flora)	Direct/indirect	Long-term	Reversible	Low	Low	Minor	Minor
	Soil erosion	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
	Wastes (Solid wastes)	Direct/indirect	Short-term	Reversible	Low	Low	Minor	Minor
Wastes (Liquid wastes)	Direct	Short-term	Reversible	Low	Low	Minor	Negligible	
Impacts on infrastructure and utilities	Water consumption	Direct	Short/long-term	Reversible	Medium	Low	Minor	Minor
	Energy consumption	Direct	Short/long-term	Reversible	Low	Low	Minor	Minor
Impacts on social environment	Impacts to livelihoods from grazing land access restrictions	Direct	Long term	Irreversible	Low	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Worker influx-Incoming Workforce	Direct	Short/long-term	Reversible	Low	Low	Moderate	Minor

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Gender-based violence	Direct	Short/long-term	Irreversible	High	Low/medium	Major	Minor
	Impact to livelihoods from grazing land access restrictions	Direct	Long-term	Irreversible	Low	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short-term	Reversible	Low	Low	Minor	Negligible
	Worker influx – Incoming Workforce	Direct	Short/long-term	Reversible	Low	Low-medium	Moderate	Minor
	Labour disputes	Direct	Short-term	Reversible	High	Medium	Moderate	Minor
	Child and forced labour	Direct	Short-term	Reversible	Medium	Medium	Moderate	Minor
	Risks related to poor or inadequate stakeholder engagement (conflicts)	Direct/indirect	Short/long-term	Reversible	Medium	Low/medium	Moderate	Minor
	Occupational health and safety	Direct	Long-term	Irreversible	High	Low	Moderate	Minor
	Community health and safety risks	Direct	Short/long-term	Irreversible	High	Low	Moderate	Minor
	Fire hazards	Direct	Short-term	Irreversible	High	Low	Moderate	Minor

6.5.3. Decommissioning

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

Impact	Attribute	Type of effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
Impacts on biophysical environment	Landscape and visual	Direct	Short term	Irreversible	Low	High	Minor	Minor
	Biological environment	Direct/indirect	Short term	Reversible	Low	Medium	Moderate	Minor
	Solid waste generation	Direct/indirect	Short-term	Reversible	Low	Low	Moderate	Minor
	Noise and vibration	Direct	Short-term	Reversible	Low	Medium	Minor	Negligible
Impacts on infrastructure and utilities	Water utilities	Direct	Short-term	Reversible	Medium	Low	Minor	Negligible
Impacts on social environment	Occupational health and safety	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Impact to livelihoods from agricultural and grazing land access restrictions	Direct	Short term	Irreversible	High	Low	Minor	Minor
	Trespassing of unauthorized personnel	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Worker influx – Incoming Workforce	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Gender-based violence	Indirect	Short term	Irreversible	High	Low	Moderate	Minor

Impact	Attribute	Type effect	Duration	Reversibility	Receptor Sensitivity	Magnitude	Significance without mitigation	Significance with mitigation
	Labour disputes	Indirect	Short term	Irreversible	High	Low	Moderate	Minor
	Child and forced labour	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Security	Direct	Short term	Irreversible	High	Low	Minor	Negligible
	Community health and safety risks	Direct	Short term	Irreversible	High	Low	Moderate	Minor
	Fire hazards	Direct	Short term	Irreversible	High	Low	Moderate	Minor

6.6. ASSESSMENT OF CUMULATIVE IMPACTS

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

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

Attribute	Cumulative Impacts
Landscape and visual	The installation of a hybrid power plant could alter the area's natural topography and aesthetics, potentially impacting the landscape's scenic value. The development could also influence community perceptions, with some viewing it as progress, while others see it as disruption to traditional land use practices.
Land Use	The project's solar panels could decrease traditional livestock grazing land, potentially leading to land tenure conflicts. However, it could also generate economic opportunities, but requires careful management to ensure equitable access. Proactive land use planning and stakeholder engagement are crucial for preserving traditional practices. However, the proposed project site is privately owned by BECO and no compensatory measures to the livestock herders will be expected from BECO.
Biodiversity	Impacts are mainly related to construction phase. The project may lead to habitat loss or fragmentation due to land clearing for infrastructure, particularly in areas used for grazing and natural vegetation. Disturbances from construction activities, such as noise, dust, and increased human activity, could displace wildlife and reduce biodiversity. Over time, the development of roads and settlements associated with the plant may further encroach on natural habitats, intensifying these impacts. Socially, changes in biodiversity could affect livelihoods reliant on natural resources, such as pastoralism, and alter community relationships with the local environment.
Air quality and noise	The cumulative environmental and social impacts of the hybrid solar power plant on air quality and noise are primarily associated with the construction and operation phases. During construction, dust emissions from land clearing, vehicular movement, and material handling, combined with emissions from diesel-powered machinery, could temporarily degrade air quality. Noise pollution from equipment and transport activities may disturb nearby communities and livestock, particularly if construction occurs near grazing areas. Cumulatively, these impacts could affect respiratory health, reduce the quality of life for local residents, and disturb wildlife. Implementing dust suppression measures, using low-emission equipment, enforcing noise control measures, and prioritizing renewable energy over diesel generation can significantly reduce these cumulative impacts.
Infrastructure and utilities	The cumulative environmental and social impacts of the proposed hybrid power plant are expected to be transformative, with both positive and potentially challenging outcomes. The development is likely to catalyze improvements in local infrastructure, such as roads and power distribution networks, enhancing accessibility and electricity availability for communities. This can stimulate economic growth and facilitate the provision of social services, such as schools and healthcare facilities. However, the increased demand for utilities during construction and operation, including water and energy, could strain existing resources and services, potentially impacting local households and businesses. Additionally, the influx of workers and secondary developments may put pressure on transportation networks and sanitation systems. Proactive planning, including investments in utility upgrades and equitable resource allocation, is essential to ensure the project's benefits are maximized while mitigating adverse cumulative impacts on infrastructure and utilities.

Attribute	Cumulative Impacts
Socio-economic conditions	The cumulative environmental and social impacts of the hybrid power plant on socioeconomic conditions are both substantial and multifaceted. The project will boost local economic development by creating jobs during construction and operation, stimulating businesses, and improving access to reliable electricity, which can enhance productivity and quality of life. It may also attract further investments in infrastructure, education, and healthcare, contributing to long-term socioeconomic advancement. However, the influx of workers and new developments may strain local resources, increase the cost of living, and potentially lead to land use conflicts or social tensions.
Occupational health and safety	The cumulative environmental and social impacts of the hybrid power plant on occupational health and safety are significant, particularly during the construction and operation phases. Construction activities involving heavy machinery, elevated work, and potential exposure to dust, noise, and hazardous materials pose risks of accidents, injuries, and health issues for workers. During operation, risks may arise from handling battery systems, and electrical equipment, requiring strict safety protocols. The presence of a large workforce over time may strain local healthcare services and create challenges in maintaining consistent safety standards. Cumulatively, these factors underscore the importance of robust occupational health and safety management systems, including regular training, provision of personal protective equipment, health surveillance, and emergency response preparedness to safeguard worker well-being and ensure compliance with international and local labor standards.
Community health, safety, and security	The construction and operation phases could introduce health risks related to air and water pollution, noise, and traffic accidents, potentially affecting nearby communities. Increased population due to the influx of workers could strain local healthcare services and housing, while also raising concerns over the spread of infectious diseases. Social tensions may arise if safety and security are not adequately managed, with risks of crime, labor disputes, or community conflicts. Additionally, the establishment of infrastructure such as roads and powerlines could expose local communities to greater security risks, including the unauthorized access to project areas. Proactive community engagement, robust health and safety measures, and enhanced security protocols are essential to mitigate these cumulative impacts and ensure that the benefits of the project are equitably shared while protecting the well-being of local populations.

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

The proposed hybrid power plant by BECO in Dayniile, which will incorporate solar PV and BESS systems, will potentially face vulnerability to natural and climate-related hazards, particularly flooding due to its proximity to the Shabelle River. Seasonal heavy rains can cause the river to overflow, leading to waterlogging and flash floods that may damage critical electrical infrastructure such as inverters, battery storage units, and underground cables. Flooding can also accelerate soil erosion, weakening the foundation of solar panel mounting structures and BESS enclosures, which may lead to structural instability. Additionally, excessive moisture can short-circuit electrical components, leading to power outages and costly repairs if adequate drainage and flood protection measures are not in place.

Beyond flooding, extreme heatwaves and wildfires could pose another major risk, given Mogadishu's hot and dry climate. High temperatures can reduce the efficiency of solar panels and degrade battery storage capacity, affecting energy generation and storage reliability. Prolonged heatwaves may also increase the risk of wildfires, which could damage electrical installations and

battery storage units if fire prevention measures are not adequately implemented. Other hazards, such as earthquakes and landslides, although less frequent in Mogadishu, could still pose risks to panel mounting systems and structural foundations if the site is not reinforced properly. To ensure long-term operational resilience, the hybrid power plant must integrate climate-resilient designs, robust flood protection measures, fire prevention strategies, and structural reinforcements to withstand environmental hazards.

Mitigation Measures	
Flooding and soil erosion	<ul style="list-style-type: none"> • Elevate critical infrastructure, including BESS units, inverters, and electrical control rooms, above potential flood levels. • Construct drainage channels, retention basins, and embankments to manage floodwaters and prevent water accumulation. • Use reinforced concrete foundations and install gravel or geotextile membranes around solar panel mounts to prevent soil erosion.
Heatwaves and wildfire risks	<ul style="list-style-type: none"> • Install high-temperature-resistant solar PV modules and BESS components designed for extreme heat conditions. • Implement passive and active cooling systems, such as shaded enclosures, ventilation, and heat-resistant coatings, to prevent overheating of BESS units. • Establish firebreaks around the facility and maintain a buffer zone free of dry vegetation to reduce wildfire risks. • Equip the site with fire detection and suppression systems, including fire extinguishers for BESS units.
Earthquake and landslides	<ul style="list-style-type: none"> • Use seismic-resistant mounting structures for solar panels and battery storage enclosures to withstand potential ground movement. • Secure battery storage units and inverters with shock-absorbing foundations to minimize earthquake-induced damage. • Implement retaining walls and terracing in areas susceptible to soil instability.

7.0. Mitigation, Monitoring and Reporting

This section examines the mitigation measures for the outlined impacts as assessed for the project (Section 6). It also gives detailed account on monitoring and reporting requirements for the mitigation measures. The mitigation measures together with the accompanying monitoring and reporting requirements have been pooled according to the project phases – construction, operation and decommissioning. The proposed solar power plant, presents a valuable opportunity to harness renewable energy and promote sustainable development, especially in the Benadir Administrative Region 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 BECO Hybrid Power Plant

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> Erect a fence around the power plant. 	Construction	<ul style="list-style-type: none"> Presence of a perimeter fence
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> 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 drained into approved drainage facilities No vehicle maintenance and service shall be done at project site Scoop and correctly dispose contaminated soil. 	Construction	<ul style="list-style-type: none"> Records of any leakages from construction equipment/ vehicles. Oil spill containment plan. Provision of fuel/oil drip and spill trays
	Air quality (Dust)	<ul style="list-style-type: none"> Burning of woody debris & construction waste to be prohibited. Cover construction trucks moving materials to prevent material dust emissions. Ensure all the personnel use PPEs. Keep stockpiles compacted and re-vegetate as soon as possible. Restrict speed on loose surface roads during dry or dusty conditions Stockpiles of excavated soil should be palliated dry or windy conditions. Suppress dust during dry periods by use of water sprays. 	Construction	<ul style="list-style-type: none"> Visual Observation of dust Provision of PPEs especially masks
	Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Sensitize drivers to avoid/minimize vehicle idling to lower emissions. Maintain all machinery order to minimum emissions of CO NO₂, SO₂, PM 	Construction	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks
	Noise & vibration	<ul style="list-style-type: none"> Train workers on the importance of noise control and best practices on noise. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Provide appropriate PPEs to workers during construction activities. Inform nearby communities in advance about scheduled high-noise activities. 	Construction	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> Establish a monitoring program to regularly measure noise and vibration levels. Establish a GRM for community to report noise or vibration disturbances. Ensure regular maintenance of machinery to reduce noise emissions. Employ modern equipment fitted with noise-reduction technologies 		
	Biodiversity (Fauna)	<ul style="list-style-type: none"> Site clearing work/earthwork shall be carried out during the dry season. Limit all vehicle movements to designated roads with speed of 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 Undertake a supplementary biodiversity assessment on fauna in the area An ecologist shall be hired to coordinate the fauna monitoring. 	Construction	<ul style="list-style-type: none"> Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting
	Biodiversity (Flora)	<ul style="list-style-type: none"> Ensure proper demarcation of the project site for all construction works. Designate access routes and parking areas Re-vegetation including planting of trees around the plant/facility 	Construction	<ul style="list-style-type: none"> Number of trees cleared Planted trees
	Soil erosion	<ul style="list-style-type: none"> Avoid ground-breaking during the seasons of high rainfall to avoid erosion. Monitoring of areas of exposed soil during rainy seasons. Use silt traps where necessary Monitor exposed soils to ensure that any incidents of erosion are controlled. Ensure spoil from excavations is arranged according to the various soil layers. 	Construction	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from compacted areas
	Wastes (Solid wastes)	<ul style="list-style-type: none"> Handle and label all hazardous products properly to avoid ground contacts Dispose hazardous waste through a approved waste handler Segregate waste 	Construction	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> • Provide litter collection facilities such as bins • Contractor to put in place and comply with a site waste management plan • Use of durable materials to avoid regular replacements – avoid waste generation • 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 • Manage all the wastes in accordance with internationally accepted standards. 		
	Wastes (Liquid wastes)	<ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled. • Create awareness for the employees on procedures of dealing with spills/leaks • Develop and implement a detailed Spill Prevention Plan (SPP) • Disposal of waste through septic tanks • Store all hazardous materials in compliance with local regulations. • Develop and implement spill management plan with clear procedures • Scoop all top toils for disposal incase of leaks. • Install oil-water separators in drainage systems to remove oil from stormwater. • Keep accurate documentation of fuel and oil storage volumes/transfer activities. • Ensure proper training for staff on handling and use of oils. • 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 to avoid leaks. 	Construction	<ul style="list-style-type: none"> • Engine maintenance records • Oil spill containment plan • Presence of separate and clean washrooms for both the gents and ladies
	Water consumption	<ul style="list-style-type: none"> • Ensure prudent use of available water • Consultations with the project local committee on water 	Construction	<ul style="list-style-type: none"> • Water usage records

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
Impacts on infrastructure and utilities		<ul style="list-style-type: none"> use to avoid conflicts with the community Source and utilize a sustainable and reliable water supply for all project phases 		
	Energy Consumption	<ul style="list-style-type: none"> Ensure responsible electricity use through staff sensitization of staff. Ensure proper planning of transportation of materials for efficient fuel usage Monitor all energy usage during construction and set reduction targets. 	Construction	<ul style="list-style-type: none"> Energy consumption records
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> Coordinate with the local herders and farmers to grazing routes or areas. Regularly engage the local community and address ant emerging concerns. Provide alternative water points for livestock near the construction area. Establish a grievance redress mechanism to address any conflicts or complaints 	Construction	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Develop and implement a Chance Finds Procedures Engage a qualified archaeologist for any early identification of chance finds. Establish a clear protocol for halting construction activities upon a chance find. Ensure proper documentation of all chance finds. 	Construction	<ul style="list-style-type: none"> Stratigraphic Soil profile reports during excavation Fully developed artefact recovery protocols Discovery of human burials reports during excavation. Regulatory Compliance reporting under Somali Heritage Laws.
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Presence of a controlled access and records of every person accessing the site
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Raise awareness among local community and workers on cordial working relation Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM accessible to community members. 	Construction	<ul style="list-style-type: none"> 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
		<ul style="list-style-type: none"> Respect for community values/culture. Prompt payment of workers as per the contractual agreements/terms. 		
	Gender-based violence	<ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Implement a code of conduct signed by all those with physical presence on site. Establish Workers GRM with multiple channels including SEA/H channels. Ensure that Code conducts are signed by all employers in the contracts. 	Construction	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. Grievances raised, aggrieved persons and status on resolution etc
	Labour disputes	<ul style="list-style-type: none"> Ensure full compliance with local labor laws. Ensure that all workers receive clear contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. Establish mechanisms to guarantee fair/timely payment of wages and benefits. Establish worker welfare systems to represent concerns & promote dialogue. Implement non-discrimination policies to ensure equal treatment for all. Set up a transparent GRM to handle all complaints/disputes in a timely manner. 	Construction	<ul style="list-style-type: none"> Number of grievances filed and time taken to resolve them. Frequency of labor disputes. Health and safety violations. Worker turnover rate and compliance with working hours and overtime rules. Labor law compliance audits Worker welfare committee activities.
	Child and forced labour	<ul style="list-style-type: none"> 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 all the ESS 2 provisions and FRS Employment Act on forced labour. Report any form of forced labour at the site. 	Construction	<ul style="list-style-type: none"> Updated employment register indicating locals employed, their ages, national identification numbers etc. Grievances raised, aggrieved persons and status on resolution etc. Number of reported cases of forced labour.
	Security risks	<ul style="list-style-type: none"> Conduct a comprehensive risk assessment to identify specific security threats. Engage all stakeholders to understand and address local security concerns. Collaborate with local law enforcement/security agencies 	Construction	<ul style="list-style-type: none"> Number of security incidents and response time to security incidents. Compliance with security protocols. Incidents of unauthorized site access. Grievances related to security.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		to enhance security. <ul style="list-style-type: none"> • Hire licensed security to provide 24/7 site surveillance, patrols, and monitoring. • Use surveillance systems/CCTV cameras to monitor critical areas in real-time. • Implement strict access control protocols, including sign-in procedures. • Provide workers with ID badges and restrict entry to authorized personnel only. • Develop a security incident response plan including emergencies procedures. • Provide workers with security training and response protocols to threats. • Maintain constant with local authorities on security updates in the area. • Have security response teams on standby to address any security emergencies. 		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Develop and implement a comprehensive OHS plan before the commencement of the project. • Use skilled personnel for activities which demand skills/technical tasks • Workers coming to the site should be knowledgeable on safety precautions • Provide appropriate PPE to all workers. • Undertake risk assessment 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	<ul style="list-style-type: none"> • Records of any near misses, incident, and accidents. • Records of corrective actions implemented if there was an accident.
	Community health and safety risks	<ul style="list-style-type: none"> • Allowing migrant workers time to be with their families • Create awareness to the community on risks associated with construction works. • 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. 	Construction	<ul style="list-style-type: none"> • Number of awareness creation sessions conducted. • Availability of and distribution of condoms

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> Provide awareness materials on HIV/AIDS transmission and prevention. 		
	Fire Hazards	<ul style="list-style-type: none"> 'No smoking' signs shall be posted at the construction site A fire risk assessment/evacuation be prepared and posted across site. 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	<ul style="list-style-type: none"> Records of any Fire incidences Fire equipment and evacuation plan
	Traffic risk	<ul style="list-style-type: none"> Develop and implement a Traffic Management Plan (TMP). Use traffic signs, barriers, and cones to guide construction and local traffics. Enforce strict speed limits for vehicles within the site and designated routes. Install speed bumps/ traffic-calming measures on roads near the site. Engage with local communities to raise awareness about safety measures. Erect temporary road signs warning local road users near the site. Designate safe parking and loading zones for all construction vehicles. 	Construction	<ul style="list-style-type: none"> Number of traffic incidents. Traffic management plan compliance. Speed limit violations. Traffic safety training attendance. Community complaints related to traffic. Emergency response time to traffic incidents. Community awareness programs on traffic safety. Use of alternative routes by construction vehicles.
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Update the existing SEP to make it more relevant to the subproject and the identified stakeholders. In line with the SEP, undertake adequate consultations prior to construction. 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	<ul style="list-style-type: none"> Availability of and implementation of the Stakeholder Engagement Plan. Number of stakeholder consultations held Record of stakeholder consultations held (minutes of meetings and list of participants). Information disclosed, to whom it was disclosed (Men, women, PWD, youth, vulnerable individuals and households etc., methods and languages used in the disclosure (culturally appropriate and accessible), grievances raised and status on resolution etc. Concerns raised and actions raised.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee in consultation with stakeholders Implement a workers and community GRM. Ensure proportionate representation of VMGs in the local grievances committee. Provide for confidential reporting under the GRM 	Construction	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel.
Impacts on biophysical environment	Landscape and visual	<ul style="list-style-type: none"> Fence off the power plant. 	Operation	<ul style="list-style-type: none"> Presence of a perimeter fence
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> Ensure proper design of drainage system to minimize contaminated run-off. Develop and implement oil-spill containment plan as part of the EPRP. No vehicle maintenance and service shall be done at project site Ensure that potential sources of petro-chemical pollution protected from leaks. 	Operation	<ul style="list-style-type: none"> Oil spill containment plan. Provision of fuel/oil drip and spill trays
	Flood risks	<ul style="list-style-type: none"> Ensure drainage channels are free of any obstruction at all times. Construct more channels and or expand existing ones Raise foundations of the solar panels and ensure well designed concrete base Create flooding diversions and or spill ways to divert water from the plant 	Operation	<ul style="list-style-type: none"> Provision of drainage system Raised foundations for the structures
	Air quality (Dust)	<ul style="list-style-type: none"> Plant trees around the plant to act as wind breakers/decrease dust pollution Ensure planting of grass around and within the facility compound 	Operation	<ul style="list-style-type: none"> Visual inspection
	Air quality (Vehicle and exhaust emissions)	<ul style="list-style-type: none"> Maintain all machinery in good to minimum emissions of CO, NO₂, SO₂. Regularly monitor and report emissions data as part of EHS compliance. 	Operation	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks
	Noise & vibration	<ul style="list-style-type: none"> Use quieter, high-efficiency fans and cooling systems with lower noise outputs. 	Operation	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> Equip the BESS unit with vibration isolators to reduce vibrations/noise Install sound barriers or walls around the BESS unit to deflect or absorb noise. Use sound-absorbing materials within the BESS housing units. Regularly service and maintain fans, inverters, and other equipment 		and at distances of 30m from the Hybrid power plant
	Biodiversity (Fauna)	<ul style="list-style-type: none"> Undertake a supplementary biodiversity assessment and develop BMP 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. Undertake regular monitoring and report on biodiversity 	Operation	Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting
	Biodiversity (Flora)	<ul style="list-style-type: none"> Re-vegetation including planting of trees around the plant/facility Develop and implement an invasive species management plan. 	Operation	<ul style="list-style-type: none"> Number of trees cleared Planted trees
	Soil erosion	<ul style="list-style-type: none"> Monitor exposed soil during rainy seasons for proper erosion control. Landscape the power plant with grass in all open areas Construct the drainage system in a way to follow natural water channels Concrete only the required area and leave the rest of the land with grass Construct rain water harvesting system on buildings and install adequate storages 	Operation	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from compacted areas Provision of a drainage system and a rain water harvesting system
	Wastes (Solid)	<ul style="list-style-type: none"> 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 	Operation	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<p><i>Damaged solar panels and hazardous wastes</i></p> <ul style="list-style-type: none"> • Ensure segregation from other waste streams • Ensure proper labelling and handling of all hazardous products/wastes. • Dispose hazardous waste through a approved waste handler 		
	Wastes (Liquid)	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> • Provide adequate sanitary waste facilities for both genders clearly marked • Disposal of waste through septic tanks <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> • Refuelling and maintenance of vehicles will not take place at the construction site. • Create awareness for the employees on procedures of handling spills and leaks • All vehicles and equipment must be kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> • Ensure quick response to hazardous materials' spill by a trained response team. • Install oil-water separators in drainage systems to manage oil from stormwater. • Establish proper waste management protocols for the disposal of used oil, fuel, and filters from equipment maintenance activities. • Implement a regular environmental monitoring program to check for any signs of contamination in soil, groundwater, and surface water near the plant. 	Operation	<ul style="list-style-type: none"> • 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
<i>Impacts on infrastructure and utilities</i>	Water consumption	<ul style="list-style-type: none"> • Ensure prudent use of water. • Install water-conserving automatic taps. • Any water leaks through damaged pipes and faulty taps 	Operation	<ul style="list-style-type: none"> • Water usage records

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		should be fixed promptly.		
	Energy consumption	<p><i>Lightings</i></p> <ul style="list-style-type: none"> • 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. • Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar and BESS. 	Operation	<ul style="list-style-type: none"> • Solar Energy Generation (kWh/month): • Battery Energy Storage System (BESS) Utilization (cycles/month). • Lighting Energy Consumption (kWh/month). • Carbon Emissions (tons of CO2/month).
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> • Continue consultations with local communities to assess 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	<ul style="list-style-type: none"> • Number of complaints from affected communities (monthly). • Access routes to grazing lands (percentage maintained). • Community satisfaction with alternative grazing lands (% satisfaction). • Community engagement and participation (number of meetings/year). • Conflict or dispute incidents (number reported/year).
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> • Fencing off the facility to keep of illegal access to the power plant. • Ensure controlled access to the site only with prior approval • Maintain records of any person who comes to site 	Operation	<ul style="list-style-type: none"> • Presence of a controlled access and records of every person accessing the site
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> • Prioritize the hiring of local workers to reduce the need for incoming workforce. • Establish and enforce a strict code of conduct for incoming workers. • Design separate worker accommodations for local and incoming workers. 	Operation	<ul style="list-style-type: none"> • Number of local workers employed (% of total workforce). • Community grievances related to workforce behavior (number of grievances/month). • Community interaction incidents (number reported/month).

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> Encourage use of local suppliers of good and services to support local economy. Develop and implement waste management systems in all accommodation areas. Ensure both the workforce and the local community have access to GRM. Maintain links with local communities to address any concerns on worker influx. 		<ul style="list-style-type: none"> Local business engagement (percentage of local suppliers engaged). Worker turnover rate (%). Worker welfare program implementation (% of programs implemented). Community consultation meetings held (number/year).
	Gender-based violence	<p><i>GBV- SEA and SH</i></p> <ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Develop and implement 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 all employees sign Code conducts on GBV in employment contracts. <p><i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i></p> <ul style="list-style-type: none"> Ensure VMGs individuals have to ensure they equally benefit from the project. 	Operation	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Documented referral services for survivors. Interventions to enable those vulnerable access project benefits. Number of complaints raised by VMGs/vulnerable individuals regarding access to project services.
	Labour disputes	<ul style="list-style-type: none"> Ensure all employees have clear and legally binding employment contracts. Establish an accessible and transparent GRM for all workers' 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 hiring practices. Set up a monitoring system to track and evaluate labor relations. Conduct regular worker feedback surveys to understand 	Operation	<ul style="list-style-type: none"> 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).

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		any emerging disputes.		
	Child and forced labour	<ul style="list-style-type: none"> • Ensure compliance with the national labor laws management practices. • Put visible signage on site "No Jobs for children" "Do not allow children". • Adhere to the ESS 2 provisions and FRS Employment Laws. • Report any form of forced labour at the site. 	Operation	<ul style="list-style-type: none"> • Number of child labor incidents reported (incidents/month). • Number of forced labor incidents reported (incidents/year). • Grievances related to child or forced labor (number of grievances/year). • Community outreach and awareness campaigns on child labor (campaigns/year). • Compliance with international labor standards (compliance level). • Social audits conducted (number of audits/year). • Local community feedback on employment practices (satisfaction level).
	Risks related to poor or inadequate stakeholder engagement (Conflict)	<p><i>Risks related to Inadequate stakeholder engagement</i></p> <ul style="list-style-type: none"> • Update the existing SEP to make it more relevant to the subproject and to the identified stakeholders. • Ensure timely and prior disclosure of project all project information. • Prepare and implement a GRM to deal with all grievances. • The grievance redress committee to include representatives from the community. • Sensitize stakeholders on SEP and GRM. <p><i>Inadequate grievances management</i></p> <ul style="list-style-type: none"> • Employ from the community to the extent possible • Engage the community members and other stakeholders in a timely manner • Work closely with the GRM committee members in solving the conflicts • Solve all conflicts/grievances at the earliest time possible • Ensure all grievances are logged and closed • Monitoring the pattern of grievances to come up will long term measures 	Operation	<ul style="list-style-type: none"> • Availability of and implementation of the Stakeholder Engagement Plan. • Number of stakeholder consultations held • Record of stakeholder consultations held (minutes of meetings and list of participants). • Availability of grievance redress process.
Occupational health and Safety	<ul style="list-style-type: none"> • Ensure only qualified staff are employed to work in the facility • All workers operating the project site must be equipped 	Operation	<ul style="list-style-type: none"> • Provision of PPEs and WIBA cover • Environmental audit reports 	

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		with appropriate PPEs. <ul style="list-style-type: none"> • Ensure all operators are skilled on firefighting management • Annual EHS audits should be done 		
	Community health and safety risks	<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> • Informing workers on local cultural values and health matters. • Allowing migrant workers time to be with their families • Ensure equal treatment of workers. <p><i>Shocks and electrocutions</i></p> <ul style="list-style-type: none"> • Inspect the wiring of the houses before connecting power • Undertake safety awareness campaigns to the community • 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 • Develop and implement a reporting system for all safety risk and incidences. <p><i>Public Health Impacts –HIV/AIDs</i></p> <ul style="list-style-type: none"> • Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community • Allowing migrant workers time to be with their families 	Operation	<ul style="list-style-type: none"> • Number of awareness creation sessions conducted. • Records of awareness sessions conducted • Incidences report • Number of awareness creation sessions conducted. • Availability of and distribution of condoms
	Fire hazards	<ul style="list-style-type: none"> • Install and ensure the facility has proper and well-serviced firefighting equipment. • Install detection/alarm systems that can detect fire should be and installed • Develop and create awareness on fire management and response plans • 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 shall be identified and clearly 	Operation	<ul style="list-style-type: none"> • 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
		marked at the facility		
	Security risks	<ul style="list-style-type: none"> Monitor local security developments and adjust security protocols accordingly. Maintain a secure perimeter with robust fencing of the site. Ensure proper access control measures - only allowing authorized personnel. Deploy trained security personnel to guard the site 24/7. Continue engaging local communities to minimize any emerging hostility. Maintain and regularly update a comprehensive security incident response plan Maintain close coordination with local law enforcement and security agencies Implement a vetting process for all employees to minimize risk of insider threats. Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters. 	Operation	<ul style="list-style-type: none"> Number of security incidents reported (incidents/month): Number of security audits conducted (audits/year): Community engagement activities held (number/year): Incidents of violence or threats against staff (number/year). Collaboration with local law enforcement (number of meetings/year). Number of partnerships established with security ngos (active partnerships).
Impacts on biophysical environment	Impacts on landscape and visual	<ul style="list-style-type: none"> Create a decommissioning plan that includes minimizing any visual impacts. Implement a revegetation plan using native plants and vegetation. Ensure proper management of all waste materials to prevent visual pollution. Conduct regular cleanup to remove any unsightly materials. Install informational signs explaining the decommissioning process. Provide regular updates to stakeholders on decommissioning progress. 	Decommissioning	<ul style="list-style-type: none"> Photographic documentation: Vegetation health monitoring: Number of complaints: Soil erosion assessment: Public awareness programs participation. Community engagement metrics.
	Impacts on biological environment	<ul style="list-style-type: none"> Develop habitat protection plans to protect sensitive habitats, such as wetlands. Implement erosion control measures to prevent sediment runoffs. Undertake habitat restoration using native plants to promote ecosystem recovery. Monitor and manage invasive species to prevent their 	Decommissioning	<ul style="list-style-type: none"> Biodiversity surveys. Community engagement records. Erosion and sedimentation rates. Flora and fauna species lists. Habitat quality assessments. Invasive species monitoring. Vegetation health monitoring.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		spread in disturbed areas. <ul style="list-style-type: none"> • Implement noise control measures to minimize disturbance to local wildlife. • Ensure proper disposal of waste materials to prevent any harmful pollution. • Work with environmental specialists to implement effective mitigation measures. • Develop and implement detailed site restoration plans. 		
	Solid Waste Generation	<ul style="list-style-type: none"> • Demolition contractor to adhere to the various manufacturer's guidelines. • Ensure proper segregation of waste streams - hazardous and non-hazardous. • Ensure proper handling and storage of all demolition materials. • Ensure 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	<ul style="list-style-type: none"> • Presence of well-maintained receptacles and centralized collection points
	Wastes (liquid)	<ul style="list-style-type: none"> • Conduct a comprehensive assessment to identify/categorize all liquid waste. • Develop a detailed liquid waste management plan outlining all procedures. • Establish temporary storage facilities for all liquid wastes to prevent leaks/spills. • Use environmentally friendly materials that generate less hazardous liquid wastes. • Ensure that all liquid wastes are disposed by licensed waste disposal facilities. • Provide training for staff on liquid waste handling to minimize risks. • Identify opportunities for the reuse or recycling of liquid waste materials. • Maintain accurate records of liquid waste management and disposals. • Establish an emergency contact list and response procedures. • Maintain an inventory of chemicals and hazardous substances. 	Decommissioning	<ul style="list-style-type: none"> • Liquid waste generation quantities. • Soil contamination assessments. • Incidence of spills and leaks. • Liquid waste management plan compliance. • Public reporting and complaints. • Community engagement metrics. • Volume of recovered reusable liquids.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
	Noise and Vibration	<ul style="list-style-type: none"> Use quiet equipment (i.e., equipment designed with noise control elements). 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	<ul style="list-style-type: none"> Noise levels-Records of noise measurements done by contractor within the project area and at distances of 30m from the project site
	Air quality (dust)	<ul style="list-style-type: none"> Use water sprays or misting systems to dampen surfaces and reduce dust. Implement soil stabilization techniques to minimize dust from disturbed areas. Enforce speed limits for vehicles to reduce dust emissions from vehicle traffic. Engage with local communities to inform them about decommissioning activities. Conduct regular inspections to identify potential sources of dust emissions. Plan for site restore vegetation restoration to prevent dust generation. 	Decommissioning	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative dust impact assessment. Effectiveness of dust control measures. Health impact assessments. Long-term dust emission trends. Post-activity dust 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)	<ul style="list-style-type: none"> Implement a regular maintenance schedule for all vehicles to minimize emissions. Train drivers/equipment operators on practices that limit emissions. Conduct scheduled checks to ensure emission controls. Establish a reporting system for emissions data to track progress. 	Decommissioning	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative emission impact assessment: Environmental compliance audits. Health impact assessment reports. Long-term emission trends. Maintenance records of vehicles.
Impacts on Infrastructure & Utilities	Water Resources	<ul style="list-style-type: none"> Conduct assessment to evaluate water needs & identify reduction opportunities. Develop a water management plan that minimize water consumption. Implement systems to recycle and reuse water for various tasks. Provide training for personnel on water conservation practices. Use temporary storage solutions to manage water supplies and reduce waste. Implement measures to prevent leaks and spills from 	Decommissioning	<ul style="list-style-type: none"> Community feedback Compliance with water usage regulations: Impact on local water resources: Mitigation measure implementation records. Water consumption efficiency Water recycling rates: Water usage quantities and supply.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		water storage.		
Impacts on social environment	Impacts on Occupational health and safety	<ul style="list-style-type: none"> Conduct a thorough occupational health and safety risk assessment. Ensure that all workers are equipped with appropriate PPE. Conduct regular safety inspections to address potential hazards promptly. Establish EPRP 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	<ul style="list-style-type: none"> Incident reporting and tracking. Health and safety training participation. Personal protective equipment (PPE) compliance. Safety audits and inspections. First aid response records. Compliance with safety regulations. Incident investigation reports.
	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> 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. Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation. 	Decommissioning	<ul style="list-style-type: none"> Conflict incidence reports. Community meetings and feedback. Long-term livelihood trends.
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. Define and communicate restricted access hours during 	Decommissioning	<ul style="list-style-type: none"> Incident reports of trespassing. Visitor logs. Community awareness programs. Community feedback on security. Stakeholder engagement effectiveness. Reporting mechanisms for trespassing.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<ul style="list-style-type: none"> which the site is closed to unauthorized personnel. Hold regular community engagement meetings to discuss security concerns and gather feedback on improving site safety. 		
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Consult with and involve local community in the decommissioning activities. Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM 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	<ul style="list-style-type: none"> Records of employees/updated employee register. Number of local community employees and external employees/ updated employee register.
	Gender-based violence	<ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage SEA/SH risks that are relevant to the subproject. Implement a code of conduct signed by all those with physical presence on site. Establish Workers GRM with multiple channels including SEA/H channels. Ensure that Code conducts on GBV are signed by all employers. 	Decommissioning	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. Grievances raised, aggrieved persons and status on resolution etc
	Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. Implement a worker's grievances mechanism. Ensure proportionate representation of VMGs in the local grievances committee. 	Decommissioning	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances Availability of grievance redress process Number of grievances reported Number of grievances resolved in a timely manner Number of grievances escalated to national courts and the World Bank Grievances

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
				Redress Service and Inspection Panel.
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> 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. 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	<ul style="list-style-type: none"> Frequency of stakeholder meetings. Documentation of stakeholder concerns. Follow-up actions on feedback. Community representation in decision-making. Collaboration with local organizations. Long-term engagement strategies.
	Child and forced labour	<ul style="list-style-type: none"> Adhere to the ESS 2 provisions and FRS Employment Laws. 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". 	Decommissioning	<ul style="list-style-type: none"> Number of reported cases of forced labour. Updated employment register indicating locals employed, their ages, national identification numbers etc. Grievances raised, aggrieved persons and status on resolution etc.
	Security risks	<ul style="list-style-type: none"> Conduct a thorough security risk assessment to identify potential threats. 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. Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities. 	Decommissioning	<ul style="list-style-type: none"> Incident reports. Access control measures. Response time to security incidents. Training of security personnel. Community security awareness programs. Stakeholder feedback on security. Analysis of security trends. Feedback from security personnel.
	Community health and safety risks	<ul style="list-style-type: none"> Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the 	Decommissioning	<ul style="list-style-type: none"> Health incident reports. Community health assessments.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		decommissioning process. <ul style="list-style-type: none"> • 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. 		<ul style="list-style-type: none"> • Feedback mechanisms for community concerns. • Community satisfaction surveys. • Communication of health risks. • Injury rate monitoring. • Environmental health audits. • Documentation of community feedback.
	Fire hazards	<ul style="list-style-type: none"> • Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. • Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. • Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. • Ensure the availability of adequate firefighting equipment, such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. • Store flammable materials in designated, secure areas 	Decommissioning	<ul style="list-style-type: none"> • Fire incident reports. • Fire risk assessments. • Documentation of fire hazards. • Monitoring of flammable materials storage. • Documentation of community feedback on fire safety.

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	PROJECT PHASE	MONITORING INDICATOR
		<p>away from ignition sources, following appropriate storage guidelines.</p> <ul style="list-style-type: none"> • 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. 		

8.0. Environmental and Social Management Plan

This section describes the environmental and social management plan (ESMP) for the proposed project. The ESMP provides a logical framework within which the identified negative environmental and social can be mitigated and monitored (Table 8.1). It also provide a detailed arrangement on how the ESMP will be implemented in each of the project phases. It is expected that BECO will refer to this ESMP during all phases of the project and develop specific implementation plans. In addition, the ESMP assigns responsibilities of actions to various actors and provides a timeframe within which mitigation measures and monitoring should be done. The ESMP aims to monitor the implementation of mitigation measures against potential adverse impacts of construction and operation phases of a project, ensuring compliance with relevant environmental and social policies, guidelines, and legislation. It also assesses emerging non-anticipated adverse impacts and implements mitigation measures to maintain them within acceptable levels. The ESMP also maintains best practices in environmental, social health, and safety, adhering to environmental laws and WB policies.

8.1. THE ESMP IMPLEMENTATION TOOLS

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

8.1.1. Construction Phase

The contractor will prepare targeted management plans to deal with specific environmental and social aspects guided by the ESMP and any other emerging issues on the ground. The contractor shall prepare these plans and have them approved by the MoEWR before they mobilize to the site: Construction management plan; rehabilitation and site closure plan; local recruitment plan; workplace health and safety plan; community safety plan; emergency management and response plan; SEA/SH prevention and response plan; stakeholder engagement management plan; grievance redress mechanism; and labour influx management plan

8.1.1.1. Construction Management Plan

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

- *Management of fuels and other hazardous materials:* The Contractor shall comply with all applicable laws, regulations, permit and approval conditions and requirements relevant to the storage, use, and proper disposal of hazardous materials.
- *Management of the construction site:* The contractor shall prevent littering and the random discard of any solid waste on or around the construction site. The contractor shall manage other solid and liquid waste.
- *Fire prevention and management:* The Contractor shall take all necessary precautions to prevent fires caused either deliberately or accidentally during construction process. The Contractor shall prepare a fire prevention and fire emergency plan as a part of the plans to be submitted to MoEWR and BECO.
- *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/BECO and the neighbours e.g., the wayleaves agreements signed between MoEWR/BECO 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/BECO 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/BECO.

8.1.1.2. Rehabilitation and Site Closure Plan

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

8.1.1.3. Local Recruitment Plan

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

8.1.1.4. Workplace Health and Safety Plan

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

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

8.1.1.5. Community Health and Safety Plan

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

- Adherence to the existing FRS and BRA by-laws and regulations, and the WB ESS4.
- The contractor to ensure that construction work is undertaken in manner not likely pose risks to community health and safety.

- The contractor shall undertake an independent risk assessment prior to any construction activity. The findings of this assessment will inform the development of a community safety plan and create awareness to the community on the same.

8.1.1.6. Emergency Preparedness and Response Plan

The Contractor shall develop an emergency plan that will enable rapid and effective response to all types of environmental emergencies in accordance with recognized national and international standards. The emergency plan shall include establishment of a network of communication between the Contractor and emergency services including police, ambulance services, and fire brigades among others.

8.1.1.7. SEA/SH Prevention and Response Plan

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

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

8.1.1.8. Stakeholder Engagement Plan

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

8.1.1.9. 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. Local Grievance Committee (LGC) will be established before the commencement of the project. The LGC will further need additional training to make them more effective. 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/BECO 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 Benadir Administrative Region) systems. However, it is expected that most disputes will be resolved at the

lowest level through the GRC. Since most disputes/grievances are likely to arise during the Construction and operation period, the contractor's Environmental and Social Safeguard team specifically the Community Liaison Officer will work closely with the community to be able to resolve disputes. The responsibilities of the Community Liaison Officer shall include:

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

World Bank Grievances Redress Mechanism

The World Bank has established 2 grievance redress mechanisms that provide avenues for individuals and communities to submit complaints directly if there is belief that they have been, or are likely to be, adversely affected by a World Bank-funded project. In this project PAPs and other stakeholders have the right to know and access at no cost these GRMs as described below.

- **World Bank Grievances Redress Service:** The Grievance Redress Service (GRS) is an avenue for individuals and communities to submit complaints directly to the World Bank if they believe that a World Bank-supported project has or is likely to have adverse effects on them, their community, or their environment. The GRS enhances the World Bank's responsiveness and accountability to project-affected communities by ensuring that grievances are promptly reviewed and addressed. Complaints must be in writing and addressed to the GRS and sent through the following methods namely:
 - (a) Online by accessing the online form;
 - (b) Sending an Email to grievance@worldbank.org; or
 - (c) Submitting a letter to the World Bank Headquarters in Washington D.C., United States or World Bank Kenya County Office.
- **World Bank Inspection Panel:** The Inspection Panel is an independent complaints mechanism for people and communities who believe that they have been, or are likely to be, adversely affected by a World Bank-funded project. The Panel is an impartial fact-finding body, independent from the World Bank management and staff, reporting directly to the Board. The Inspection Panel process aims to promote accountability at the World Bank, give affected people a greater voice in activities supported by the World Bank that affect their rights and interests, and foster redress when warranted. In September 2020, the Board updated the resolution that created the Panel and added to the Panel functions. At the same time, the Board approved a resolution establishing the World Bank Accountability Mechanism (AM). The new AM began operations in early 2021 and houses the Panel to carry out compliance reviews and a new Dispute Resolution Service (DRS), which will give complainants another way to have their concerns addressed. Contacts for registration of complaints to the IP are; Tel: +1 202 458 5200; email:ipanel@worldbank.org.

8.1.1.10. Labour Influx Management Plan

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

- Monitor the scale of project induced in-migration into the project area and specific in-migration;
- Support Benadir Administrative Region 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) Benadir Administrative Region/FRS labour laws
 - (b) Benadir Administrative Region/FRS child labour laws
 - (c) FRS/International forced labour laws
- (ii) Enforce:
 - (a) The Code of conduct
 - (b) Benadir Administrative Region/FRS labour laws
 - (c) Benadir Administrative Region/FRS child labour laws
 - (d) FRS/International forced labour laws

8.1.2. Operation Phase

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

8.1.3. Decommissioning Phase

The rehabilitation and decommissioning management plan shall include the following:

- (i) Planning for Closure
 - (a) The MoEWR (the proponent) shall investigate practical options for closure of the facility at least one year before decommissioning and submit a report to relevant FRS and BRA authorities.
 - (b) The MoEWR and BECO 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 BECO shall explore options of re-use and recycling of the facility's components/structures.
- (ii) The decommissioning
 - (a) The MoEWR and BECO 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 BECO shall undertake a further survey to identify any contaminated areas and remediate them accordingly.

(iii) Post Closure

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

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

8.2. MONITORING

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

- *Safety*: hours worked, recordable incidents and corresponding root cause analysis (lost time incidents, medical treatment cases), first aid cases, high potential near misses, and remedial and preventive activities required (for example, revised job safety analysis, new or different equipment, skills training, and so forth).
- *Environmental incidents and near misses*: environmental incidents and high potential near misses and how they have been addressed, what is outstanding, and lessons learned.
- *Major works*: those undertaken and completed, progress against project schedule, and key work fronts (work areas).
- *E&S inspections and audits*: to include date, inspector or auditor name, and records reviewed, major findings, and actions recommended and implemented.
- *Workers*: number of workers, indication of origin (expatriate, local, nonlocal nationals), gender, age and skill level (unskilled, skilled, supervisory, professional, management).
- *Training on E&S issues*: including dates, number of trainees, and topics.
- *Footprint management*: details of any work outside boundaries or major off-site impacts caused by ongoing construction—to include date, location, impacts, and actions taken.
- *External stakeholder engagement*: highlights, including number of formal and informal meetings, and information disclosure and dissemination—to include a breakdown of women and men consulted and themes coming from various stakeholder groups, including vulnerable groups (e.g., disabled, elderly, children, etc.).
- *Details of any security risks*: details of risks the contractor may be exposed to while performing its work—the threats may come from third parties external to the project.
- *Worker grievances*: details including occurrence date, grievance, and date submitted; actions taken and dates; resolution (if any) and date; and follow-up yet to be taken—grievances listed should include those received since the preceding report and those that were unresolved at the time of that report.
- *External stakeholder e.g., community grievances*: grievance and date submitted, action(s) taken and date(s), resolution (if any) and date, and follow-up yet to be taken—grievances listed shall include those received since the preceding report and those that were unresolved at the time of that report. Grievance data shall be age and gender-disaggregated.
- Major changes to contractor's environmental and social practices.
- *Deficiency and performance management*: actions taken in response to previous notices of deficiency or observations regarding E&S performance and/or plans for actions to be taken—these should continue to be reported until BECO determines the issue is resolved satisfactorily.
- *Grievance mechanism monitoring*: A more focused grievance mechanism monitoring regarding compliance will be implemented during all the project phases.

Table 8-1: The Environmental and social management plan (ESMP) for the proposed BECO Dayniile Hybrid Power Plant – Dayniile District, BRA

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
Contraction Phase						
Impacts on biophysical environment	Landscape and visuals	<ul style="list-style-type: none"> Erect a fence around the power plant. 	Contractor	<ul style="list-style-type: none"> Presence of a perimeter fence 	One-off	As per the construction budget
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> 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 drained into approved drainage facilities No vehicle maintenance and service shall be done at project site Scoop and correctly dispose contaminated soil. 	BECO Contractor	<ul style="list-style-type: none"> Records of any leakages from construction equipment/ vehicles. Oil spill containment plan. Provision of fuel/oil drip and spill trays 	Quarterly	3,500
	Air quality (Dust)	<ul style="list-style-type: none"> Burning of woody debris & construction waste to be prohibited. Cover construction trucks moving materials to prevent material dust emissions. Ensure all the personnel use PPEs. Keep stockpiles compacted and re-vegetate as soon as possible. Restrict speed on loose surface roads during dry or dusty conditions Stockpiles of excavated soil should be palliated dry or windy conditions. Suppress dust during dry periods by use of water sprays. 	Contractor BECO	<ul style="list-style-type: none"> Visual Observation of dust Provision of PPEs especially masks 	Quarterly	4,000
	Air quality (Vehicle exhaust emissions)	<ul style="list-style-type: none"> Sensitize drivers to avoid/minimize vehicle idling to lower emissions. Maintain all machinery order to minimum emissions of CO NO₂, SO₂, PM 	Contractor BECO	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks 	Biannually	3,500
	Noise & vibration	<ul style="list-style-type: none"> Train workers on the importance of noise control and best practices on noise. Restrict construction activities to daylight hours (e.g., 7:00 AM to 6:00 PM). Provide appropriate PPEs to workers during construction activities. 	Contractor BECO	<ul style="list-style-type: none"> Noise levels- Records of noise measurements done by contractor within the project area and at 	Quarterly	2,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> Inform nearby communities in advance about scheduled high-noise activities. Establish a monitoring program to regularly measure noise and vibration levels. Establish a GRM for community to report noise or vibration disturbances. Ensure regular maintenance of machinery to reduce noise emissions. Employ modern equipment fitted with noise-reduction technologies 		distances of 30m from the Hybrid power plant		
	Biodiversity (Fauna)	<ul style="list-style-type: none"> Site clearing work/earthwork shall be carried out during the dry season. Limit all vehicle movements to designated roads with speed of 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 Undertake a supplementary biodiversity assessment on fauna in the area An ecologist shall be hired to coordinate the fauna monitoring. 	BECO Contractor	<ul style="list-style-type: none"> Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting 	Monthly	6,000
	Biodiversity (Flora)	<ul style="list-style-type: none"> Ensure proper demarcation of the project site for all construction works. Designate access routes and parking areas Re-vegetation including planting of trees around the plant/facility 	BECO Contractor	<ul style="list-style-type: none"> Number of trees cleared Planted trees 	Quarterly	6,000
	Soil erosion	<ul style="list-style-type: none"> Avoid ground-breaking during the seasons of high rainfall to avoid erosion. Monitoring of areas of exposed soil during rainy seasons. Use silt traps where necessary Monitor exposed soils to ensure that any incidents of erosion are controlled. Ensure spoil from excavations is arranged according to the various soil layers. 	BECO Contractor	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from compacted areas 	Monthly	4,000
	Wastes (Solid wastes)	<ul style="list-style-type: none"> Handle and label all hazardous products properly to avoid ground contacts 	BECO Contractor	<ul style="list-style-type: none"> Presence of well-maintained 	Weekly	8,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> • 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 materials to avoid regular replacements – avoid waste generation • 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 • Manage all the wastes in accordance with internationally accepted standards. 		receptacles and centralized collection points.		
	Wastes (Liquid wastes)	<ul style="list-style-type: none"> • All chemicals should be stored within the bunded areas and clearly labelled. • Create awareness for the employees on procedures of dealing with spills/leaks • Develop and implement a detailed Spill Prevention Plan (SPP) • Disposal of waste through septic tanks • Store all hazardous materials in compliance with local regulations. • Develop and implement spill management plan with clear procedures • Scoop all top toils for disposal incase of leaks. • Install oil-water separators in drainage systems to remove oil from stormwater. • Keep accurate documentation of fuel and oil storage volumes/transfer activities. • Ensure proper training for staff on handling and use of oils. • 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 to avoid leaks. 	BECO Contractor	<ul style="list-style-type: none"> • Engine maintenance records • Oil spill containment plan • Presence of separate and clean washrooms for both the gents and ladies 	Weekly	5,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> 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 all project phases 	BECO Contractor	<ul style="list-style-type: none"> Water usage records 	Monthly	2,000
	Energy Consumption	<ul style="list-style-type: none"> Ensure responsible electricity use through staff sensitization of staff. Ensure proper planning of transportation of materials for efficient fuel usage Monitor all energy usage during construction and set reduction targets. 	BECO Contractor	<ul style="list-style-type: none"> Energy consumption records 	Monthly	2,000
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> Coordinate with the local herders and farmers to grazing routes or areas. Regularly engage the local community and address ant emerging concerns. Provide alternative water points for livestock near the construction area. Establish a grievance redress mechanism to address any conflicts or complaints 	BECO	<ul style="list-style-type: none"> Number of Alternative Grazing Routes/Areas Established. Frequency of Community Consultations. Grazing Land Access Complaints. Usage of Alternative Grazing Areas. Incidence of Conflict Over Grazing Access. Changes in Grazing Patterns. 	Quarterly	3,500
	Archaeology and cultural heritage	<ul style="list-style-type: none"> Develop and implement a Chance Finds Procedures Engage a qualified archaeologist for any early identification of chance finds. Establish a clear protocol for halting construction activities upon a chance find. Ensure proper documentation of all chance finds. 	Contractor BECO	<ul style="list-style-type: none"> Stratigraphic Soil profile reports during excavation Fully developed artefact recovery protocols Discovery of human burials reports during excavation. Regulatory 	Weekly	3,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				Compliance reporting under Somali Heritage Laws.		
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Controlled access to the site only with prior approval Fencing off the construction site to keep of unauthorized personnel Hazard communication Maintain records of any person who comes to site Ensure proper barricading 	Contractor	<ul style="list-style-type: none"> Presence of a controlled access and records of every person accessing the site 	Monthly	1,500
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Tap into the local workforce to the extent possible to reduce labour influx. Raise awareness among local community and workers on cordial working relation Sensitize workers regarding engagement with local community. Establish and operationalize an effective GRM accessible to community members. Respect for community values/culture. Prompt payment of workers as per the contractual agreements/terms. 	BECO Contractor	<ul style="list-style-type: none"> Records of employees/updated employee register. Number of local community employees and external employees/ updated employee register. 	Quarterly	4,500
	Gender-based violence	<ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Implement a code of conduct signed by all those with physical presence on site. Establish Workers GRM with multiple channels including SEA/H channels. Ensure that Code conducts are signed by all employers in the contracts. 	BECO Contractor	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Code of conduct signed by all those with physical presence on site. GRM that ensures confidentiality of GBV cases in place. Documented referral services for survivors. 	Quarterly	5,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				<ul style="list-style-type: none"> Grievances raised, aggrieved persons and status on resolution etc 		
	Labour disputes	<ul style="list-style-type: none"> Ensure full compliance with local labor laws. Ensure that all workers receive clear contracts outlining their rights, responsibilities, wages, benefits, working hours, and terms of employment. Establish mechanisms to guarantee fair/timely payment of wages and benefits. Establish worker welfare systems to represent concerns & promote dialogue. Implement non-discrimination policies to ensure equal treatment for all. Set up a transparent GRM to handle all complaints/disputes in a timely manner. 	BECO Contractor	<ul style="list-style-type: none"> Number of grievances filed and time taken to resolve them. Frequency of labor disputes. Health and safety violations. Worker turnover rate and compliance with working hours and overtime rules. Labor law compliance audits Worker welfare committee activities. 	Quarterly	3,500
	Child and forced labour	<ul style="list-style-type: none"> 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 all the ESS 2 provisions and FRS Employment Act on forced labour. Report any form of forced labour at the site. 	BECO Contractor	<ul style="list-style-type: none"> Updated employment register indicating locals employed, their ages, national identification numbers etc. Grievances raised, aggrieved persons and status on resolution etc. Number of reported cases of forced labour. 	Biannually	4,000
	Security risks	<ul style="list-style-type: none"> Conduct a comprehensive risk assessment to identify specific security threats. 	Contractor BECO	<ul style="list-style-type: none"> Number of security incidents and 	Monthly	4,800

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> Engage all stakeholders to understand and address local security concerns. Collaborate with local law enforcement/security agencies to enhance security. Hire licensed security to provide 24/7 site surveillance, patrols, and monitoring. Use surveillance systems/CCTV cameras to monitor critical areas in real-time. Implement strict access control protocols, including sign-in procedures. Provide workers with ID badges and restrict entry to authorized personnel only. Develop a security incident response plan including emergencies procedures. Provide workers with security training and response protocols to threats. Maintain constant with local authorities on security updates in the area. Have security response teams on standby to address any security emergencies. 		<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Develop and implement a comprehensive OHS plan before the commencement of the project Use skilled personnel for activities which demand skills/technical tasks Workers coming to the site should be knowledgeable on safety precautions Provide appropriate PPE to all workers. Undertake risk assessment and implement mitigation measures appropriately Availability of equipped first aid box on site Provide safe drinking water for workers Engagement of trained first aider on site Establish safety committees 	Contractor	<ul style="list-style-type: none"> Records of any near misses, incident, and accidents. Records of corrective actions implemented if there was an accident. 	Weekly	3,000
	Community health and safety risks	<ul style="list-style-type: none"> Allowing migrant workers time to be with their families Create awareness to the community on risks associated with construction works. 	Contractor BECO	<ul style="list-style-type: none"> Number of awareness creation sessions conducted. 	Monthly	3,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> • 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. • Provide awareness materials on HIV/AIDS transmission and prevention. 		<ul style="list-style-type: none"> • Availability of and distribution of condoms 		
	Fire Hazards	<ul style="list-style-type: none"> • 'No smoking' signs shall be posted at the construction site • A fire risk assessment/evacuation be prepared and posted across site. • 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. 	Contractor	<ul style="list-style-type: none"> • Records of any Fire incidences • Fire equipment and evacuation plan 	Weekly	2,500
	Traffic risk	<ul style="list-style-type: none"> • Develop and implement a Traffic Management Plan (TMP). • Use traffic signs, barriers, and cones to guide construction and local traffics. • Enforce strict speed limits for vehicles within the site and designated routes. • Install speed bumps/ traffic-calming measures on roads near the site. • Engage with local communities to raise awareness about safety measures. • Erect temporary road signs warning local road users near the site. • Designate safe parking and loading zones for all construction vehicles. 	Contractor BECO	<ul style="list-style-type: none"> • Number of traffic incidents. • Traffic management plan compliance. • Speed limit violations. • Traffic safety training attendance. • Community complaints related to traffic. • Emergency response time to traffic incidents. • Community awareness programs on traffic safety. • Use of alternative routes by construction 	Weekly	3,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> Update the existing SEP and make it more relevant to the subproject and the identified stakeholders. In line with the SEP, undertake adequate consultations prior to construction. 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. 	BECO	vehicles. <ul style="list-style-type: none"> Availability of and implementation of the Stakeholder Engagement Plan. Number of stakeholder consultations held Record of stakeholder consultations held (minutes of meetings and list of participants). Information disclosed, to whom it was disclosed (Men, women, PWD, youth, vulnerable individuals 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	4,500
	Inadequate grievances management	<ul style="list-style-type: none"> Constitute a Local Grievances Committee is in consultation with stakeholders Implement a workers and community GRM. Ensure proportionate representation of VMGs in the local grievances committee. 	Contractor BECO	<ul style="list-style-type: none"> Local Grievances Committee in place, composition of committee, awareness of 	Monthly	4000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> Provide for confidential reporting under the GRM 		community and workers on project and worker GRMs, updated GRM logs, types of grievances <ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Fence off the power plant. 	BECO	<ul style="list-style-type: none"> Presence of a perimeter fence 	On-off	As per the operation budget
	Soil, groundwater and surface water contamination	<ul style="list-style-type: none"> Ensure proper design of drainage system to minimize contaminated run-off. Develop and implement oil-spill containment plan as part of the EPRP. No vehicle maintenance and service shall be done at project site Ensure that potential sources of petro-chemical pollution protected from leaks. 	BECO	<ul style="list-style-type: none"> Oil spill containment plan. Provision of fuel/oil drip and spill trays 	Quarterly	4,800
	Flood risks	<ul style="list-style-type: none"> Ensure drainage channels are free of any obstruction at all times. Construct more channels and or expand existing ones Raise foundations of the solar panels and ensure well 	BECO	<ul style="list-style-type: none"> Provision of drainage system Raised foundations for the structures 	Biannually	4,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> designed concrete base Create flooding diversions and or spill ways to divert water from the plant 				
	Air quality (Dust)	<ul style="list-style-type: none"> Plant trees around the plant to act as wind breakers/decrease dust pollution Ensure planting of grass around and within the facility compound 	BECO	<ul style="list-style-type: none"> Visual inspection 	Biannually	2,000
	Air quality (Vehicle and exhaust emissions)	<ul style="list-style-type: none"> Maintain all machinery in good to minimum emissions of CO, NO2, SO2. Regularly monitor and report emissions data as part of EHS compliance. 	BECO	<ul style="list-style-type: none"> Engine maintenance records Inspection of stacks 	Quarterly	2,500
	Noise & vibration	<ul style="list-style-type: none"> Use quieter, high-efficiency fans and cooling systems with lower noise outputs. Equip the BESS unit with vibration isolators to reduce vibrations/noise Install sound barriers or walls around the BESS unit to deflect or absorb noise. Use sound-absorbing materials within the BESS housing units. Regularly service and maintain fans, inverters, and other equipment 	BECO	<ul style="list-style-type: none"> Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the Hybrid power plant 	Quarterly	2,000
	Biodiversity (Fauna)	<ul style="list-style-type: none"> Undertake a supplementary biodiversity assessment and develop BMP 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. Undertake regular monitoring and report on biodiversity 	BECO	<ul style="list-style-type: none"> Full implementation of biodiversity management plan for the project Regular biodiversity monitoring and reporting 	Quarterly	4,000
	Biodiversity (Flora)	<ul style="list-style-type: none"> Re-vegetation including planting of trees around the plant/facility Develop and implement and invasive species management plan. 	BECO	<ul style="list-style-type: none"> Number of trees cleared Planted trees 	Quarterly	3,500
	Soil erosion	<ul style="list-style-type: none"> Monitor exposed soil during rainy seasons for proper erosion control. Landscape the power plant with grass in all open areas Construct the drainage system in a way to follow natural 	BECO	<ul style="list-style-type: none"> Assess size of rills or Gulleys forming from accelerated run off from 	Biannually	4,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		water channels <ul style="list-style-type: none"> Concrete only the required area and leave the rest of the land with grass Construct rain water harvesting system on buildings and install adequate storages 		compacted areas <ul style="list-style-type: none"> Provision of a drainage system and a rain water harvesting system 		
	Wastes (Solid)	<ul style="list-style-type: none"> 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 <p><i>Damaged solar panels and hazardous wastes</i></p> <ul style="list-style-type: none"> Ensure segregation from other waste streams Ensure proper labelling and handling of all hazardous products/wastes. Dispose hazardous waste through a approved waste handler 	BECO	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points. 	Quarterly	5,500
	Wastes (Liquid)	<p><i>Sanitary wastes</i></p> <ul style="list-style-type: none"> Provide adequate sanitary waste facilities for both genders clearly marked Disposal of waste through septic tanks <p><i>Oils from vehicles</i></p> <ul style="list-style-type: none"> Refuelling and maintenance of vehicles will not take place at the construction site. Create awareness for the employees on procedures of handling spills and leaks All vehicles and equipment must be kept in good state to avoid leaks. <p><i>Chemicals</i></p> <ul style="list-style-type: none"> All chemicals should be stored within the bunded areas and clearly labelled detailing the nature and quantity of chemicals within individual containers. <p><i>Accidental fuel and oil spill</i></p> <ul style="list-style-type: none"> Ensure quick response to hazardous materials' spill by a 	BECO	<ul style="list-style-type: none"> 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 	Quarterly	5,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		trained response team. <ul style="list-style-type: none"> Install oil-water separators in drainage systems to manage oil 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. 				
Impacts on infrastructure and utilities	Water consumption	<ul style="list-style-type: none"> Ensure prudent use of water. Install water-conserving automatic taps. Any water leaks through damaged pipes and faulty taps should be fixed promptly. 	BECO	<ul style="list-style-type: none"> Water usage records 	Monthly	2,500
	Energy consumption	Lightings <ul style="list-style-type: none"> 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. Regularly review and adjust the hybrid power system's configuration to optimize the balance between solar and BESS. 	BECO	<ul style="list-style-type: none"> Solar Energy Generation (kWh/month): Battery Energy Storage System (BESS) Utilization (cycles/month). Lighting Energy Consumption (kWh/month). Carbon Emissions (tons of CO2/month). 	Monthly	2,500
Impacts on social environment	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> Continue consultations with local communities to assess 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. 	BECO	<ul style="list-style-type: none"> Number of complaints from affected communities (monthly). Access routes to grazing lands (percentage maintained). 	Biannually	2,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				<ul style="list-style-type: none"> 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	<ul style="list-style-type: none"> Fencing off the facility to keep of illegal access to the power plant. Ensure controlled access to the site only with prior approval Maintain records of any person who comes to site 	BECO	<ul style="list-style-type: none"> Presence of a controlled access and records of every person accessing the site 	Weekly	1,500
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> Prioritize the hiring of local workers to reduce the need for incoming workforce. Establish and enforce a strict code of conduct for incoming workers. Design separate worker accommodations for local and incoming workers. Encourage use of local suppliers of good and services to support local economy. Develop and implement waste management systems in all accommodation areas. Ensure both the workforce and the local community have access to GRM. Maintain links with local communities to address any concerns on worker influx. 	BECO Contractor	<ul style="list-style-type: none"> 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 	Annually	3,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				rate (%). • Worker welfare program implementation (% of programs implemented). • Community consultation meetings held (number/year).		
	Gender-based violence	<i>GBV- SEA and SH</i> <ul style="list-style-type: none"> Update the existing SEA/SH Prevention/Response Action Plan, to manage the SEA/SH risks that are relevant to the subproject. Develop and implement 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 all employees sign Code conducts on GBV in employment contracts. <i>Inaccessibility of project benefits to VMGs and other vulnerable individuals due to affordability challenges</i> <ul style="list-style-type: none"> Ensure VMGs individuals have to ensure they equally benefit from the project. 	BECO	<ul style="list-style-type: none"> Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. Documented referral services for survivors. Interventions to enable those vulnerable access project benefits. Number of complaints raised by VMGs/vulnerable individuals regarding access to project services. 	Quarterly	3,000
	Labour disputes	<ul style="list-style-type: none"> Ensure all employees have clear and legally binding employment contracts. Establish an accessible and transparent GRM for all workers' disputes. Maintain open communication between management and workers. Ensure full compliance with national labor laws. 	BECO	<ul style="list-style-type: none"> Number of Labor Disputes Raised (disputes/month): Grievances Resolved Within Agreed Timeframe (%): 	Biannually	2,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> • Implement fair and transparent disciplinary procedures. • Promote equal opportunities and non-discriminatory hiring practices. • Set up a monitoring system to track and evaluate labor relations. • Conduct regular worker feedback surveys to understand any emerging disputes. 		<ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Ensure compliance with the national labor laws management practices. • Put visible signage on site "No Jobs for children" "Do not allow children". • Adhere to the ESS 2 provisions and FRS Employment Laws. • Report any form of forced labour at the site. 	BECO	<ul style="list-style-type: none"> • Number of child labor incidents reported (incidents/month). • Number of forced labor incidents reported (incidents/year). • Grievances related to child or forced labor (number of grievances/year). • Community outreach and awareness campaigns on child labor (campaigns/year). • Compliance with international labor standards (compliance level). • Social audits conducted (number of audits/year). • Local community 	Biannually	2,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				feedback on employment practices (satisfaction level).		
	Risks related to poor or inadequate stakeholder engagement (Conflict)	<p><i>Risks related to Inadequate stakeholder engagement</i></p> <ul style="list-style-type: none"> Update the existing SEP and make it more relevant to the subproject and to the identified stakeholders. Ensure timely and prior disclosure of project all project information. Prepare and implement a GRM to deal with all grievances. The grievance redress committee to include representatives from the community. Sensitize stakeholders on SEP and GRM. <p><i>Inadequate grievances management</i></p> <ul style="list-style-type: none"> Employ from the community to the extent possible Engage the community members and other stakeholders in a timely manner 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 	BECO	<ul style="list-style-type: none"> Availability of and implementation of the Stakeholder Engagement Plan. Number of stakeholder consultations held Record of stakeholder consultations held (minutes of meetings and list of participants). Availability of grievance redress process. 	Quarterly	6,000
	Occupational health and Safety	<ul style="list-style-type: none"> Develop and implement a comprehensive OHS plan before the commencement of the project Ensure only qualified staff are employed to work in the facility All workers operating the project site must be equipped with appropriate PPEs. Ensure all operators are skilled on firefighting management Annual EHS audits should be done 	BECO	<ul style="list-style-type: none"> Provision of PPEs and WIBA cover Environmental audit reports 	Weekly	4,500
	Community health and safety risks	<p><i>Public Health Impacts</i></p> <ul style="list-style-type: none"> Informing workers on local cultural values and health matters. Allowing migrant workers time to be with their families Ensure equal treatment of workers. 	BECO	<ul style="list-style-type: none"> Number of awareness creation sessions conducted. Records of awareness sessions 	Quarterly	4,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<p><i>Shocks and electrocutions</i></p> <ul style="list-style-type: none"> Inspect the wiring of the houses before connecting power Undertake safety awareness campaigns to the community 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 Develop and implement a reporting system for all safety risk and incidences. <p><i>Public Health Impacts –HIV/AIDS</i></p> <ul style="list-style-type: none"> Sensitize workers and the community on prevention and mitigation of HIV/AIDS and other sexually transmitted diseases, through staff awareness and awareness campaigns for the community Allowing migrant workers time to be with their families 		<p>conducted</p> <ul style="list-style-type: none"> Incidences report Number of awareness creation sessions conducted. Availability of and distribution of condoms 		
	Fire hazards	<ul style="list-style-type: none"> Install and ensure the facility has proper and well-serviced firefighting equipment. Install detection/alarm systems that can detect fire should be and installed Develop and create awareness on fire management and response plans 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 shall be identified and clearly marked at the facility 	BECO	<ul style="list-style-type: none"> Provision of serviced fire equipment, evacuation plan and safety signages Records of fire safety training 	Monthly	3,000
	Security risks	<ul style="list-style-type: none"> Monitor local security developments and adjust security protocols accordingly. Maintain a secure perimeter with robust fencing of the site. Ensure proper access control measures - only allowing authorized personnel. Deploy trained security personnel to guard the site 24/7. Continue engaging local communities to minimize any 	BECO	<ul style="list-style-type: none"> Number of security incidents reported (incidents/month): Number of security audits conducted (audits/year): Community 	Weekly	1,200

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		emerging hostility. <ul style="list-style-type: none"> • Maintain and regularly update a comprehensive security incident response plan • Maintain close coordination with local law enforcement and security agencies • Implement a vetting process for all employees to minimize risk of insider threats. • Develop and periodically review contingency plans for worst-case scenarios, such as armed attacks, civil unrest, or natural disasters. 		engagement activities held (number/year): <ul style="list-style-type: none"> • 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	<ul style="list-style-type: none"> • Create a decommissioning plan that includes minimizing any visual impacts. • Implement a revegetation plan using native plants and vegetation. • Ensure proper management of all waste materials to prevent visual pollution. • Conduct regular cleanup to remove any unsightly materials. • Install informational signs explaining the decommissioning process. • Provide regular updates to stakeholders on decommissioning progress. 	BECO Contractor	<ul style="list-style-type: none"> • Photographic documentation: • Vegetation health monitoring: • Number of complaints: • Soil erosion assessment: • Public awareness programs participation. • Community engagement metrics. 	One-off	Decommissioning budget
	Impacts on biological environment	<ul style="list-style-type: none"> • Develop habitat protection plans to protect sensitive habitats, such as wetlands. • Implement erosion control measures to prevent sediment runoffs. 	Contractor	<ul style="list-style-type: none"> • Biodiversity surveys. • Community engagement records. 	Weekly	4,800

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> Undertake habitat restoration using native plants to promote ecosystem recovery. Monitor and manage invasive species to prevent their spread in disturbed areas. Implement noise control measures to minimize disturbance to local wildlife. Ensure proper disposal of waste materials to prevent any harmful pollution. Work with environmental specialists to implement effective mitigation measures. Develop and implement detailed site restoration plans. 		<ul style="list-style-type: none"> Erosion and sedimentation rates. Flora and fauna species lists. Habitat quality assessments. Invasive species monitoring. Vegetation health monitoring. 		
	Solid Waste Generation	<ul style="list-style-type: none"> Demolition contractor to adhere to the various manufacturer's guidelines. Ensure proper segregation of waste streams - hazardous and non-hazardous. Ensure proper handling and storage of all demolition materials. Ensure adequate collection and storage of waste on site Safe transportation to the disposal sites / designated area Hazardous waste must be disposed by approved waste handler 	Contractor BECO	<ul style="list-style-type: none"> Presence of well-maintained receptacles and centralized collection points 	Monthly	5,000
	Wastes (liquid)	<ul style="list-style-type: none"> Conduct a comprehensive assessment to identify/categorize all liquid waste. Develop a detailed liquid waste management plan outlining all procedures. Establish temporary storage facilities for all liquid wastes to prevent leaks/spills. Use environmentally friendly materials that generate less hazardous liquid wastes. Ensure that all liquid wastes are disposed by licensed waste disposal facilities. Provide training for staff on liquid waste handling to minimize risks. Identify opportunities for the reuse or recycling of liquid waste materials. Maintain accurate records of liquid waste management and disposals. 	Contractor BECO	<ul style="list-style-type: none"> Liquid waste generation quantities. Soil contamination assessments. Incidence of spills and leaks. Liquid waste management plan compliance. Public reporting and complaints. Community engagement metrics. Volume of 	Monthly	4,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> Establish an emergency contact list and response procedures. Maintain an inventory of chemicals and hazardous substances. 		recovered reusable liquids.		
	Noise and Vibration	<ul style="list-style-type: none"> Use quiet equipment (i.e., equipment designed with noise control elements). 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 BECO	<ul style="list-style-type: none"> Noise levels- Records of noise measurements done by contractor within the project area and at distances of 30m from the project site 	Weekly	2,000
	Air quality (dust)	<ul style="list-style-type: none"> Use water sprays or misting systems to dampen surfaces and reduce dust. Implement soil stabilization techniques to minimize dust from disturbed areas. Enforce speed limits for vehicles to reduce dust emissions from vehicle traffic. Engage with local communities to inform them about decommissioning activities. Conduct regular inspections to identify potential sources of dust emissions. Plan for site restore vegetation restoration to prevent dust generation. 	BECO Contractor	<ul style="list-style-type: none"> Community complaints and feedback. Cumulative dust impact assessment. Effectiveness of dust control measures. Health impact assessments. Long-term dust emission trends. Post-activity dust cleanup reports. Public awareness programs participation. Soil and vegetation dust monitoring. Traffic patterns and impact assessment. Visual assessment of dust levels. 	Weekly	1,500
	Air quality (vehicle fumes)	<ul style="list-style-type: none"> Implement a regular maintenance schedule for all vehicles to minimize emissions. 	BECO Contractor	<ul style="list-style-type: none"> Community complaints and 	Weekly	2,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		<ul style="list-style-type: none"> • Train drivers/equipment operators on practices that limit emissions. • Conduct scheduled checks to ensure emission controls. • Establish a reporting system for emissions data to track progress. 		feedback. <ul style="list-style-type: none"> • Cumulative emission impact assessment: • Environmental compliance audits. • Health impact assessment reports. • Long-term emission trends. • Maintenance records of vehicles. 		
Impacts on Infrastructure & Utilities	Water Resources	<ul style="list-style-type: none"> • Conduct assessment to evaluate water needs & identify reduction opportunities. • Develop a water management plan that minimize water consumption. • Implement systems to recycle and reuse water for various tasks. • Provide training for personnel on water conservation practices. • Use temporary storage solutions to manage water supplies and reduce waste. • Implement measures to prevent leaks and spills from water storage. 	Contractor BECO	<ul style="list-style-type: none"> • Community feedback • Compliance with water usage regulations: • Impact on local water resources: • Mitigation measure implementation records. • Water consumption efficiency • Water recycling rates: • Water usage quantities and supply. 	Monthly	2,000
Impacts on social environment	Impacts on Occupational health and safety	<ul style="list-style-type: none"> • Develop and implement a comprehensive OHS plan before the commencement of the project • Conduct a thorough occupational health and safety risk assessment. • Ensure that all workers are equipped with appropriate PPE. • Conduct regular safety inspections to address potential hazards promptly. • Establish EPRP for incidents such as fires, chemical spills, and 	Contractor BECO	<ul style="list-style-type: none"> • Incident reporting and tracking. • Health and safety training participation. • Personal protective equipment (PPE) compliance. 	Monthly	2,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		medical emergencies, and ensure all workers are trained in these procedures. <ul style="list-style-type: none"> Develop and enforce safe work practices and standard operating procedures for decommissioning tasks, including equipment handling, dismantling, and waste disposal. Provide first aid facilities and ensure that trained personnel are available to respond to medical emergencies on-site. Implement measures to control noise and vibration levels during decommissioning activities, such as using quieter equipment and scheduling high-noise activities appropriately. Ensure that all contractors and subcontractors adhere to the same occupational health and safety standards as the main contractor. 		<ul style="list-style-type: none"> Safety audits and inspections. First aid response records. Compliance with safety regulations. Incident investigation reports. 		
	Impact to livelihoods from grazing land access restrictions	<ul style="list-style-type: none"> 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. Involve local leaders and organizations in the planning and implementation of mitigation measures to enhance community acceptance and participation. 	BECO Contractor	<ul style="list-style-type: none"> Conflict incidence reports. Community meetings and feedback. Long-term livelihood trends. 	Quarterly	2,000
	Trespassing of unauthorized personnel	<ul style="list-style-type: none"> Install clear and visible warning signs around the site indicating that it is a restricted area and unauthorized entry is prohibited. Partner with local community leaders and organizations to promote site security and encourage community members to report unauthorized access. 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. 	BECO Contractor	<ul style="list-style-type: none"> Incident reports of trespassing. Visitor logs. Community awareness programs. Community feedback on security. Stakeholder engagement effectiveness. Reporting mechanisms for 	Weekly	1,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
				trespassing.		
	Worker influx – Incoming Workforce	<ul style="list-style-type: none"> • Tap into the local workforce to the extent possible to reduce labour influx. • Consult with and involve local community in the decommissioning activities. • Sensitize workers regarding engagement with local community. • Establish and operationalize an effective GRM 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. 	BECO Contractor	<ul style="list-style-type: none"> • Records of employees/updated employee register. • Number of local community employees and external employees/ updated employee register. 	Quarterly	3,000
	Gender-based violence	<ul style="list-style-type: none"> • Update the existing SEA/SH Prevention/Response Action Plan, to manage SEA/SH risks that are relevant to the subproject. • Implement a code of conduct signed by all those with physical presence on site. • Establish Workers GRM with multiple channels including SEA/H channels. • Ensure that Code conducts on GBV are signed by all employers. 	BECO Contractor	<ul style="list-style-type: none"> • Minutes of awareness creation sessions for the community and workers on GBV-SEA/SH. • Code of conduct signed by all those with physical presence on site. • GRM that ensures confidentiality of GBV cases in place. • Documented referral services for survivors. • Grievances raised, aggrieved persons and status on resolution etc 	Quarterly	2,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Inadequate grievances management	<ul style="list-style-type: none"> • Constitute a Local Grievances Committee is in consultation with all community segments, and incorporates the existing local dispute resolution mechanism. • Implement a worker’s grievances mechanism. • Ensure proportionate representation of VMGs in the local grievances committee. 	BECO	<ul style="list-style-type: none"> • Local Grievances Committee in place, composition of committee, awareness of community and workers on project and worker GRMs, updated GRM logs, types of grievances • Availability of grievance redress process • Number of grievances reported • Number of grievances resolved in a timely manner • Number of grievances escalated to national courts and the World Bank Grievances Redress Service and Inspection Panel. 	Quarterly	2,000
	Risks related to Inadequate stakeholder engagement	<ul style="list-style-type: none"> • 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. • 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 	BECO	<ul style="list-style-type: none"> • Frequency of stakeholder meetings. • Documentation of stakeholder concerns. • Follow-up actions on feedback. • Community representation in decision-making. 	Quarterly	2,500

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		progress of decommissioning activities and how stakeholder feedback has influenced decisions. <ul style="list-style-type: none"> Ensure that women and vulnerable groups are actively involved in stakeholder engagement processes, addressing any barriers they may face in participation. 		<ul style="list-style-type: none"> Collaboration with local organizations. Long-term engagement strategies. 		
	Child and forced labour	<ul style="list-style-type: none"> Adhere to the ESS 2 provisions and FRS Employment Laws. 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". 	BECO Contractor	<ul style="list-style-type: none"> Number of reported cases of forced labour. Updated employment register indicating locals employed, their ages, national identification numbers etc. Grievances raised, aggrieved persons and status on resolution etc. 	Quarterly	3,500
	Security risks	<ul style="list-style-type: none"> Conduct a thorough security risk assessment to identify potential threats. 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. Implement strict access control procedures to limit entry to authorized personnel only, including the use of identification badges or passes. Provide training on risk mitigation strategies for all personnel involved in the decommissioning activities. 	BECO Contractor	<ul style="list-style-type: none"> Incident reports. Access control measures. Response time to security incidents. Training of security personnel. Community security awareness programs. Stakeholder feedback on security. Analysis of security trends. Feedback from security personnel. 	Weekly	3,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
	Community health and safety risks	<ul style="list-style-type: none"> Conduct a comprehensive assessment to identify potential health and safety risks to the local community during the decommissioning process. 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. 	BECO	<ul style="list-style-type: none"> Health incident reports. Community health assessments. Feedback mechanisms for community concerns. Community satisfaction surveys. Communication of health risks. Injury rate monitoring. Environmental health audits. Documentation of community feedback. 	Quarterly	4,800
	Fire hazards	<ul style="list-style-type: none"> Conduct a comprehensive fire risk assessment to identify potential fire hazards associated with decommissioning activities and materials. Create a fire safety plan that outlines prevention measures, emergency response protocols, and responsibilities for all personnel involved in decommissioning. Provide fire safety training for all workers, covering fire prevention, emergency procedures, and the proper use of firefighting equipment. Ensure the availability of adequate firefighting equipment, 	BECO Contractor	<ul style="list-style-type: none"> Fire incident reports. Fire risk assessments. Documentation of fire hazards. Monitoring of flammable materials storage. Documentation of 	Weekly	3,000

IMPACT CATEGORY	DESCRIPTION	RECOMMENDED MITIGATION MEASURES	RESPONSIBILITY	MONITORING INDICATOR	MONITORING FREQUENCY	ESTIMATED COST (USD)
		such as fire extinguishers, hoses, and water sources, in easily accessible locations throughout the site. <ul style="list-style-type: none"> • 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. 		community feedback on fire safety.		
TOTAL						224,900

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 BECO Hybrid Power Plant-Mogadishu

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.
BECO	<p>BECO 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;</p> <ul style="list-style-type: none"> • BECO 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 • BECO to hire an E&S specialist to support with the management of risks
Benadir Administrative Region Government	The Benadir Administrative Region Government is a key stakeholder in this project. The roles of the Benadir Administrative Region 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 BRA Ministries of Environment	Shall be responsible for approval of ESIA and EHS reports and licensing. Additionally, the ministries shall be free to check progress of implementation of ESMP.
E&S supervising consultant	<ul style="list-style-type: none"> • The E&S supervising consultant shall prepare quarterly supervision reports detailing environmental, health, social and safety compliance on quarterly basis amongst other technical aspects • Ensure the project adheres to all environmental and social impact assessment (ESIA) recommendations, national regulations, and international standards such as the World Bank ESS. • Oversee the implementation of mitigation measures for environmental, social, and community health and safety risks identified during the ESIA, including soil erosion, waste management, biodiversity protection, and labour influx. • Supervise the proper execution of the ESMP during the construction phase, ensuring contractors comply with the stipulated environmental and social safeguards. • Conduct regular field inspections and audits to assess the environmental and social performance of the contractors and identify non-compliance issues. • Prepare and submit periodic environmental and social monitoring reports to the MoEWR, regulatory bodies, and the World Bank. • Coordinate the training of train project staff and contractors on environmental and social management procedures, including waste handling, safety protocols, and community engagement. • Support the contractor and client is development of EPRP, and oversee emergency preparedness and response plans for potential environmental and social incidents, ensuring swift action to mitigate impacts. • Ensure that gender-based violence (GBV) risk mitigation measures and other labour-related guidelines are implemented on-site, particularly in managing the labour influx and worker-community relations.

Entity	Roles and responsibilities
	<ul style="list-style-type: none"> • Liaise with local and regional environmental authorities in Mogadishu to ensure compliance with the Benadir Administrative Region Environmental Policy (2014) and the Benadir Administrative Region Environmental Management Act (2016). • Continuously identify potential environmental and social risks throughout the construction phase and recommend adaptive management strategies as needed.
Contractor	<ul style="list-style-type: none"> • Implementation of the contractor related aspects of the ESMP and regularly (monthly) reporting • 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 Benadir Administrative Region 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 BECO. 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 Benadir Administrative Region 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 BECO Dayniile Hybrid Power Plant project in Mogadishu, 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 Mogadishu District, Lower Shebelle Region. Stakeholders were identified on the basis of their interaction with the proposed project site. Stakeholders identified were:

- *Business operators:* Local business owners, particularly those in industries that may be affected by the project.
- *Community-based organizations (CBOs):* Local non-governmental organizations and community groups active in the area.
- *Gender advocacy groups:*
- *Local communities:* Representatives from households in Mogadishu City and surrounding villages
- *Local Government*
- *Civil Society*
- *Representatives of Office of the Prime Minister:*
- Representatives from the Ministry of Environment, Ministry of Climate Change, Ministry of Energy, Ministry of Health,

9.2. OBJECTIVES OF THE STAKEHOLDERS' CONSULTATIONS

The key objectives of the stakeholder consultation process were:

- To inform stakeholders about the proposed BECO Dayniile Hybrid Power Plant project, including its scope, potential adverse impacts, and benefits.
- To gather stakeholder concerns, opinions, and expectations regarding the project.
- To understand community dynamics, relations, and the broader social and economic context of the communities and the possible impacts of this Project.
- To build a constructive dialogue between the project developers and local communities,

- government entities, and other interested parties.
- To ensure that stakeholder input is incorporated into project planning and implementation, in compliance with best practices and regulatory requirements.
 - To facilitate transparency and inclusive participation of community members in the project so they can voice their concerns and views regarding the project design and its project impacts, and to ask questions.

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

9.3. SUMMARY OF KEY FEEDBACKS FROM STAKEHOLDERS

Table 9.1 summarizes the key outcomes from the engagement with the stakeholders. Overall, the majority of stakeholders expressed their agreement and support for the proposed hybrid power plant, recognizing the potential benefits it will bring in terms of improved access to affordable and clean energy, job creation, and enhanced local economic development. However, there were variations of different strengths in the opinions when analysed across gender as there were feelings that the project will only directly benefit BECO from economic perspective. A common request across all stakeholder groups was the need for ongoing, stakeholder engagement from the BECO. Communities expect the ESP to establish clear channels of communication to keep them informed. While the majority of stakeholders engaged supported the project, some concerns were raised about possible complains about land take, fire and safety risks and environmental impacts such as soil and water pollution and clearance of vegetation. They expect that BECO will implement mitigation measures and keep them informed of any significant changes or delays.

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

Stakeholder category	Summary of interests and concerns
International NGO- ICRC	The project is expected to benefit the entire city by creating job opportunities and improving access to electricity. Given that it is a solar project, potential adverse impacts are minimal. However, the proponent should prioritize developing environmental protection measures and a comprehensive stakeholder engagement plan to ensure the project's success and inclusivity.
Women Groups Representatives	The project will create job and business opportunities and provide access to cheap electricity. The adverse impacts include: waste generation, diseases from foreign workers, fire safety risks, electrocution. The proponent should consider constructing underground distribution/transmission lines and conduct broader stakeholder engagement.
Elder	The project will be beneficial as it will supply electricity to support business enterprises. While no significant risks are associated with the project, concerns may arise from individuals claiming the company has taken their land. To address such issues, the proponent should collaborate with local elders to resolve conflicts amicably.
NGO- DRC	The project will generate clean energy, reducing reliance on charcoal and lowering air pollution. It will also enhance livelihoods through job creation. However, potential adverse impacts include water pollution from solar batteries, significant land use, and health and safety risks. Mitigation measures should include proper waste handling and recycling, strict adherence to safety protocols, transparent information sharing, and establishing an effective feedback mechanism.
Business Operator	The project will improve energy access, enhance livelihoods through job creation and reduction in carbon emission. However, potential adverse impacts include

Stakeholder category	Summary of interests and concerns
	water pollution and health and safety risks. Mitigation measures should include proper waste handling, community engagement and consultation, and establishing an effective feedback mechanism.
NGO-CARE	The project is expected to have several positive impacts, including improved safety through better lighting at night, income generation, reduced air pollution, and conservation of natural resources, particularly trees. To maximize its benefits, the project should prioritize enhanced community engagement.
NGO-SRCS	The project is anticipated to lower electricity prices, support small businesses, and reduce air pollution. However, potential adverse impacts during construction include effects on soil, water, and vegetation. To address these, it is essential to engage all stakeholders actively and ensure clear and transparent communication throughout the project.
Business Operator-Raabax Business Centre	The project is environmentally friendly and will generate benefits to the community. It will increase business hours because of lighting and also create employment. Waste generated should be recycled and staff should be provided with PPE. Stakeholder engagement should be done and communication contacts should be maintained.
NGO-SRCS	The project is beneficial and has no environmental risks. It is anticipated to lower the cost of electricity.
NGO	The project is highly beneficial, with no significant environmental risks anticipated. It is expected to lower electricity costs, create employment opportunities, and support local businesses through the procurement of goods and services. Additionally, the project is environmentally friendly, contributing to sustainable development.
Government Institution- Ministry of Environment and Climate Change	The project offers numerous benefits, including increased access to energy, enhanced security, and job creation. However, potential adverse impacts include water and air pollution, land contamination from waste disposal, and safety risks. To address these concerns, the proponent should implement a clear awareness strategy, engage stakeholders effectively, and use traditional mediation techniques to build social cohesion through dialogue. Additionally, a third-party EIA agent should be hired to monitor the implementation of mitigation measures during the project's execution.
NGO- Alight	The project is expected to lower electricity costs, support small businesses, and reduce air pollution. However, potential impacts from construction and operation activities must be addressed. Active stakeholder engagement and clear, consistent communication throughout the project are crucial to its success.
Government Institution- Social Affairs Benadir Region	The project is climate-friendly and expected to reduce electricity costs, improve health and livelihoods, create employment, and provide business opportunities through the procurement of solar equipment. However, it may affect natural resources, which should be managed through sustainable practices.
Government Institution-Office of the Prime Minister	The project is expected to have positive impacts, including contributing to economic development. However, it may pose environmental and safety risks during construction. Mitigation measures, such as implementing robust safety protocols and environmental management plans, should be put in place to address these concerns.

9.4. EXPECTED COMMITMENTS BY BECO

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

- *Ongoing consultations.* Stakeholder consultations will continue throughout the project lifecycle, with periodic meetings held at key milestones of the construction and operation phases.
- *Public communication channels.* BECO will establish communication channels, such as social media platforms, local radio updates, and community notice boards, to ensure that information reaches all stakeholders in a timely and accessible manner.
- *Mitigation of disruptions.* Detailed plans will be implemented to minimize construction-

related disruptions, including dust control, noise management, and traffic regulation measures. A grievance mechanism will also be put in place to address any concerns raised by the community during the project.

9.5. CONCLUSION

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

10.0. Conclusion and Recommendations

10.1. CONCLUSION

- This study found that negative social and environmental impacts can be mitigated, while positive impacts benefit the community. The project proponent, implementing entity, and contractor must adhere to environmental and social management plans, obtain permits, and have qualified personnel. ESIA proposes adequate mitigation measures.
- The ESIA analysis shows that the proposed power plant will have positive impacts on the FGS, BRA Region governments, and residents, including increased clean energy, employment, investment, and improved living standards. However, it also poses potential negative impacts like noise, dust, soil erosion, and increased resource demand.
- The Environmental and Social Management Plan (ESMP) has been developed to ensure sustainability of project activities from construction to decommissioning. It provides a general outlay of activities, associated impacts, mitigation action plans, and monitorable indicators. Implementation timeframes and responsibilities are defined, and cost estimates for recommended measures are provided. A monitoring plan highlights environmental performance indicators, allowing for continuous review of operational and maintenance activities to identify trends in degradation or improvement and propose mitigation measures.
- The ESIA indicates that the proposed project will yield significant socio-economic benefits, a significant improvement over the "NO development option." Stakeholders agree it's overdue, and potential adverse impacts can be mitigated. The project will adhere to industry norms and standards, ensuring environmental sustainability. Mitigation measures will be integrated to comply with national and World Bank requirements.

10.2. RECOMMENDATION

The MoEWR and BECO are advised to implement the ESMP, conduct statutory EHS Audits during all the phases of the project, including regular evaluation of the project site's environmental performance against the recommended measures and targets outlined in this report. On the basis of the findings from this ESIA, the following specific recommendations can be made:

- 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.
- Undertake a supplementary biodiversity assessment and develop a biodiversity management plan (BMP) to be implemented during the full project cycle
- Contractor to ensure grievance redress mechanism is established and operational before commencement of the operation.
- Contractor to undertake habitat restoration programmes through planting of indigenous vegetation in all cleared areas to promote environmental sustainability
- Cultivate and maintain a good working relationship with the community members, and all other relevant stakeholders.
- Diligence on the part of the contractor and proper supervision by the MoEWR and BECO is crucial for mitigating the potential impacts and ensuring environmental, health, safety, and efficient operation of the project.
- EHS Audits shall be carried annually or as prescribed by the FGS Authority during the operational phase.
- Ensure social inclusion of the vulnerable groups by paying attention to the most vulnerable and provide ready boards as spelt out

- Stakeholder engagement to be carried out throughout the construction and operation and decommissioning phases.
- The BECO and the contractor shall adhere to relevant legal and regulatory framework to ensure compliance and success of the project.

10.3. AUTHORIZATION OPINION

The Horizon Development (HD) believes that this ESIA report provides enough information for decision-making on the project. It has been shown that the proponent's preferred alternatives and technological alternatives are generally acceptable. The ESIA has also identified essential mitigation measures to limit project impacts. The HD believes that the applicant's proposal should be approved on environmental grounds, provided essential mitigation measures are implemented. The HD believes that the anticipated negative impacts can be effectively mitigated, and that the proposed project does not pose a significant threat to environment and social aspects. The project should therefore be allowed to proceed. It is also expected that the proponent (MoEWR/BECO) will own this ESIA and ensure its full implementation during all phases of the project, including monitoring and reporting.

11.0. Annexes

ANNEX 11.1. LAND OWNERSHIP DOCUMENT FOR THE PROPOSED PROJECT SITE

ANNEX 11.2. PUBLIC CONSTULTATION QUESTIONNAIRES



Attendance list



BECO - KII



BECO-GBV
questionnaire

ANNEX 11.3. FOCUS GROUP DISCUSSIONS

Environmental and Social Assessment Checklist

Project Name: BECO Daynile Hybrid Power Plant	District/City: Mogadishu
Project Location: BRA	Nature/Size: ESP
Type of activity: (Hybrid power plant)	
Name & Signature of Evaluator: SAAD ADAN AIDED	Date of Field Evaluation: 30 November 2024

Item	Appraisal Yes/No	Risk / Significance rating					
		None	Low	Moderate	Substantial	High	Unknown
1. Environmental Screening (ESS3 and ESS6)							
Will the project generate the following impacts?							
1.1	Loss of trees	Yes				X	
1.2	Soil erosion/siltation in the area	No					
1.3	Pollution to land by diesel, oils etc.	Yes		X			
1.4	Dust emissions	No					
1.5	Solid and liquid wastes	Yes		X			
1.5	Borrow pits and pools of stagnant water	No					
1.6	Rubble/heaps of excavated soils	No					
1.7	Emergence of wildfire	yes		x			
1.8	Invasive tree species	No					
1.9	Long term depletion of water	No					
1.10	Exposure to hazardous chemicals including PCBs	No					
1.11	Nuisance from noise or smell	Yes		X			
1.12	Loss of soil fertility	No					
1.13	Generation of hazardous waste including solar batteries	Yes		X			
1.14	Cross through, located within or nearby environmentally sensitive areas (e.g., national parks, intact natural forests, wetlands, etc.)?	No					
1.15	Cause poor water drainage and increase the risk of water-related diseases such as malaria or bilharzias?	No					
1.16	Risk of exposing the workers to extremely hazardous working conditions.	Yes		x			
2. Social Screening (ESS5)							
Will the project generate the following negative social and economic impacts?							
2.1	Loss of land by households	No					
2.2	Loss of properties –houses, structures	No					
2.3	Loss of perennial trees, fruit trees by households	No					
2.4	Loss of crops by people	No					
3. ESS2, ESS4, ESS5, ESS7, ESS8							
3.1	Loss of access to river/forests/grazing area	No					
3.2	Impact heritage site, graveyard land	No					
3.3	Conflicts over use of local water resources	No					

Item	Appraisal Yes/No	Risk / Significance rating					
		None	Low	Moderate	Substantial	High	Unknown
3.4	Disruption of important pathways, footpath/roads	Yes		x			
3.5	Loss of communal facilities – mosques	No					
3.6	Loss of livelihood system	No					
3.7	Risk of encouraging child labour	No					
3.8	Risk of workers to extreme exposure for GBV	No					
3.9	Spread of HIV/AIDS and other STI's	No					
3.10	Risk of GBV/SEA/SH to the affected communities	No					
3.11	Risk associated with Security personnel	No					
<i>4: Impacts on Historically underserved groups/Ethnic minorities</i>		No					

Categorisation & Recommendations:

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

World Bank ESF Categorisation

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

Focus Group Discussion Guide – Youths/Associations

FGD Youth /Association		
<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 probe for explanations for responses (what, where, when, why, how). Take lots of pictures. The Federal Government of Somalia has secured a grant from the World Bank to implement the Somali Electricity Sector Recovery Project (SESRP). The SESRP is implemented by the Ministry of Energy and Water Resources (the MoEWR). The Project Development Objective is to increase access to lower-cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry. We are conducting an environmental and social impact study for Component 1 of the project, focusing on the sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa. The purpose of this study is to collect comprehensive information to comprehend the potential impacts of the project and solicit feedback from stakeholders.</i>		
Section A: General Information	Responses	
1	Date and time of meeting	25th November 2024
2	Name of facilitators (inc note taker)	Saad Adan Aided

3	Region/District	Dayniile District
4	Name of Village	
5	Number/gender of participants	Males: 7 Females:4
Section B: The Project		
1	Have you heard of the project before? How/when/where (if not please explain) Do you feel that you understand the project?	Yes, we have heard about the project, but lacking detailed or official communication.
2	What do you think could be the positive impacts of the project on youth, so that people benefit?	Provide a reliable, stable power supply.
3	What other impacts to you think that the project could have on the youth and communities?	No business opportunities, especially for the youth in the community.
4	How do you think that the project could minimize or avoid negative impacts?	Establishing a comprehensive mitigation plan.
5	Do you have any questions/comments regarding the project?	Will the project contribute to a reduction in the cost of electricity?
Section C: Overview		
1.	If a youth group - When was your youth group established? Why was it established?	No formal youth groups in the area
2.	What are the key priorities among the youth? What are the main issues faced? Why?	Top goals frequently centered on job opportunities and security. The main challenges are on security.
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?	Youth are often excluded from decision-making hierarchy. Elders make most decisions.
4.	What programmes are in place to help the youth? How successful have they been?	No formally known youth programmes known in the area.
Section D: Education		
1.	How many of the youth have completed secondary education?	No official data available, but approximately 50% have secondary education.
2.	How many of the youth have been to vocational school and have qualifications? What subjects do these apply?	None of the youths has been in a vocational training facility.
3.	What skills to the youth feel they have that enable them to work?	Youth have a mix of skills from technical and vocational trainings would be ideal.
Section E: Unemployment		
1.	How many of the youth do not have a full-time salaried job?	Most youth in Dayniile District are unemployed.
2.	Why do the unemployed youth not have a job? What are they doing to find a job? Are there any barriers to finding work? What are these?	Little investment in job creation.
Section F: Employment		
1.	How many of the youth are working?	All the youths reported that they were in informal employment

	How many are self-employed and how many work for an employer?	
2.	What are the main jobs that the youth have?	Not described
Section G: Aspirations		
1.	What aspirations/goals do the youth have? How are they planning to achieve those goals? What, if any, are the main barriers to achieving their goals? How can they overcome these barriers?	More and better participation in national and community development. These can be achieved under an environment of peace and stability devoid of corruption and insecurity.
Section H: Recreation		
1.	What do the youth do in their spare time? Where do they go?	They primarily play or perform various forms of entertainment, such as football.
2.	Do they feel that they have an active social life or is there more that needs to be done to encourage them to engage in recreational/social activities? Explain response	The security environment in Mogadishu and surrounding areas have limited the youth participation in recreational activities.
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 participate during the meeting?)	Most participants shied from speaking their minds. Little trust among participants.

Focus Group Discussion Guide - Female

FGD Female		
<p><i>Facilitator Instructions: The purpose of the meeting is to gather information on women's role in the household, livelihoods/jobs, health issues, challenges, perceptions on quality of life, education options for children, health care and project perceptions. Introduce yourselves, the project and explain the purpose of the meeting. Gather a representative sample of a maximum of 10 women that include a combination of youth, elderly and disabled where appropriate. Keep the discussion focused and please <u>probe</u> for explanations for responses (what, where, when, why, how). Take lots of pictures. <u>Ensure everyone participates in the discussion.</u> The Federal Government of Somalia has secured a grant from the World Bank to implement the Somali Electricity Sector Recovery Project (SESRP). The SESRP is implemented by the Ministry of Energy and Water Resources (the MoEWR). The Project Development Objective is to increase access to lower-cost and cleaner electricity supply in the project areas and to re-establish the electricity supply industry. We are conducting an environmental and social impact study for Component 1 of the project, focusing on the sub-transmission and distribution network reconstruction, reinforcement, and operations efficiency in the major load centers of Mogadishu and Hargeisa. The purpose of this study is to collect comprehensive information to comprehend the potential impacts of the project and solicit feedback from stakeholders.</i></p> <p><i>Show the participants the layouts/models</i></p>		
Section A: General Information		Responses
6	Date and time of meeting	25th November 2024
7	Name of facilitators (inc note taker)	Saad Adan Aided
8	Name of Region Region/District	Dayniile District
9	Number of participants	7
10	Describe the demographics / composition of the group (age range, ethnicity and any vulnerabilities)	Between 20 – 40 and all Somali community and no disability or other type of vulnerability.
11	Number of female headed households in the group? What is the main reason for this?	Not provided Most women in Dayniile District are involved in family domestic chores.
Section B: The Project		

6	Have you heard of the project before? How/when/where Do you feel that you understand the project? (if not please provide an explanation and show the site map)	The participants had general knowledge of the project but expressed uncertainty about it.
7	What is your view on the project? How do you think that the project could impact women in the community positively and negatively?	The women unanimously agreed on the project's benefits for themselves and the wider community. They highlighted that access to electricity is essential for development, and the project promises affordable energy that will raise living standards.
8	How do you think that the project could minimize or avoid negative impacts on women and the community?	Provide employment opportunities for women, especially the widows.
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?	Many women work long hours managing domestic household responsibilities.
2	Do you think that men and women have equal opportunities in the community, workplace and education?	No -Gender-based inequalities are significant and impact various aspects of daily life, from employment to social engagement and educational access.
3	What resources do women mainly have control of compared to men? (eg land, assets, equipment) Please explain response	Women typically manage the day-to-day household budget and have decision-making power over basic household expenditures
4	Do women feel safe in the community? Are there any particular crimes that are common in the community? Have you experienced any conflicts in the community? Explain responses	Yes. But they also raised concerns regarding GBV Yes, mostly brought about by insecurity.
5	How do women receive information about local issues and developments, news etc in the community?	Most of information is received informally.
6	Do women rely on each other for support? What type of support? (eg childcare, someone to talk to, income generation etc).	Yes, women have formed social groupings to discuss and mobilize resources for domestic investments.
Section D: Institutions / Community Development		
1	How are women represented in the community (eg is there a female head/leader who champions their interest)? Do women contribute in decision making within the community? Are women represented at important meetings? If not, do men discuss decisions with you?	Yes, there are female heads/leaders involved in championing gender and youth issues.
2	Do you have any women's traditional/cultural groups? What are they called? What is the purpose of these groups?	There are traditional women's groups, often referred to using different names, and operate in several locations within Mogadishu city and the surrounding areas.
3	Are there any other local associations in the area that they are aware of? If so, which ones.	No
4	Are any Non-Governmental Organisations working here? If yes – which ones and what do they do? How successful have the projects been?	Yes, there are many national and international organizations operate in the City and are engaged in different socio-economic development programmes and activities.
Section E: Economy/Income Generation		
1	What could women do to have greater economic opportunities in this area?	Advocacy on capacity building and formation of socioeconomic groups.
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	Most women operate tiny enterprises but most rely on their husbands or relatives for support.

	at disposal? What do they spend it on most frequently?	
3	Does your family receive support from remittance or other support from family members working elsewhere?	Yes, 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>	Housework and small family businesses.
2	What are the main crops that you grow? What % are for household consumption and what % do you sell? If you sell crops, where do you sell them?	Data not provided.
3	What are the main animals that people keep in the community? Is this a subsistence activity or an income-generating activity?	Large stocks (camel, goats, sheep), and small stock comprising mainly of poultry.
4	Do you collect natural resources (eg timber, herbs, firewood and roofing, fruits, etc) for subsistence and domestic use? Where do you get these from? Explain the uses. Explore issues related to charcoal production as well as commercial extraction of natural resources	Some rural inhabitants collect natural resources.
5	Where does the community buy and sell agricultural produce? How far is the nearest market? What is the name of the market?	Local markets in Dayniile and even Mogadishu city.
6	Have you experienced any conflicts in the community in relation to land? Who was involved? What was the issue? How was it resolved? Are conflicts frequent? (explain response)	Yes associated mainly with insecurity in Mogadishu city and the surrounding areas.
Section G: Education, Literacy and Training		
1	How would you describe accessibility and quality of education for children in your community? How far are they (KM)? what are the names/levels of schools accessed	Education is costly, especially in private schools.
2	Do most females in the community go to school? What level do they generally complete up to? Explain responses. Are there factors that prevent girls from continuing education? Has anyone in the community complete vocational training or university? What subjects? (explore issues of girl child work/labour verses education.	Few girls complete secondary school, and even fewer pursue vocational training or university education.
3	Can girls/women in the community generally read and write?	Literacy rates among women are still low in Dayniile District.
Section H: Health		
1	How and where do you access healthcare?? Do the services available meet your needs?	What are considered the best health facilities are located in Mogadishu city. Fewer healthcare facilities exist in Dayniile District. Many healthcare facilities are run by NGOs.
2	What are the top 3 health problems that girls and women face in the settlement? Please explain the reason for each of the health issues Are there any particular times of the year where these issues are more challenging than others?	Girls and women face several health challenges, many of which are compounded by cultural and socioeconomic factors.
3	Are there any environmental issues that affect health in the community (e.g. water quality, sanitary conditions etc) Please explain	There is overreliance on underground water resources, often characterised with poor water quality.
4	If someone in the household is ill, how do you usually treat him/her? How do you treat sick elderly, children, men and women? Are there any disabled people in the community that require care?	Yes, they are treated and are always taken care of by families
Section I: Access to Water		

1	Where do you get your water for drinking, cooking, bathing and for livestock?		Description of water source	Walking distance from dwelling (KM)	Collection method (if applicable)	Description of quality/colour/taste/smell
		Drinking:	Borehole and berket	Out of the town	Piped	Hard water
		Cooking:	Borehole and berket	Out of the town	Piped	Hard water
		Washing dishes:	Borehole and berket	Out of the town	Piped	Hard water
		Bathing:	Borehole and berket	Out of the town	Piped	Hard water
		Livestock:	Borehole and berket	Out of the town	Piped	Hard water
		Irrigation:				
2	Do you have to treat drinking water? If so, how?	No				
3	If the community has a borehole, do they know when it was installed? Who installed it? How deep it is? How is it operated?	No				
4	Is anyone in the community or a community water committee responsible for managing boreholes or other water sources in the community? Who? How well does this work?	No				
Section J: Sanitation and Hygiene						
1	What type of toilet facilities do households have? (eg community or private/household, ventilated pit latrine, un-ventilated pit latrine, hole in the ground, no latrine/use the bush etc)	Yes, pit latrines and septic 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:	BECO	In town		
		Keeping warm:	BECO			
		Cooking:	Gas, firewood, charcoal			
		Heating water:	none			
		Charging mobile phones:	Solar, BECO			
2	Do you face any challenges regarding access to power? Please explain?	The current tariffs are unaffordable to many residents.				
Section L: Transport and Communication						
1	What are the main forms of transportation used within the community? Please describe the quality/accessibility of transportation in the community	Vehicles, tuktuks.				
2	Is there telecommunication services in the area	Hormuud Telkom				
Section M: Cultural heritage						

1	What are the sacred/ historical or religious sites in the area? Are these accessible to women? Where are they located?	There are no such places,
2	What are the main festivals or rituals undertaken in the community by women? Give details	International women's day and eid festivals and some other days that people celebrate
Section N: Insert photos here		

ANNEX 11.4. STAKEHOLDERS' CONSULTATIONS ATTENDADANCE LISTS



SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SES RP)

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

STAKEHOLDERS' CONSULTATIONS SESSIONS ATTENDANCE SHEETS

Date : 27/11/2020

Venue : Mogadishu

#	Name	Organization/title	Signature
1	Farhou Jimale	Director. OPM Somalia	
2	Abdirani Abdillahi Sh.	OPM Somalia Head of communication	
3	ABDIAZIZ Admen	SRCS	
4	Sahre Omar	Can Internet	
5	Abdi'salam ahmed yuusuf	Ministry of energy	
6	Abdulkadir	SRES	
7	Omar Ahmed	SRCS	
8	Saad Cali	LNGO	
9	Faralawra.	SRCS	
10	Aisha Yarey Iid	Ministry of health	
11	Mohammed Harsan	Ministry of justice	
12	Saad Aadan	LNGO	
13	OMAR ADEN OMAR	Civil society	
14	Abdisherif ibrahim	Business men	
15	Ahmed aadan	Local Community	
16	Jamaal Hasan	M. Climate change	
17	Asma Xassan	Women Activist	
18	Jama Al	Social Affairs Bancadir	



SOMALI ELECTRICITY SECTOR RECOVERY PROJECT (SESRP)

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

STAKEHOLDERS' CONSULTATIONS SESSIONS ATTENDANCE SHEETS

Date : 27/11/2024

Venue : Mogadishu

#	Name	Organization/Title	Signature
1	Ali Asad Adam	Local Government	[Signature]
2	Ali Maynuu Abdullahi	Business man	[Signature]
3	Ahmed Abdi Ahmed	LNCO	[Signature]
4	Jibril Xasan Xuseen	Civil society	[Signature]
5	Xuseen Mohamed	Local Community	[Signature]
6	Fu'aad Sa'iid Cabdi	Local Community	[Signature]
7	ismaciil C/Risaaq Siyaad	Government	[Signature]
8	Jeylaani Abdirahman gal	Government	[Signature]
9	MAHAMED MUKHTAR CARIF	ICRC	[Signature]
10	Ibraahim Raahid Mohamed	Local Community	[Signature]
11	anays Jirow cali	Local Community	[Signature]
12	Maxamed cumar aden	Business man	[Signature]
13	Ali shahiid macaw	Business	[Signature]
14	Fey sal kusaw carif	ICRC	[Signature]
15			
16			
17			
18			

ANNEX 11.5. STAKEHOLDERS' ENGAGEMENT PHOTO LOGS

Photo1: View of the enumerator and the IDP representative in Mogadishu during the stakeholders engagement



Photo 2: View of the enumerator conducting Women FGD in Mogadishu during the stakeholders engagement



Photo 3: View of the enumerator and conducting Youth FGD in Mogadishu during the stakeholders engagement



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