ENVIRONMENTAL MANAGEMENT PLAN FOR THE OPERATION OF OMBURU SUBSTATION, ERONGO REGION

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1. INTRODUCTION

The purpose of this document is, to provide an indication of the anticipated impacts of the operation of the Omburu Substation on the receiving environment. This EMP document will ensure sound environmental performance by all contractors and NamPower employees during the operation of the Omburu Substation.

Location (coordinates)	Lat : -21.496963 Lon : 16.029280
Foot print area of the substation	84 Ha

2. OBJECTIVES OF THE OPERATIONAL EMP

The aim of this operational EMP is to detail the management actions required to implement the mitigation measures identified thereby ensuring that any operational phase activity is carried out in a manner that takes cognisance of environmental protection and is in line with National legislation. This EMP has the following objectives:

- To ensure that the operational activities associated with the operation of the substation do not result in undue or reasonably avoidable adverse environmental impacts.
- Minimise negative impacts and enhance positive impacts associated with the operations.
- Stipulate specific actions to assist in mitigating the environmental impact of the project
- To identify key personnel who will be responsible for the implementation of the measures and outline functions and responsibilities
- Create management structures that address the concerns and complaints of Interested and Affected Parties (I&APs) with regards to the operation of the substation.
- To propose mechanisms for monitoring compliance, and preventing long term or permanent environmental degradation.

3. APPROACH TO IMPACT MANAGEMENT

Avoidance	Avoiding activities that could result in adverse impacts and/or resources or areas considered sensitive.
Prevention	Preventing the occurrence of negative environmental impacts and/or preventing such an occurrence having negative impacts.
Preservation	The process of working to protect something valuable so that it is not damaged or destroyed (i.e. environmental resources)
Minimization	Limiting or reducing the degree, extent, magnitude or duration of adverse impacts through scaling down, relocating, redesigning and/or realigning elements of the project.
Mitigation	Measures taken to minimise adverse impacts on the environmental and social aspects.
Enhancement	Magnifying and/or improving the positive effects or benefits of a project.
Rehabilitation	Repairing affected resources to their original state.
Restoration	Restoring affected resources to an earlier (possibly more stable and productive) state, typically 'background' condition, where identified to be appropriate and reasonable. These resources may include soils and biodiversity.

4. POLICY AND LEGISLATIVE FRAMEWORK

Table 1 below outlines the legislative requirements which are applicable to the operation of this substation.

Legislation:	***Section (s) applicable:***	***Implications:***
Environmental Management Act no 7 of 2007	Section 3 Section 27 Section 33 onwards	- All activities performed should be in line with the following principles: o Interested and affected parties should have an opportunity to participate in decision making o Listed activities should be subject to an EIA o Polluter should pay for rehabilitation o Pollution should be minimized - Environmental assessments should be carried out for listed activities. The proposed activity can be classified under the following range of activities: o Generation of electricity o Transmission of electricity - These sections details the process to be followed in order to obtain a clearance certificate. - All existing listed activities must obtain a clearance certificate within one year of the law coming into effect (February 2013). Therefore, all existing activities which can be considered a listed activity should apply for clearance.
EMA Regulations GN 28-30 (GG 4878) (February 2012)	Listed activity: 5.1 6. – 9; 13; 15; 21 -24	- This activity can be considered as electricity generation and transmission. - These sections details the process to be followed in terms of producing an Environmental Assessment and this process should be adhered to during the generation of information for this document.
Petroleum Products and		- Regulations relating to the purchase,sale,supply,acquisition, possession, disposal, storage, transportation, recovery and refinement of used mineral oil.

Energy Act-1990		
Labour Act no 11 of 2007	Section 3 Section 4 Section 9 Section 39 - 42	- Children under the age of 16 may not be employed Forced labour may not be used during any construction activities. - Basic conditions of employment as stipulated by the law must be met. - The employer shall ensure the health and safety of all employees and non-employees on site. Employees must fulfil their duties in order to ensure their own health and safety and that of other employees and persons. Employees may leave the work site if reasonable measures to protect their health are not taken.
Electricity Act no 4 of 2007	Section 33	- Installations used for the provision of electricity should be operated with due compliance with the requirements of laws relating to health, safety and environmental standards. Therefore – any company involved within the Electricity Supply Industry must adhere to the laws covering the previously stated aspects or stand to lose their licenses to operate.
Water Act no 54 of 1956	Section 21 and 22 Section 23	- Conditions in terms of the disposal and management of effluent are to be adhered to. - Any person causing pollution to a water source shall be guilty of an Offence.
Public Health Act no 36 of 1919	Section 122	- It is an offence to cause any form of a nuisance which includes water pollution.
Water Resources Management Act no 24 of 2004	Section 56	- No discharge of effluent may take place without a permit. - Effluent is defined under this Act as any liquid discharge that occurs as a result of domestic, commercial, industrial or agricultural activities.
Hazardous Substances Ordinance 14 of 1974	Section 27	- To provide for the control of substances which may cause injury or ill-health to or death of human beings, by reason of their toxic, corrosive, irritant, strongly sensitizing or flammable nature or the generation of pressure thereby in certain circumstances;

		- to provide for the division of such substances into groups in relation to the degree of danger; - to provide for the prohibition and control of the importation, manufacture, sale, use, operation, application, modification, disposal or dumping of such substances; and to provide for matters connected therewith.
Forest Act no 12 of 2001	Section 22 Section 41	- Vegetation may not be removed within 100 m of a river, stream or water course - A person shall be liable for damage caused by any fire which arises as a result of activities carried out on site without having taken reasonable measures to prevent a fire.
Fertilizers, farm feeds, agricultural remedies and stock remedies Act no 36 of 1947	Definitions Section 7 Section 10	- Arborocide application is defined as an agricultural remedy under this Act - Only registered herbicides may be used. - May only buy herbicides in a container that complies with the prescribed requirements and is sealed and labelled. - Only allowed to use herbicides in the prescribed manner. - Land owners must be notified about applications, and the following information must be supplied: o Purpose of administration o Registered name and number of the product - Precautions to be taken before, during and after each administration.
Nature Conservation Ordinance no 4 of 1975	Section 74	- Protected plants may not be removed or damaged without a permit.
Soil Conservation Act no 76 of 1969	Section 4 Section 13 Section 21	- Institutions may be ordered by the relevant Minister to construct soil conservation works when and where necessary. - Fire protection schemes may be implemented to regulate the prohibition of veld burning as well as the prevention, control and extinguishing of veld and forest fires. - It is illegal to damage, destroy / fail to maintain any soil conservation works; fire belts; works constructed in terms of a fire protection scheme

National Heritage Act No 27 of 2004	Section: 46, 48, 55	- All heritage resources are to be identified and either protected or removed/mitigated with a permit from the National Monuments Council, before any development may take place - A chance find procedure should be followed in case of discovery of a heritage resource.
		-

7. DESCRIPTION OF ACTIVITIES TO BE UNDERTAKEN

The following activities are associated with the operation of this substation and their associated potential impacts:

Activity	Activity description	Associated environmental aspects and impacts
General functioning	Physical presence and functional characteristics of the substation	• Visual impact • Community impacts in a form fatalities or injuries caused by electrocution.
Maintenance of the substation	The maintenance of the substation entails: • General equipment repairs • Replacement of batteries • Servicing batteries • Replacing electrical equipment such as transformers, relays and capacitors • Maintenance of electrical equipment such as transformers, relays and capacitors	Soil and water contamination Waste generation Loss of biodiversity Social issues related to the introduction of new workers in the area, e.g. HIV/AIDS spreading

	• Construction or repairing of access roads	
General site inspection	Site inspection conducted by the technical and SHEW teams	Waste generation Improve compliance Enables identification of non – conformances and stakeholder complaints
Construction	Construction include the following activities: • Construction of temporary or permanent buildings (digging and setting of foundations, digging of cable trenches) • Extension of boundary fences • Construction of additional feeder bays • Upgrade of electrical equipment (either in size, capacity or • technology) • Connection of new lines to Substations • Refurbishment of buildings • Personnel conduct	Noise emissions Dust emissions Introduction of new people in the area leading to the spread of diseases such as HIV/AIDS Soil and water contamination Waste generation Employment of casual workers Loss of biodiversity Loss of productive land
Hazardous Substances	• Storage of hazardous material;	• Possible oil spills and soil contamination due to transformer blow out.
Vegetation Management	Vegetation management methods include: • Manually	• Loss of biodiversity • Soil and water contamination

	• Mechanically • Herbicide application • Combination of one or two methods	• Employment opportunities • ill-health as a result of incorrect handling of herbicides

8. ROLES AND RESPONSIBILITIES

It is the responsibility of NamPower to ensure that all management actions are carried out. The successful implementation of the EMP is, however dependant on clearly defined roles and responsibilities by several stakeholders, each fulfilling a different but vital role to ensure sound environmental management during each phase of the project.

The following roles and responsibilities have been identified as it pertains to this project:

Responsible person	Responsibilities	Phase/Activity
The Area Superintendent	Is responsible for the enforcement of the EMP To ensure that environmental requirements are adequately covered in any external service providers contracts. To ensure that SHE requirements are included in the tender documents sent to the contractors. A copy of this EMP should also form part of the tender documents. To ensure that corrective actions are implemented for non-compliances	Operation of the substation

	To ensure that appropriate records and information regarding compliance with environmental requirements are maintained. To ensure that the substation remains in compliance with the requirements of this EMP, through regular communication and monitoring. • To ensure that all incidents, accidents and complaints are reported the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence.	
Project Manager	• Is responsible for the enforcement of the EMP • To ensure that SHE requirements are included in the tender documents sent to the contractors • Must ensure that the contractor remains in compliance with the requirements of this EMP, through regular communication and monitoring.	During substation upgrades and extensions
NamPower SHEW	To ensure that all requirements with regards to this EMP are fulfilled. • To assist the Project Manager in ensuring that the contractor remains in compliance with this EMP. • Provides SHEW inductions to NamPower and contractor employees as well other	All phases of the project

	stakeholders working or visiting the substation. • Organize and implement monitoring and audit functions, in consultation with the Project Manager. • Document and communicate monitoring, audit and inspection findings to project manager and area superintendent. • Communicate the final inspection report to the Project manager on contractor compliance to the EMP before the project close-off and final payment is made to the contractor.	
Contractor	• Is responsible for the implementation of the EMP • To appoint as SHE officer responsible for the implementation of this EMP. • To ensure that all tasks undertaken under the scope of work, are in accordance both with NamPower's SHEW policies and procedures as well as to the requirements of this EMP. • Ensure staff members are regularly trained and awareness built relating to environmental and social management. • To ensure that all incidents, accidents and complaints are reported the project manager. The contractor to ensure that incidents and accidents are investigated to prevent re-occurrence.	

	• Ensuring that all employees receive a SHEW induction before the start of the project. • Ensuring that the work being done does not create a nuisance to any being working, residing or living on adjacent properties or within the immediate surroundings of the site.	

9. OPERATIONAL ENVIRONMENTAL MANAGEMENT PLAN (EMP)

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
Personnel and Environmental awareness	• All employees both internal and external to receive environmental awareness training and refresher environmental awareness training to be available when required. • All contractor employees to receive induction before any work is commenced on the power line. • All employees are to be made aware of their individual roles and responsibilities in achieving compliance with the EMP. • Environmental toolbox talks to be conducted by the contractors and records to kept onsite. • The Contractor shall take all necessary precautions against trespassing on private properties; • Warning signs must be placed on and around the site as per the	All phases	Area superintendent Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	Occupational, Health and Safety requirements; • Adequate first aid services must be provided by the contractor at the contractor's camp; • The contractor will be responsible for his own security arrangements and shall comply will all site security instructions; • Basic firefighting equipment must be available on site; • PPE to be provided and well maintained at contractor's camp; and • All incidents should be reported to ECO, investigated, documented and kept in safety file.		
Safety Management	• All staff should undergo a general health and safety induction • Enforce general health and safety rules onsite • Develop and implement an occupational health and safety system that comprises key elements such as risk assessment and safe working procedure. • All work activities to be done under the supervision of a competent person. • Personal protective equipment must be worn by all employees and contractors. • Employees must receive proper training before receiving PPE. • Erect physical barriers to ensure there is no	All phases	Area superintendent Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	unauthorised access to site. • All gates is to be fitted with locks and kept locked . • Identify fire hazards, demarcate and restrict public access to the site. • Warning signage to be posted on the fence in order keep away the general public . • Maintain an incident and complaint register. • The Contractor shall recognise that the Site is situated close to inhabited and agricultural areas and shall therefore take all reasonable measures to ensure the safety of people in the surrounding area; • Where the public could be exposed to danger by any of the Works or Site activities, the Contractor shall as appropriate provide suitable flagmen, barriers and/ or warning signs in English and Afrikaans. • All unattended open excavations shall be adequately demarcated (fencing shall consist of a minimum of three strands of wire and made clearly visible). • Adequate protective measures must be implemented to prevent unauthorised access to and climbing of partly constructed towers and protective scaffolding.		

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	• No firearms shall be permitted on Site without the prior approval of the Project Manager.		
Fire Management	• Eliminating the presence of potential sources of ignition and providing appropriate equipment to minimize static electricity hazards. • Fire extinguishers to be readily available onsite, especially when hot works are conducted. • Regular servicing of fire extinguishers.	All phases	Area superintendent Project manager Contractor
Dust Management	• Control dust in the during substation upgrades or maintenance. • Excavation, handling and transport of erodible materials shall be avoided under high wind conditions or when a visible dust plume is present. • Dust generation from all activities will be minimised wherever possible. • A maximum speed limit of 20 km/h will be enforced to control dust emissions, and minimize incidents onsite. • Transport of construction material will ensure measures to prevent fugitive dust emissions. • Dust suppression measures shall be implemented if necessary. Dust may be	All phases	Area superintendent Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	controlled by damping of the road with water when necessary to minimise nuisance dust. • Construction machinery and equipment will be maintained in good working order in order to minimise exhaust fumes		
Resources Efficiency	• Minimise water use • Avoid wasteful use of materials • Source goods and services locally were possible • Minimise the generation of waste by applying the waste hierarchy.	All phases	Area superintendent Project manager Contractor
Waste Management	• Substation to be kept free of waste. • No burning, burying or dumping of any waste materials, vegetation, litter or refuse shall be permitted onsite. • Labelled waste bins with lids must be provided onsite for all waste streams and ensure that waste is disposed at nearest approved waste disposal site. • Ensure that waste segregation is done at source. • Hazardous waste shall be disposed of at a registered waste disposal site. • Safe disposal certificates for hazardous waste must be kept in the SHE file. • No material shall be left on site that could be of	All phases	Area superintendent Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	harm to humans and animals. • Broken, damaged and unused nuts, bolts and washers shall be picked up and removed from site. • Surplus concrete may not be dumped indiscriminately on site, but shall be removed from site when nearing completion of the different stages of work. • Concrete trucks shall not be washed on site unless adequate washing and concrete collection facilities be introduced to site. • Bins and containers must be made available by the contractor for the storage of construction waste. • No burning of cleared vegetation shall be allowed on site.		
Wastewater management	• Water containing environmental pollutants shall be collected and removed from site. • No waste water runoff or uncontrolled discharges from the site/working areas shall be permitted. • Mobile toilets or septic tanks should be used and be regularly emptied.	During substation upgrades and extensions	Project manager Contractor
Hazardous Substances	• All hazardous substance will be stored in suitable containers as defined in the method statement or Material safety data sheet (MSDS). • Containers will be clearly marked to indicate	All phases	Area superintendent Project manager Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	contents, quantities and safety requirements. • All storage areas will be bunded. The bund will be of sufficient capacity to contain a spill/leak from stored containers. • The contractor shall ensure that diesel and other liquid fuel, oil and hydraulic fluid is stored in appropriate storage tanks or in bowsers. • The tanks /bowsers shall be situated on a smooth impermeable surface(concrete) bund. The impermeable lining shall extend to the crest of the bund and volume inside the bund shall be 110%. • Inspect and maintenance of bunded and fenced area for storage of hazardous materials, with required safety equipment. • Clean up any accidental chemical, fuel and oil spills that occur at the site in an appropriate manner by using a corrective action method. • Keep a record of hazardous substances stored on site. • Storage areas shall display the required safety signs depicting “No smoking”, “No naked lights” and “Danger”. Containers shall be clearly marked to indicate contents as well as safety requirements; and		

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	• Hazardous materials – such as paint, cement, fuels, bitunmen, fuel, oil, herbicides, battery acid or detergents – must be stored in sealed, lockable containers when not in use • All spills (minor and major) must be cleaned and remediated to the satisfaction of the SHEW within 24 hours of occurrence.		
Herbicide use	• Triple rinse containers before disposal. • Empty containers shall be returned to the suppliers and if this is not possible the containers must be punctured and disposed at a registered hazardous waste disposal site. • Manual vegetation removal encouraged. • Invasive vegetation management programme to be in place for areas disturbed by the substation development. • Herbicide will be handled in accordance with the requirements outlined in the NamPower Herbicide procedure and the NamPower herbicide application at substations EMP. • Herbicide application is to be conducted by a trained	Operational phase	Area superintendent SHEW Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	herbicide applicator and under the supervision of a Qualified Pest Control officer. • Invasive vegetation management programme to be in place for areas disturbed by the substation development.		
Cultural resource	• Any chance finds must be reported to NamPower environmental section. • In an event of discovery of human remains or other artefacts the work shall cease. A professional archaeologist is to be consulted and carry out investigation.	All phases	Area superintendent Project Manager SHEW Contractor
Protection and handling of fauna on site.	• The contractor must ensure that the site is kept clean and free of rubbish that could potentially attract animal pests, and that rubbish bins are scavenger proof. • The contractor must report problem animals or vermin to the SHEW. • Ensure that domesticated and livestock animals belonging to the local community are kept away from the construction works. • The contractor may under no circumstances make use of pesticide or poison to control unwanted animals. • Workers should be educated so as not to kill any fauna found onsite. • The footprint of disturbance should be kept to a minimum	All phases	Area superintendent Project Manager SHEW Contractor

ASPECT	MANAGEMENT AND MITIGATION MEASURES/COMMITMENTS	Phase/ Activity	RSEPONSIBLE PERSON
	• No hunting or trapping is permitted along the alignment. • Excavations must be checked on a regular basis for any signs of wildlife which may have fallen in.		
Site Rehabilitation	• A post construction audit within 1 week after the Contractor has moved off site. • SHEW to sign site close off or take over certificate once remedial corrective action is implemented.	During substation upgrades and extensions	Area superintendent Project Manager SHEW Contractor

10. ENVIRONMENTAL MONITORING AND AUDITING

Environmental monitoring, audits and inspections must be conducted by SHEW personnel and SHE representatives during construction and operational phases. The environmental monitoring and audits conducted at the substation will cover all management procedures and the requirements of this plan.

11. NON-CONFORMANCE PROCEDURES DURING OPERATIONS

In the event of non-compliance the following recommended process shall be followed:

- Non-compliances will be identified during inspections or audits carried out by the SHEW Section and reported to the Area superintendent or project manager for corrective actions.
- Area superintendent or project manager shall notify the both internal and external employees about the non-compliance
- Corrective and preventative actions must be implemented on an agreed timeframes
- Follow – up inspections shall be conducted to assess whether the corrective and preventative actions were implemented effectively.

NamPower has the right to ban any employee from the site, which have not attended a SHEW induction, until the time that they receive induction. NamPower also has the right to stop all construction activities if it is found that a gross violation of the EMP is taking place.

12. SUB-CONTRACTOR MANAGEMENT

The contractor shall in writing inform its sub-contractors and issue them a copy of this EMP and SHE Plan. Sub-contractors shall indicate in writing their commitment to comply with these plans. The Contractor has the overall responsibility of ensuring that all its sub-contractors comply with both plans.

13. DOCUMENTATION, RECORD KEEPING AND REPORTING PROCEDURES

The following documents must be kept on site in an accessible place, and maintained by the Contractor and district personnel:

- Copy of the Environmental Clearance Certificate
- SHE file
- Induction records;
- Environmental monitoring and inspection reports
- Site Locality Plan
- Site instructions
- Substation register

- Records of the quantities of general and hazardous waste generated on site and disposal certificates or details of volumes of waste recycled
- Water consumption
- Incidents and accidents (spills, impacts, complaints, legal transgressions)
- Corrective and preventive actions taken to rectify incidents and accidents.

14. CONCLUSIONS AND RECOMMENDATIONS

The purpose of this document is to provide guidelines for environmental best practice during the operation of the substation. This document shall be seen as part of the all contracts related to the substation.

FICHTNER

BESS Project - Phase II

Scoping Report (incl. ESMP)

NamPower Battery Energy Storage System (BESS)

NamPower

ENGINEERING CONSULTING

Document approval

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Abbreviations

BESS	Battery Energy Storage System
BID	Background Information Document
DEA	Directorate of Environmental Affairs
EAP	Environmental Assessment Practitioner
EHS	Environment, Health and Safety
EIA	Environmental Impact Assessment
EMA	Environmental Management Act (Act No. 7 of 2007)
EMP	Environmental Management Plan
ESMP	Environmental and Social Management Plan
EPC	Engineering, Procurement, and Construction
ESDD	Environmental and Social Due Diligence
ESS	Environmental and Social Standards (World Bank)
IAP	Interested and affected parties
KfW	Kreditanstalt für Wiederaufbau (Development Bank)
MoL	Ministry of Labour and Social Welfare
MAWF	Ministry of Agriculture, Water and Forestry
MEFT	Ministry of Environment, Forestry and Tourism
MFMR	Ministry of Fisheries and Marine Resources
MGECW	Ministry of Gender Equality and Child Welfare
MLR	Ministry of Lands, Resettlement and Rehabilitation
MME	Ministry of Mines and Energy
MW	Megawatt
NamPower	Namibia Power Corporation Limited
NEMWA	National Environmental Waste Management Act
NGO	Non-governmental Organization
NIRP	National Integrated Resource Plan
PCS	Power Conversion Systems
PPP	Public Participation Process
ToC	Table of Content
ToR	Terms of Reference

1 Introduction

The global energy market is undergoing a transformation in response to decarbonization goals, and the power generation mix is changing as the penetration of low carbon generation technologies, such as wind and solar, increases. Namibia is currently following this trend as renewables are increasingly incorporated into the local supply mix.

As part of NamPower's short-to-medium term strategy to fulfil its future energy demand, NamPower is planning to commence with the development of renewable energy projects to increase local generation capacity and to help support NamPower's transmission network.

Considering that Namibia possesses a number of viable renewable energy sources, coupled with the objectives set out in the government's National Integrated Resource Plan (NIRP) and NamPower's strategic roadmap to expand the penetration of renewables within the energy mix, renewable energy power plants will play an important role in NamPower's energy mix by providing additional electricity at a competitive tariff to the customer. To support the development and uptake of renewable energy plants, NamPower is exploring the feasibility of the integration of Battery Energy Storage Systems (BESS) into the transmission network.

The following two phases are being conducted as part of the project:

a) Phase I (February - April 2020): consisted of a detailed technical feasibility study to determine the required BESS application for integration into the grid, its operating concept, sizing, technology, location and time of implementation to suit the Namibian energy market. This included a draft Scoping Report and overview (Table of Content) of an Environmental Management Plan (EMP), a preliminary carbon credit and avoided emissions calculation, and a high-level financial feasibility assessment.
b) Phase II (May 2020 – August 2020): consisted of the design basis report, the detailed financial feasibility study and economic modelling of the BESS project. This will serve as the basis for project appraisal by project sponsors and NamPower, as well as for NamPower's discussions with the regulator (Electricity Control Board) on a suitable tariff regime to cover the long-term cost of the BESS project. This phase also includes the detailed project risk assessment report, detailed carbon credit and avoided emissions calculation, as well as the Scoping Report including an Environmental and Social Management Plan (ESMP, this document) for submission to the Ministry of Environment, Forestry and Tourism (MEFT).

The Government of Namibia is committed to environmental protection, socioeconomic and sustainable development, as expressed and articulated in the Environmental Management Act (EMA) with the objective to prevent and mitigate the significant effects of activities on the environment. Therefore, before starting any operation that might likely cause a significant effect on the environment, an Environmental Impact Assessment (EIA) must be undertaken, as per Environmental Assessment Process.

Phase I was conducted independently of location and at a generic level, as no location was defined at this stage. The purpose of the scoping assessment was to identify the potential impacts this type of project might generally have on the environment and surrounding community. The Draft Scoping Report was a Phase I deliverable as mentioned above. After completion of Phase I, the location at Omburu was selected for project implementation.

As per the findings of the Draft Scoping Report in Phase I, a Draft Environmental Management Plan (EMP) was compiled to be submitted with the Scoping Report to the Directorate of Environmental Affairs (DEA) of the Ministry of the Environment, Forestry and Tourism (MEFT) who are the custodians of the EMA.

These documents have been compiled in accordance with the requirements of the EMA and its regulations (see Section 3.1) as to afford the DEA an objective view of expected impacts on the physical, biological and human environment.

In consultation with the proponent and the respective consultant, the MEFT will decide on whether this project requires a full Environmental Assessment or not. NamPower, consulted by FICHTNER, is of the opinion that this ESMP sufficiently addresses the social and environmental risks and that there will be no need for further documents to assess and mitigate environmental and social risks. Alternatively, the Commissioner and/or Board may decide that an in-depth Environmental Assessment is required, and they will then discuss the Terms of Reference for the study with the proponent.

In addition to the national requirements of Namibia, all financial cooperation (FC) measures (projects) of KfW are classified into one of the four categories "A", "B", "B+" or "C", according to the relevance of their potentially adverse environmental and social impacts and risks.

Projects are classified as:

- Category A, (High E&S Risks) if the project has significantly adverse impacts and risks because of the complex nature of the project type, the scale, the sensitivity of the location or if the impacts and risks are irreversible or unprecedented. Category A projects require an independent ESIA and the implementation of an ESMP to avoid, mitigate, offset and monitor any adverse impacts and risks.
- Category B, (Moderate E&S Risks) if the project has adverse risks and impacts, although to a lesser extent than these of category A and can usually be mitigated through best available mitigation approaches. Potential impacts are limited to a local area, are in most cases reversible and are easier to mitigate through appropriate measures.
- Category B+, (Substantial E&S Risks) if the project has significant impact and/or risk in some areas but not as varied and unpredictable as under Category A. A B+ project has single significantly adverse environmental and social impacts and risks. For B+ project an in depth ESIA and an ESMP for these impacts and risks are required.
- Category C, if they are expected to have no or only minor adverse environmental and social impacts or risks, and if the implementation and operation of the project does not require any particular protection, compensation or monitoring measures.

The current project as proposed herein is classified as Category B by the Consultant and by the KfW competence center for environmental and social risks. Details on the assessment are outlined in the following Chapters.

2 Methodology

The scoping process required an integrated approach to gather relevant information to obtain data in respect to the description of the environment and the project. The purpose of the scoping phase was to determine the key environmental and social issues (physical, biological, social) related to the activities of the project with the potential to contribute to, or cause, potentially significant impacts. Initially project objectives and components were obtained from the proponent, NamPower. The scoping phase considered the project area which would most likely be affected by the project activities and potential impacts on a generic level, as neither a specific site nor a battery technology had been determined at Phase I.

Subsequent steps in Phase II focused on these key issues through the collection of information on existing conditions and developing the more detailed measures to avoid, control, mitigate and monitor these impacts; tailored to the selected site at Omburu Substation and the chosen technology of Lithium-Ion-Batteries.

This process considered the secondary data and information already gathered during Phase I as well as the additional information provided by the proponent in May 2020. That information was reviewed in detail and complemented by further desktop research of available data, and a social and environmental baseline evaluation. A site verification visit and formal and informal engagement with key stakeholders could not yet take place, due to ongoing restriction caused by COVID-19.

The following table provides an overview of the scoping requirements in Namibia and refers to respective sections of this report.

Table 1: Scoping Report Requirements, stipulated in the Namibian EIA Regulation

REQUIREMENTS FOR A SCOPING REPORT IN TERMS OF THE FEBRUARY 2012 REGULATION	REFERENCE IN REPORT
a) the curriculum vitae of the Environmental Assessment Practitioner (EAP) who prepared the report;	Annex 1
b) a description of the proposed activity;	Section 4
c) a description of the site on which the activity is to be undertaken and the location of the activity on the site;	Section 4.1
d) a description of the environment that may be affected by the proposed activity and the manner in which the geographical, physical, biological, social, economic and cultural aspects of the environment may be affected by the proposed listed activity;	Section 6
e) an identification of laws and guidelines that have been considered in the preparation of the scoping report;	Section 3
f) details of the public consultation process conducted in terms of regulation 7(1) in connection with the application, including – (i) the steps that were taken to notify potentially interested and affected parties of the proposed application; (ii) proof that notice boards, advertisements and notices notifying potentially interested and affected parties of the proposed application have been displayed, placed or given; (iii) a list of all persons, organizations and organs of state that were registered in terms of regulation 22 as interested and affected parties in relation to the application; and (iv) a summary of the issues raised by interested and affected parties, the date of receipt of and the response of the EAP to those issues;	Section 7

REQUIREMENTS FOR A SCOPING REPORT IN TERMS OF THE FEBRUARY 2012 REGULATION	REFERENCE IN REPORT
g) a description of the need and desirability of the proposed listed activity and any identified alternatives to the proposed activity that are feasible and reasonable, including the advantages and disadvantages that the proposed activity or alternatives have on the environment and on the community that may be affected by the activity;	Section 5 & Section 8
h) a description and assessment of the significance of any significant effects, including cumulative effects, that may occur as a result of the undertaking of the activity or identified alternatives or as a result of any construction, erection or decommissioning associated with the undertaking of the proposed listed activity;	Section 5 & Section 6
i) terms of reference for the detailed assessment; and	Section 9
j) a draft management plan, which includes - (i) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address the effects on the environment that have been identified including objectives in respect of the rehabilitation of the environment and closure; (ii) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and (iii) a description of the manner in which the applicant intends to modify, remedy, control or stop any action, activity or process which causes pollution or environmental degradation, remedy the cause of pollution or degradation and migration of pollutants.	Section 10

2.1 Desktop Review

The scoping as presented here was completed as a desktop exercise, during which documents provided by NamPower and publicly available information related to the project were analyzed. National and international environmental and social laws, legislations, policies and procedures were reviewed, as appropriate and deemed necessary.

These tasks were to provide sufficient background information about the environmental and social components of the project and to initially identify the main sensitivities and risks associated with the project.

Information regarding the biophysical environment was sourced from the Atlas of Namibia and augmented by various other NamPower project-related documentation. Furthermore, significant desktop research was undertaken to obtain information regarding the latest technologies and associated environmental and social impacts with various BESS technologies.

2.2 Site Visit

Due to ongoing travel restrictions caused by COVID-19 a physical site visit could not be conducted at the site of Omburu. Information regarding the environment, the biophysical and social characteristics of the area was derived through desktop review of relevant related documentation, by materials and photographs shared by NamPower which included a high-resolution image of the entire project site and site-specific photographs as well as publicly available information.

The project site of Omburu is located in a remote and previously disturbed area within NamPower property and as such will pose little to no biophysical concern. The desktop assessment included the area as a whole from a community perspective to identify potential stakeholders and possible socioeconomic impacts.

2.3 Stakeholder Engagement

Stakeholder engagement through the public consultation process, as described in Section 7 of this report, will be conducted. Persons, communities or any parties who may be affected by the project and its related activities must be notified and given a chance to comment on the Scoping report. This could be done by a respective publication of a notice in a local newspapers and public hearings. The regulations provide more details about the notification process.

Stakeholder engagement aims to provide insightful concerns regarding potential impacts on the environment from the affected community. Comments and concerns as obtained through discussions, written submissions and stakeholder meetings generate information regarding the current and future surrounding land use and will be included in a comments register. Once all the information has been gathered, a matrix of impact identification will be established as per Section 8 of this report. All of the information generated and considered will be cross referenced with pertinent national and international legislation discussed in Section 3 of this report.

3 Administrative, Legal and Policy Requirements

Regulations regarding assets in general and applicable to BESS in particular are the following:

- Occupational health and safety
- Safety of people, environment and assets in the vicinity of the BESS
- Ensuring the Power Quality and reliability of the electricity supply.

As the main source of legislation, the Namibian Constitution makes provisions for the creation and enforcement of applicable legislation. In this context and in accordance with its Constitution, Namibia has passed numerous laws intended to protect the natural environment and to mitigate against adverse environmental impacts.

The Republic of Namibia has five tiers of law and several policies relevant to the proposed project and these include:

- The Constitution
- Statutory laws
- Common law
- Customary law
- International law.

The following sections provide a summary of the Namibian administrative framework and describe the relevant Namibian legislation, international treaties and industry standards and guidelines applicable to the proposed BESS project.

3.1 National Laws and Regulations

3.1.1 The Constitution of the Republic of Namibia (1990)

Article 91 defines the function of the Ombudsman and, 91 (c) describes the duty to investigate complaints concerning the over-utilization of living natural resources, the irrational exploitation of non-renewable resources, the degradation and destruction of ecosystem and failure to protect the beauty and character of Namibia.

Article 95 (l) of the Constitution of the Republic of Namibia states that "*the State shall actively promote and maintain the welfare of the people by adopting, inter alia, policies aimed at … maintenance of ecosystems, essential ecological processes and biological diversity of Namibia and utilization of natural resources on a sustainable basis for the benefit of all Namibians both present and future; in particular the Government shall provide measures against the dumping or recycling of foreign nuclear and toxic waste on Namibian Territory*."

Article 100 states "*that the land, water and natural resources below and above the surface of the land …shall belong to the State if they are not otherwise lawfully owned*."

The constitutional recognition of environmental concerns triggered widespread legislative reform relating to the management of natural resources in Namibia. The country's environmental protection effort is currently comprised of the Environmental Management Act (No. 7 of 2007) and its Regulations (2012).

3.1.2 Environmental Management Act (Act No. 7 of 2007)

The Environmental Management Act (EMA) has three main purposes:

- to make sure that people consider the impact of activities on the environment carefully and in good time;
- to make sure that all interested or affected people have a chance to participate in environmental assessments;
- to make sure that the findings of environmental assessments are considered before any decisions are made about activities which might affect the environment.

The EMA presents the procedures and application process to obtain an environmental clearance certificate for a proposed activity and defines the respective roles and responsibilities. If an environmental clearance certificate is required, certain activities may first require an environmental assessment, which shall serve the following purposes:

- ensure that activities which may have a significant effect on the environment follow the principles of environmental management planning and development process;
- analyze the possible environmental impacts of activities, and look at ways to decrease negative impacts and increase positive ones;
- make sure that the environmental effects of activities are given adequate consideration before the activities are carried out;
- provide an opportunity for public participation in considering the environmental impact of a project.

3.1.3 The Green Plan and Vision 2030

In 1992, Namibia's Green Plan was drafted by the newly created Ministry of Environment and Tourism (MET) (now Ministry of Environment, Forestry and Tourism (MEFT)) and presented at the United Nations Conference on Environment and Development in Rio de Janeiro. This document analysed the main environmental challenges facing Namibia and specified actions required to address them. Following on the foundation laid by the Green Plan, an effort was made to incorporate environmental and sustainable development issues and options into Namibia's National Development Plans (NDPs), which run for a period of five years each.

In addition, Vision 2030, which was formulated in 2001/02, aims to guide the country's development plans from NDP II through NDP VII, while providing direction to government ministries, the private sector, non-governmental organizations (NGOs) and local authorities. At the present, the NDP V covers the period 2017/2018 until 2021/22 and is based on four pillars, namely Economic Progression, Social Transformation, Environmental Sustainability (Climate change falls within this area) and Good Governance. Vision 2030 fully embraces the idea of sustainable development. For the natural resource sector, it states:

"The nation shall develop its natural capital for the benefit of its social, economic and ecological well-being by adopting strategies that: promote the sustainable, equitable and efficient use of natural resources; maximize Namibia's comparative advantages; and reduce all inappropriate resource use practices. However, natural resources alone cannot sustain Namibia's long-term development, and the nation must diversify its economy and livelihood strategies."

3.1.4 Policies

Namibia's policies provide the framework for the applicable legislation. Whilst policies do not often carry the same legal recognition as official statutes, policies can and are used in providing support to legal interpretation. Relevant policies currently in force include:

- The EIA Policy (1995)
- Namibia's Environmental Assessment Policy for Sustainable Development and Environmental Conservation (1994)
- National Development Plan 5 (NDP) and Vision 2030
- National Guidelines on Forest Fire Management in Namibia (2001)
- White Paper on Energy Policy (1998)
- National Industrial Policy (2012)
- Policy for the Conservation of Biotic Diversity and Habitat Protection (1994)
- The National Climate Change Policy of Namibia (June 2011)

3.1.5 Legislation and standards

The sections below summarize the relevant legislation currently in force in Namibia:

- Environmental Management Act (Act 7 of 2007) and Regulations (outlined above)
- The Forest Act (Act 12 of 2001) and Regulations (2015)
- The Soil Conservation Act (Act 76 of 1969) & the Soil Conservation Amendment Act (Act 38 of 1971)
- The Water Act, No. 54 of 1956 and Water Resources Management Act, No.11 of 2013
- Electricity Act (Act. of 2007)
- National Heritage Act 27 of 2004
- Draft Pollution Control and Waste Management Bill of 1999
- Road Traffic and Transport Act, 22 of 1999

The following Table provides an overview of Namibian Legislation pertaining environmental and social sectors.

Table 2: Overview of Namibian Legislation

Sector	Primary agency	Title and date of document	Purpose
Natural resources	Ministry of Environment, Forestry and Tourism	Environmental Management, Act 7 of 2007	The Act promotes sustainable management of the environment and the use of natural resources. It provides a process of assessment and control of activities that may have a possible significant effect on the environment.
Soil resources	Ministry of Environment, Forestry and Tourism	The Soil Conservation Act	Law relating to the combating and prevention of soil erosion, the conservation, improvement and manner of use of the soil and vegetation and the protection of the water sources of Namibia.

Sector	Primary agency	Title and date of document	Purpose
Energy	Ministry of Mines and Energy (The electricity sector is regulated by the Electricity Control Board)	Electricity Act of 2007	Establishment of the Electricity Control Board; to provide for the requirements and conditions for obtaining licenses for the provision of electricity; to provide for the powers and obligations of licensees; and to provide for incidental matters.[1]
Water resources	Ministry of Agriculture, Water and Land Reform	Water Resources Management Act, No. 24 of 2004	The Act provides for the management, development, protection, conservation and use of water resources, and established various regulatory and advisory institutions. Section 78 specifies the permission required if a person wishes to block a watercourse.
Air pollution and noise	Ministry of Health and Social Services	Atmospheric Pollution Prevention Ordinance, No. 11 of 1976	Air pollution is controlled primarily by this Ordinance, which deals with air pollution as it affects occupational health and safety issues if these are the subject of one of the conditions of a registration certificate issued under the Ordinance. It considers air pollution from point sources but does not address ambient air quality.
Roads	Ministry of Works and Transport	Road Traffic and Transport Act, 22 of 1999	Provides for the control of traffic on public roads and the regulations pertaining to road transport.
Waste management	MEFT and others	Pollution Control and Waste Management Bill (in preparation)	The purpose of this Bill is to regulate and prevent the discharge of pollutants to the air and water; and enable the country to fulfil its international obligations in this regard. With respect to water pollution, the draft Bill forbids any person from discharging or disposing of pollutants into any water or watercourse without a Water Pollution License, aside from the discharge of domestic waste from a private dwelling or the discharge of pollutants or waste to a sewer or sewage treatment works.
Health	Ministry of Health and Social Services	Public Health Act, No. 36 of 1919, with subsequent amendments	This Act is only relevant in as much as workers must be protected from harm, especially during construction.

[1] https://laws.parliament.na/annotated-laws-regulations/law-regulation.php?id=422

Sector	Primary agency	Title and date of document	Purpose
Land and resettlement	Ministry of Agriculture, Water and Land Reform	Agricultural (Commercial) Land Reform Act, 1995	This Act enables the redistribution of freehold land to the previously disadvantaged under the willing seller, willing buyer principle. Problematic issues include the unclear definition and interpretation of 'underutilized' land and 'economic unit'.
		Communal Land Reform Act, 2002	The Act aims to improve the use of communal land and to reduce irregularities and constraints regarding livelihood strategies. Issues addressed are: ▪ Fencing (which is illegal); ▪ Land degradation and impacts from prospecting, mining, roadworks and the use of water resources; ▪ Allocation of land; and ▪ Institutional arrangements.
Archaeological, historical and cultural	Ministry of Education and Culture	National Heritage Act, No. 27 of 2004	The Act extends the protection of archaeological and historical sites to private and communal land and defines permit procedures regarding activities at such sites.
Local government	Ministry of Regional and Local Government and Housing	Regional Councils Act, No. 22 of 1992, amended in Act No. 24 of 2000 Local Authorities Act, No. 23 of 1992 Traditional Authorities Act, 1995	Reference to these Acts is included because traditional and regional authorities have a say in how land is allocated. This has implications for an EIA process in that these structures must be consulted, and the correct protocol must be followed.

3.2 International Conventions and Guidelines

3.2.1 Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (1992)

Namibia became a signatory to the Basel Convention in 1995. The Treaty establishes a global notification and consent system for the transboundary shipments of hazardous and other wastes among Parties and requires Parties to manage and dispose of waste in an environmentally sound manner.

3.2.2 United Nations Framework Convention on Climate Change (1992)

The first World Climate Conference was held in 1979, followed by several more specific meetings and, in 1990, the establishment of a UN sponsored Intergovernmental Negotiating Committee (INC), which was tasked with establishing the finer details of the Framework Convention on Climate Change (FCCC). The convention was duly completed and signed by 154 governments, including Namibia, at the Earth Summit

at Rio de Janeiro in 1992. The main objective of the convention is to '*stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous, man-made interference with the climatic system*'. It hopes to achieve this as quickly as possible, thereby allowing ecosystems time to adapt naturally to gradual climatic change. The FCCC emphasized the responsibility of developed countries in reducing and stabilizing greenhouse gas emissions to 1990 levels by 1995. They are furthermore expected to transfer technology to developing countries so as to enable the latter to meet their own commitments (UN 2005).

Namibia is a non-Annex I Party to the UNFCC. The country is required to provide information to the Convention on the national inventory of anthropogenic emissions (carbon dioxide, methane, nitrous oxide and precursor gases), steps taken or planned to implement the Convention and any other relevant information the country considers relevant to achieve the objectives of the Convention through national communications.

Namibia has ratified the Kyoto Protocol to the UNFCCC (2003) and the Paris Agreement (2016) and has been meeting its reporting obligations. According to Namibia´s third Biennial Update Report (BUR) from 2018 submitted to the Convention the total national emissions increased by 12.1% over the years 1994-2014. The Agriculture, Forestry and other Land Use sector is responsible for over 80% of total national emissions followed by Energy with 15,3% in 2014. Namibia's vulnerability to climate change is high, as it is the driest country in Southern Africa in terms of water resources and as much as 70% of its people depend on agriculture for their existence. The BUR points out different mitigation measures such as increasing the share of renewable in electricity generation and increase energy efficiency.

By harnessing solar and other forms of renewable energy, the country would be making a small but important contribution to the world's environmental stability (Du Plessis 1999).

3.2.3 Vienna Convention for the Protection of the Ozone Layer (1985)

The implementation of this convention followed the adoption of the Vienna Convention in 1985, the Montreal Protocol in 1987 and the London Amendment in 1990. The convention recognizes the need to protect the ozone layer from harmful emissions caused by humans and requires international cooperation and action based on ongoing scientific research and technological considerations. Its main purpose is to protect human health and the environment from increased ultra-violet solar radiation. Adverse impacts include increasing skin cancer, damage to crops and die-offs of plankton in the ocean which, in turn, affect the fishing industry. It requires that governments reduce their reliance on ozone depleting substances, and that collaborative research be undertaken to find alternatives to harmful substances such as chlorofluorocarbons (CFCs) and halons. The convention specifically urges governments to assist developing countries through technology transfer, research and training (UNEP 2004).

Although Namibia does not significantly contribute to the destruction of the ozone layer, it became a signatory to the treaty in 1993 and is therefore obliged to assist where possible and appropriate in finding solutions to the ozone problem. It is furthermore obliged to submit statistics on the production and/or use of CFCs in its industrial activities.

3.2.4 KfW Sustainability Guidelines

The Sustainability Guidelines (2019) of the KfW Development Bank represent the essential elements for the anticipation and appraisal of foreseeable environmental and social project impacts and risks, their prevention or minimization on an acceptable level and the introduction of compensation measures if the adverse impacts are inevitable but still tolerable.

The environmental and social assessment for NamPower and the development of the ESMP have been carried out taking into consideration KfW's general principles on avoiding social and environmental impacts and risks as well as the recently published Sustainability Guidelines (2019):

- to avoid, reduce or limit environmental pollution and environmental damage including climate-damaging emissions and pollution;
- to preserve and protect biodiversity and to sustainably manage natural resources;
- to avoid adverse impact upon the living conditions of communities, in particular vulnerable groups;
- to avoid and minimize involuntary resettlement and forced eviction of people and their living space as well as to mitigate adverse social and economic impacts through changes in land use by reinstating the previous living conditions of the affected population.

3.2.5 World Bank Environmental and Social Framework

The World Bank's Environmental and Social Framework (2016) determines 10 Environmental and Social Standards (ESS) which have been designed to meet sustainable development in financing projects throughout the lifecycle. The standards, their objectives and their applicability for the project are listed as follows:

- ESS1: Assessment and Management of Environmental and Social Risks and Impacts
- ESS2: Labour and Working Conditions
- ESS3: Resource Efficiency and Pollution Prevention and Management
- ESS4: Community Health and Safety
- ESS5: Land Acquisition, Restrictions on Land Use and Involuntary Resettlement
- ESS6: Biodiversity Conservation and Sustainable Management of Living Natural Resources
- ESS7: Indigenous Peoples/Sub-Saharan African Historically Underserved Traditional Local Communities
- ESS8: Cultural Heritage
- ESS9: Financial Intermediaries
- ESS10: Stakeholder Engagement and Information Disclosure

3.2.6 World Bank Environmental, Health and Safety General Guidelines

The environmental, health, and safety (EHS) guidelines (2007) are technical reference documents with general and industry-specific examples of good international industry practice (GIIP). The EHS guidelines contain the performance levels and measures that are generally considered to be achievable in new facilities by existing technology at reasonable costs. When local country regulations differ from the levels and measures presented in the EHS guidelines, projects are expected to achieve whichever is more stringent.

3.2.7 Core standards of the International Labour Organization

The International Labor Organization (ILO) aims to promote rights at work, encourage decent employment opportunities, enhance social protection, eliminate forced or compulsory labour and child labour and strengthen dialogue on work-related issues. Therefore, the ILO lists fundamental principles and rights at work, laid down in eight conventions:

1. Freedom of Association and Protection of the Right to Organize Convention, 1948 (No. 87)
2. Right to Organize and Collective Bargaining Convention, 1949 (No. 98)
3. Forced Labour Convention, 1930 (No. 29)
4. Abolition of Forced Labour Convention, 1957 (No. 105)
5. Minimum Age Convention, 1973 (No. 138)
6. Worst Forms of Child Labour Convention, 1999 (No. 182)
7. Equal Remuneration Convention, 1951 (No. 100)
8. Discrimination (Employment and Occupation) Convention, 1958 (No. 111)

Namibia has been a member of ILO since 1978. In the meantime, Namibia has ratified all the ILO Conventions listed above between 1995 and 2001. The Ministry of Labour and Social Welfare administers industrial relations, employment, migration and social security as well as being responsible for labour inspection. The Directorate for Labour Services is responsible for inspections whilst the following laws cover labour matters:

- Labour Act No. 11 of 2007
- Labour Act, 1992
- Regulations relating to the health and safety of employees at work (No. 156 of 1997)
- Public Service Act, 1995

4 Project Description

4.1 Project Site

At present, there are no utility-scale energy storage applications in Namibia. The purpose of the feasibility study in Phase I of the project was to determine suitable BESS applications for integration into the Namibian grid and energy market and to identify a potential project location. Following the feasibility study and the draft scoping process in Phase I the project site was selected to be at Omburu Substation site.

The site is located in the Erongo region, approximately 12 kilometres Southeast of the town of Omaruru, between the Erongo Mountains in the West and the (ephemeral) Omaruru River in the North. Erongo region is one of 14 regions of Namibia (see Source: Nations Online Project; Okavango region is now divided in West and East

Figure 1), named after Mount Erongo and has a shoreline on the Atlantic Ocean in the West. The biggest cities are the capital Swakopmund and Walvis Bay. The Port of Walvis Bay is Namibia's largest commercial port with direct access to principal shipping routes and offering international cargo-handling facilities. Transport corridors by railway and road allow access to the hinterland all over Southern Africa.

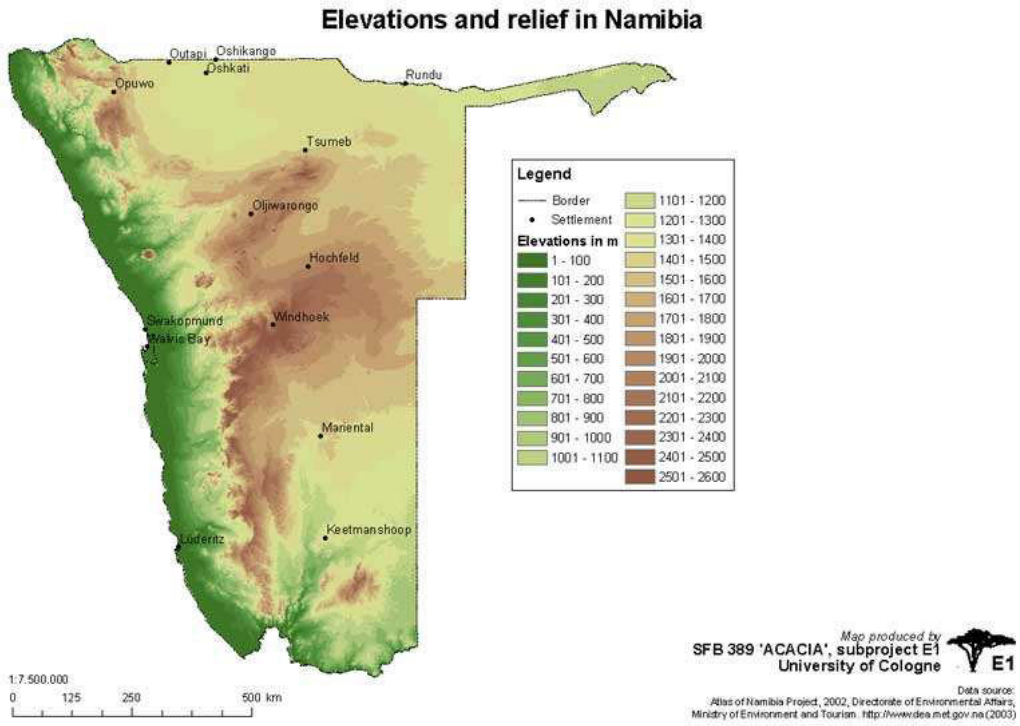
Source: Nations Online Project; Okavango region is now divided in West and East[2]

[2] https://www.nationsonline.org/oneworld/map/namibia-administrative-map.htm

Figure 1: Political Map of Namibia

The Eastern part of Erongo region is part of the Central Plateau, the largest landscape formation in Namibia. The Central Plateau borders on the Great Escarpment to the West and gives way to the Kalahari Basin in the East. It reaches an altitude of ~1,000 to ~2,000 meters above sea level. Occasionally, there are higher zones and mountain peaks exceeding 2,000 meters, for example the Brandberg Massif. Most of the arable land is located on the Central Plateau, thus most of the population resides in this region along with the majority of the country's economic activity.

The Omburu area is underlain entirely by Salem granite, which intruded into the Damara Supergroup. To the north and northwest of Omaruru, outcrops of the Swakop Group consisting of marble bands, mica schist, calc-silicate rocks and quartzite, are overlain by mica schist and quartzite of the Kuiseb Formation occur. The Southern Central Zone contains numerous plutons of Damaran granites, the boundary between the northern and southern parts being the north east trending Omaruru Lineament along which the lower Swakop Group rocks thicken rapidly northwards.



Source: University of Cologne[3]

Figure 2: Elevations and relief in Namibia

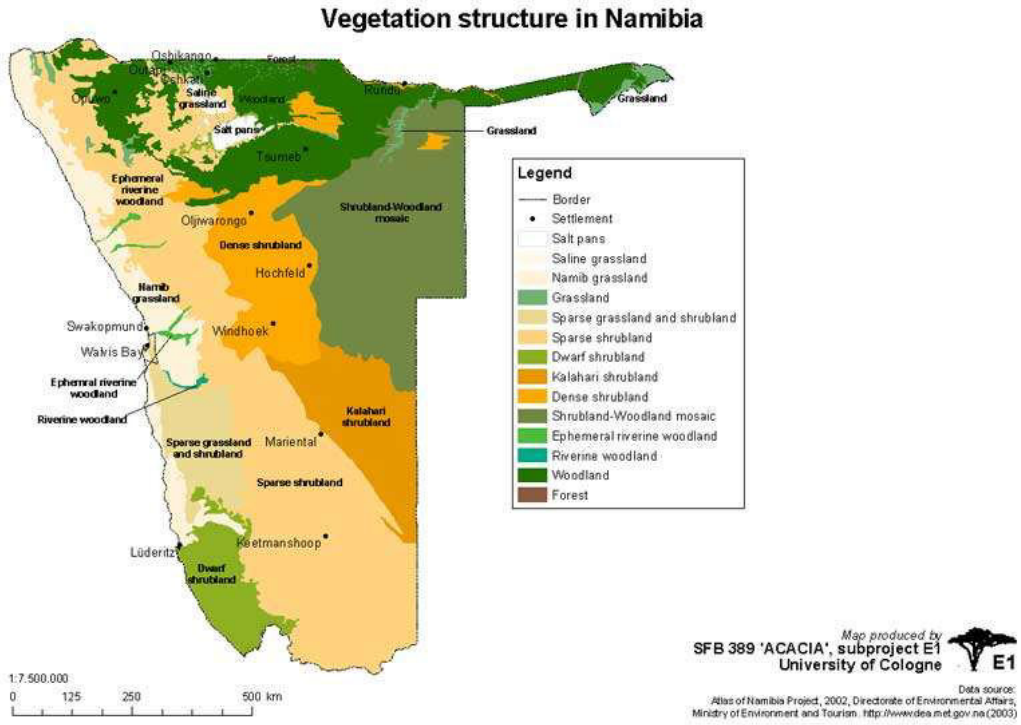
The climatic conditions at the Plateau are defined by sunny winter days and cold evenings; frosts are common in winter. The warmest period is from September to November, before the rainy season, which starts in January and lasts till May.

The relief does not prevent the sun rays from darting the ground, which makes it difficult to develop important vegetation. Bush and grassland are the predominant vegetation cover on site (see Source: University of Cologne

[3] http://www.uni-koeln.de/sfb389/e/e1/download/atlas_namibia/e1_download_physical_geography.htm

Figure 3 and Source: NamPower

Figure 4).



Source: University of Cologne[4]

Figure 3: Overview of Vegetation Cover in Namibia

Source: NamPower

Figure 4: Site view, Omburu Area

A solar power plant has already been built in the chosen locality on an area of 16 hectares and was commissioned in 2015. Source: NamPower

[4] http://www.uni-koeln.de/sfb389/e/e1/download/atlas_namibia/e1_download_physical_geography.htm

Figure 5 offers an aerial view of the NamPower Substation site at Omburu. The BESS system shall be installed within the fenced area of the NamPower property, adjacent to NamPower's 20MW Omburu PV development and presumably at the Northeastern corner of the site (coordinates as given by NamPower: Latitude: 21°29'21.51"S / Longitude: 16° 1'25.77"E).

The Omburu site has both a northern aspect and a southern aspect with a watershed between them. The only topographic feature of the site is the strong ridgeline which runs east to west through the site.

Source: NamPower

Figure 5: Aerial view, Omburu Substation, with proposed BESS location (not scaled)

4.2 Project Components

A battery is an electrochemical device which stores and delivers energy. A Battery Energy Storage System (BESS) is comprised of three major components: the battery which is the energy container; the power conversion system/inverter, which interfaces the DC battery system to the AC power system; and the power plant controller which governs, monitors, and executes the intended functions of the energy storage application. Since the BESS needs to be operated economically within the current power system, BESS have to be designed in order to meet all economic, legal and safety-related requirements.

The battery storage capacity is measured based on the following BESS characteristics:

- Energy Capacity – the maximum usable electrical energy (kWh) stored in a battery.
- Maximum Charge and Discharge Rates – the peak power (usually given as maximum current) the battery can either hold (charge) or discharge without being damaged.
- Depth of Discharge – the percentage of the battery's capacity that can be discharged before it needs to be recharged.
- Cycle Life – the number of recharge cycles a battery can undergo before it reaches the end of its life.
- Calendar Life – the duration, in calendrical days, that a battery can be expected to last before it reaches its end of life.
- Energy Density – the amount of energy stored per unit of volume or mass.
- Temperature Limitations – the acceptable operating temperature range of a battery. Some battery chemistries may not operate below freezing temperatures, or at very high temperatures, for example. Some batteries may generate significant heat either while charging or discharging and thus may need an active thermal management system to keep them from overheating.
- Self-Discharge Rates – the rate at which a battery loses charge while not being charged.
- Round Trip Efficiency – the ratio of energy-in to energy-out for one complete battery cycle (i.e., for a complete charge and discharge cycle).

A utility scale BESS consists of several battery strings which are connected via DC cables to a power converter converting the DC to AC power. When connected in parallel, malfunction of a central power converter would lead to an outage only of the connected battery strings.

BESS can be placed either in a building or module-wise within containers. In this present project, a modular container concept is planned for Omburu site (see exemplary picture in Source: PR Newswire Figure 6). Several battery strings will be installed in one container with their respective cooling system. For every two battery containers a container with power converters, BESS SCADA, and switchgears will be implemented alongside outdoor LV/MV transformers. In total, roughly 37 containers (25 battery container + 12 power conversion container) will be used; which will cover a total area of 90 m x 90 m. In addition, a 60 MVA MV / 220 kV transformer will be required.

Source: PR Newswire[5]

[5] https://www.prnewswire.com/news-releases/weltweit-erstes-und-chinas-grosstes-bess-multi-energie-kraftwerk-100-mwh-von-catl-geht-ans-netz-809283181.html

Figure 6: Example of BESS system in modular container system

As technology, Lithium-ion battery system has been selected during Phase I and will be described in more detail in the following Sections; possible cathode anode materials will be specified in Phase II.

4.2.1 Lithium-ion batteries

A Lithium-ion (Li-ion) battery is a rechargeable electrochemical battery. Rather than a single electro-chemical couple like Nickel-Cadmium (NiCd), "lithium-ion" refers to a wide array of chemistries in which lithium ions are transferred between the electrodes during the charge and discharge reactions.

A Li-ion cell consists of three main components: cathode and anode electrodes and an electrolyte that allows lithium ions to move from the negative electrode to the positive electrode during discharge and back during charge. When the battery is charging, lithium ions flow from the positive metal oxide electrode to the negative graphite electrode. When the battery is discharging, the ions flow in reverse.

The electrolyte in a lithium-ion cell is typically a mixture of organic carbonates such as ethylene carbonate or diethyl carbonate. The mixture ratios vary depending upon desired cell properties and additives in low concentrations may be included to improve performance characteristics and to reduce site reactions within the cell. The most commonly used electrolyte salt ($LiPF_6$) will decompose to form hydrofluoric acid (HF) if mixed with water or exposed to moisture; thus, cell production and assembly is conducted in "dry rooms" to prevent HF formation. Some companies have introduced inorganic electrolytes which are non-flammable and inherently safer. Specific electrolyte information will need to be provided by the respective cell manufacturer.

4.2.2 Construction and installation

The modularity of the Li-ion cells allows them to be constructed as modules and scaled. Battery packs can then be combined with inverters and control systems and packaged into BESS at manufacturing facilities. When packaged into standard shipping container sizes, shipping the BESS around the world via truck, rail, or ship is greatly facilitated. Containerized BESS can be sited on pads or simple foundations and electrically connected to switchgear. Containerization significantly reduces the costs for local labour and on-site construction.

4.2.3 Operation and maintenance

BESS solutions are essentially maintenance-free and require little on-site monitoring. This is particularly true for systems that are monitored remotely, and maintenance staff can be dispatched as needed. The greatest maintenance issue for Li-ion batteries is generally the monitoring and replacement of individual cells/modules later in life as replacement is required.

4.2.4 Decommissioning and disposal

Modularized and packaged systems offer ease of system removal from site for disposal at end of life. Site contamination is unlikely, and site restoration would include infrastructure removal and revegetation. Leakage of free electrolyte from cells is highly unlikely, and would result in deposition of the electrolyte salt, while the organic components volatilize. The materials used in Li-ion batteries are typically considered non-hazardous waste. The metals in the system can be recycled, but they do not represent a high salvage value.

4.2.5 Overheating and runaway

One of the greatest challenges facing lithium-ion is safety with the thermal run-away being the most feared hazard of all battery technologies. The energy density of the cells and the combustibility of the organic-based electrolyte make these batteries a fire hazard. Excessive charging, discharging, high current, or imbalances between cells can cause overheating in a cell and result in thermal runaway as neighbouring cells also overheat.

Extreme high temperatures lead to leaks, smoke, gas venting, and/or combustion of the cell pack. Burning lithium-ion-batteries cannot be extinguished because they provide their own oxygen for the fire. Thus, manufacturers of large systems have employed sophisticated battery management systems to monitor cell performance (such as voltage, temperature, current etc.) and limit operation to safe and acceptable performance ranges while minimizing the risk of a thermal run-away. Overcharging and overheating caused by exceedingly high currents need to be avoided by safe monitoring and control. Regarding heating, ventilation and air conditioning, Lithium-ion batteries need cooling which is usually accomplished by air conditioning within the battery rooms/containers.

Overtemperature caused by external heat sources (e.g. bush fires and lightning) can only be diminished by a safe battery containment.

4.3 Project Activities

4.3.1 Pre-construction

During the pre-construction phase, all environmental and socioeconomic factors as identified during the scoping and impact assessment phase will be incorporated into the design. During this final design phase, all impacts will determine the construction locality and design. Site access during construction (equipment delivery, construction equipment access) on a given locality is very site-specific and is affected by rural or urban locations and by the existence of communication routes (roads, rail, seaports).

For the current planned BESS project in Namibia, it is assumed that suppliers from overseas or South Africa will be chosen. Port of entry will most probably be Walvis Bay industrial port in Erongo region on the Atlantic coast. The Site of Omburu is connected to the local street network and accessible via a bitumen road (T0204) till Omaruru town and by a wide gravel road till Omburu Substation site. The road network is deemed suitable for construction activities and the required vehicles.

As mentioned above, Li-ion batteries can generate a great amount of heat if short circuited. In addition, the chemical contents of these batteries may catch fire if damaged or if improperly designed and/or assembled. Hence, batteries and their respective components should be packed to eliminate the possibility of a short-circuit or activation while in transport. For these reasons, there are safety regulations controlling the shipment and transport of these types of batteries. Usually Li-ion batteries are regulated as hazardous materials or as dangerous goods, that may only be transported under specific hazardous materials/dangerous goods regulations.

The amount of civil works required will depend upon ground quality. While the container modules will only require simple foundations, cable trenches for connection lines will have to be excavated. The

adjacent Omburu PV site is already de-bushed; the Omburu Substation site may need to be cleared from vegetation (bushes as grassland, see Source: NamPower

Figure 5) according to information from site provided by NamPower.

4.3.2 Construction

Different types of battery energy storage systems exist in containers whose weight and size make them difficult to transport and handle. Several units of the chosen system might be loaded onto a truck and transported to the site where the complete units can be moved using a forklift truck, thus replacing the need for heavy load cranes.

Comparisons should be made between indoor versus outdoor insulations and the quality of the building fabric on a brownfield site (resistance to wind, rain, water or noise). In respect to noise and other disruption, the project will necessitate extra vehicles and so frequency and time-of-day of deliveries should be considered in relation to extra traffic, disruption and noise. Consideration of construction and installation works practices in relation to time-of-day (working hours) and number of working days (including working at weekends) should be made, as well as considering provision of storage of materials during construction.

4.3.3 Operation

The noise from electrical equipment and cooling technology can have a negative effect on the surrounding environment. Although battery storage systems do not contain significant moving parts, battery Power Conversion Systems (PCS) emit a whine due to fast electrical switching, flow batteries require pumps, and various items of the plant will require fans for active cooling, even more so depending on the chosen site.

The potential noise emission will depend on the chosen BESS technology (Li-ion batteries) and its respective cooling medium. Similarly, other ancillary systems (particularly transformers) can vary in noise output due to the cooling design adopted (natural or forced, air, oil or water). A baseline noise survey is recommended to be carried out before planning so that any additional noise when operational can be objectively measured (see also Section 6.1.5 and 8.2.5).

The source of air for heating and cooling is important, as it impacts on the condition of the system. The discharge of cooling air should consider neighbouring areas of the selected site.

The developer should consider how to provide maintenance over the operational lifetime. This includes the possible need for storage of materials or equipment onsite, the need for site access for specialist equipment, and the possibility of replacing large modules (e.g. containers).

The developer, owner and operator (NamPower) should prepare a fire safety and emergency plan which will contain, but not be limited to, the ingress and egress routes to buildings, access routes for emergency vehicles, fire management and compliance with fire safety legislation.

4.3.4 Decommissioning

Reasons for decommissioning might be at the end of the lifetime of the project or e.g. safety issues, high repair costs, or because the purpose of the project is no longer needed. Early decommissioning may be a reasonable management option when the lost benefits of the project can be met through alternative means, e.g. electricity generated by other types of power plants or when there are significant environmental and social benefits achieved by decommissioning.

Decommissioning could range from partial to full removal of all BESS components, related facilities and infrastructure, together with the restoration of the project site, access roads and transmission line corridors. This shall be done based on a Decommissioning Plan, which shall detail the expected impacts of decommissioning, as well as mitigation measures to handle these impacts and will depend on the reasoning for decommissioning as well. The dismantling works will have to adhere to the latest editions of national and international laws and guidelines, or even to new ones that will be relevant at that time.

The anticipated impacts of demolition activities and respective machinery used throughout the decommissioning phase are generally similar in nature to some of the impacts foreseen for the construction phase: mostly limited to impacts on air quality, noise, waste and community and occupational health and safety.

Generally, modularized and packaged systems offer ease of system removal from site for disposal at end of life. Site contamination is unlikely, and site restoration would include infrastructure removal and revegetation. The materials used in Li-ion batteries are typically considered non-hazardous waste. The metals in the system can be recycled, but they do not represent a high salvage value.

5 Alternatives

Energy storage systems, such as batteries, cannot store electricity itself. But in times when electricity production exceeds the demand, electricity is converted by storage systems into other forms of energy which can be stored and returned to the grid later when demand is high or higher than the production. Thus, energy storage systems can contribute to decreasing the need to build additional energy generation capacity and respective associated facilities such as transmission and distribution lines and related energy infrastructure.

While there are many energy storage technologies, electrochemical (battery) energy storage is considered one of the most promising and well-suited options for dealing with intermittent renewables at the utility-scale level. This is due to its rapidly declining costs, high energy density, long lifetime, and high round-trip efficiency compared to other energy storage options (World Nuclear Association, 2017).

5.1 Location Alternatives (Site Selection)

During the site selection process, greenfield versus brownfield was a major decision.

Greenfield Sites are undeveloped areas within or outside a city or settlement area and typically on agricultural and farmed land. From a technical point of view, the advantages of such greenfield locations generally include design flexibility for meeting project requirements and room to expand for future growth. On the flip side the disadvantages include a general lack of infrastructure which often requires installation of additional associated facilities and usually bigger negative environmental impacts, especially on wildlife, flora & fauna and soils.

Brownfield Sites can be previously used sites which are now abandoned, underutilized or even contaminated properties. Development could be complicated by discovery of existing contaminants and there might be potential space constraints which limit future expansion and slow down construction. However, on the positive side, usable infrastructure such as good site access and grid connection may be already in place and the use of brownfield sites certainly avoids the destruction of natural environment.

As mentioned in Section 2.2, the location for implementation of the BESS system will be at Omburu Substation; the whole project area is within NamPower property. This means the site is located in an industrial and brownfield setting as opposed to residential or rural surroundings (greenfield).

5.2 No project scenario

The only feasible technical alternative to this project would be the “no project” scenario, describing the current situation in Namibia with little to no utility-scale battery storage.

To satisfy Namibia’s future and growing energy demand, NamPower plans to exploit a number of viable renewable energy sources and increasingly incorporate them into the local supply mix in response to decarbonization goals. In order to expand the penetration of renewables within the energy mix by introducing low carbon generation technologies, such as wind and solar, storage systems are required due to the volatile nature of renewables.

Driven by the increasing electricity demand, the “no project” alternative with regard to the BESS might result in future electrification shortcomings for the population. It could further be assumed that for the generation of the necessary electric energy, the current technology would be expanded based on fossil fuels.

Since the project aims to increase the number of renewable energy sources in the national energy mix, the “no project” alternative would only be considered if the impacts cannot be mitigated for and provide long-term and irreversible negative impacts.

6 Environmental and Social Characteristics

6.1 Assessment of Baseline Environmental Conditions

The site for implementing the BESS will be within the existing NamPower substation at Omburu (see Section 4.1) and as such is defined as industrial area (brownfield site). Due to the nature and scale of the project and the selected project site, specialist studies to accurately document the baseline conditions, potential sensitive receptors or selected representative environments are not deemed necessary by the Consultant. The following chapters provide a description addressing the environmental sectors which are potentially affected by the BESS project.

6.1.1 Biodiversity (flora & fauna)

Within an operating industrial area and fenced-off site, no wildlife is expected to be found. Flora and fauna occurring on site are to be classified as disturbed and non-natural. NamPower will verify whether the selected (brownfield) site holds a valid ECC for the whole site and/or if certain conditions are included in the ECC.

Bush clearing and tree cutting may become necessary for site preparation and to provide access to the construction site depending on the location and condition of the selected site. From the pictorial evidence and photographic information shared by NamPower, the adjacent Omburu PV site is already de-bushed; the Omburu Substation site may need to be partially cleared from vegetation (bushes as grassland, see Source: NamPower

Figure 5).

6.1.2 Geology and soils

The project location will be within the existing NamPower site which leads to the assumption that the geological conditions are suitable for the project implementation; even more so as only little foundation works are required.

The soil quality is supposed to be already highly disturbed and compacted from previous industrial activities and vehicle movement on site. No major civil works apart from cable trenches are needed for the implementation of the project; hence only little earth works are required.

6.1.3 Hydrology

No open water bodies such as lakes, ponds, rivers or streams are present at the site affected by the project; only dry riverbeds. The ESMP (see Section 10) addresses all aspects of design and construction to ensure no impact on the hydrology can take place during high rainfall episodes, resulting in no polluted run-off.

6.1.4 Visual impact & landscape

The site for implementing the BESS is within the existing NamPower site, which comprises already existing industrial infrastructure and facilities on site (see Figure 7). The BESS will be implemented in standard 40 feet (12.2 m) ISO containers which are lower in height then the already existing structures. Hence, the additional visual impact caused by the BESS is assumed to be negligible in the given surroundings.

Source: NamPower

Figure 7: Site view of Omburu Substation

6.1.5 Noise & air quality

Just as any other electrical installation, the components of a Battery Energy Storage System emit acoustic noise into their vicinity. It is not anticipated that the BESS will emit any significant noise or air pollution (see also Section 8.2.5). The noise generated is generally comparable to electrical substations or PV power plants. Large-scale BESS have been installed in residential areas where there are strict emission limits.

The sound power represents the power of the noise output of a device and is expressed in decibel (dB). The main sources of noise emissions from a BESS and exemplary sound powers are:

- Transformers (as in other electrical installations); e.g. SGB DOTML 2.5 MVA: 55 dB
- Power Conversion System (inverters, as in PV power plants); e.g. SMA 3 MVA: 92.6 dB
- Fans and pumps of heat exchangers and chillers; e.g. Lenox LGH036 sufficient for one 40' battery container: 73 dB.

These sound powers refer to operation at rated power and decrease when the BESS is idle or at partial load. Some reference sound powers for comparison are:

- Household fridge: 50 dB
- Vacuum cleaner: 80 db
- Loud conversation: 90 dB
- Diesel truck: 115 dB

The World Bank Group's General EHS Guideline (2007) addresses impacts of noise beyond the property boundary of the facilities. According to these international guidelines noise impacts should not exceed the levels presented in Table 3 or result in a maximum increase in background levels of 3 dB at the nearest receptor location off-site.

Table 3: Noise Limits according to international guidelines[6]

Receptor	One-hour L_{Aep}* (dB(A)	
	Daytime	Night time
	7:00am – 10:00pm	10:00pm – 7:00am
Residential, institutional, educational	55	45
Industrial, commercial	70	70

*Note: *L_{Aep} is the A-weighted equivalent continuous sound level in decibels measured over a stated period of time.*

It is recommended to undertake a baseline noise level study to assess the existing background noise levels at the site boundary and the nearest neighbouring residential area.

6.2 Assessment of Baseline Socioeconomic Conditions

The selected site of Omburu Substation is located around 12 km southeast of Omaruru town. Based on the provided documentation from NamPower (.kmz files and GoogleEarth), a settlement was detected around 2.5km South of the site, which is presumably a farm house. Considering the isolated location of the site, a separate socioeconomic baseline survey addressing the existing situation of the project site does not seem necessary. For further detailed information on Stakeholder Engagement Activities, see the following Section 7 (also addressing collection of communities expectations and concerns about the project and grievance mechanism). Since the project site lies within NamPower property, land acquisition and compensation are not required.

6.2.1 Archaeology

No archaeological find is to be expected on an operational, industrial site. The ESMP addresses all aspects of potential chance finds and cultural heritage (see Section 10).

6.2.2 Local nuisance

Local nuisance is defined as an activity or situation which includes conduct whereby a neighbour's health, well-being or comfort in the occupation of his land is interfered with as well as the causing of actual damage to a neighbour. From the current knowledge, the closest potential neighbour to the selected site is the settlement which was identified on GoogleEarth within a distance of around ~2.5 km. Given the dimensions of the BESS system, it is safe to assume, that neither a visual nor a noise impact will be detectable at this settlement during operation. During pre-construction, construction and decommissioning phases, the increase in traffic and dust generation may pose a potential annoyance, mostly in terms of noise. The ESMP addresses respective mitigation measures (see Section 10).

[6] World Bank Group, General EHS Guideline (2007), Chapter 1.7

7 Public Consultation Process

An important element of the planning and decision-making process is to involve the affected communities and keep the public informed. Stakeholder engagement, e.g. in form of public hearings, is to be scheduled for the scoping phase, to consult with the affected people and/or their community representatives, cooperatives or non-governmental organizations (NGOs) if applicable.

The executing agency is required to conduct a meaningful participation and consultation process that allows affected people and interested stakeholders to express their views and concerns on project risks, impacts and the proposed mitigation measures. At the same time, the process shall also enable the executing agency to take these views into account and to react. For the sake of transparency, the executing agency is required to disclose relevant information on the environmental and social assessment and a non-technical summary via appropriate media channels at an accessible location and in a timely, appropriate manner. The whole process shall be comprehensive and cover all phases of the project.

The public participation process for this project aims to ensure that all persons or organizations that may be affected by, or are interested in, the proposed BESS project are informed of the issues and can register their views and concerns.

7.1 Identification of interested and affected parties

The site for implementing the BESS will be within an existing NamPower substation site at Omburu. That means the site is located in an industrial area with little or no residential areas in the immediate vicinity. The nearest residential unit (potentially a farmer's house) is located around ~2.5km south of the project site. The next settlement is Omaruru town, about 12km northwest of the site.

Consultation with the public forms an integral component of an environmental and social assessment and enables Interested and Affected Parties (IAPs) e.g. neighbouring landowners, local authorities, environmental groups, civic associations and communities, to comment on the potential environmental and social impacts associated with the operations and to identify additional issues which they feel should be addressed in the Detailed Assessment phase. Consultation will be initiated and facilitated through notification letters, site and press notices and stakeholder meetings.

The following stakeholders have been identified at present status:

- NamPower
- Ministry of Mines and Energy (MME) as competent authority
- Ministry of Environment, Forestry and Tourism, (MEFT) as regulator
- Ministry of Agriculture, Water and Land Reform (MAWF)
- Ministry of Works and Transport (MWT)
- Ministry of Labour and Social Welfare (MLRS)
- Ministry of Health and Social Services (MoHSS)
- Ministry of Industrialization, Trade and SME Development
- National Heritage Council (NHC)
- Regional Council
- City of Omaruru
- Adjacent Landowners.

Identification of IAPs may include other neighbouring landowners, farmers, etc. who own land in the vicinity of the site and/or along the access road.

7.2 Steps in the Consultation Process

According to the Environmental Management Act (Act No. 7 of 2007) and the respective EIA regulations and policies (Section 3.1), the following steps need to be undertaken:

- Identification of interested and affected parties (IAPs) (Section 7.1)
- Background Information Document
- Notification letters to stakeholders and relevant local authorities
- Press notice
- Site notice
- Stakeholder database
- Stakeholder meeting / Public consultation
- Public disclosure of assessment report
- (potential comments, response trail).

7.2.1 Background Information Document

Interested persons must be notified about the project and the Scoping Report. Background Information Documents (BIDs) will be provided to IAPs. This document provides an overview and non-technical summary of the proposed development and act as an easy reference to proposed project information.

7.2.2 Notification letters

The Environmental Commissioner (appointed by the Ministry of Environment and Tourism) can take care of the notification or can require that the proponent takes care of the notification and then provide the Environmental Commissioner with proof that it has been properly done. The notification must say that interested persons can view the full application and assessment report at the Office of the Environmental Commissioner. It must also invite interested persons to make written submissions to the Environmental Commissioner and give the deadlines for these submissions.

7.2.3 Press and site notice

Information to a wider public could be done by publication of a notice in local newspapers, by advertisements and posters.

7.2.4 Stakeholder database

During the public consultation process, IAPs will be made aware of their rights to provide input into the assessment process through registering on the project and providing comments and concerns. The invitation to register as an IAP shall appear on all the press and site notices. The registered IAPs with those previously identified to be IAPs by the project (which received notification letters), comprise the stakeholder list for the project.

7.2.5 Public consultation

The Environmental Commissioner may decide to hold a public hearing on the report, or to appoint a person or a committee to carry out a process of public consultations. If there is a public hearing, the Environmental Commissioner must give 14 days' advance notice to the proponent and to every person who made a written submission on the assessment. Public notice of the meeting must also be published 14 days in advance, with the date, time and place of the hearing and a brief description of the proposed activity which is under consideration. This process is intended to make sure that everyone with an interest in the proposed activity has a fair chance to have a say.

7.2.6 Public disclosure of EIA

The notification must say that interested persons can view the full application and assessment report at the Office of the Environmental Commissioner. Persons and parties who may be affected by the proposed project must be given a chance to inspect the assessment report and given the opportunity to make submissions on it. The comments received from stakeholders will be recorded, responded to and reflected in the updated and revised EIA.

8 Environmental and Social Impact Assessment

Impact Assessment is the process of identifying, predicting and evaluating the effects of a proposed project and its related activities on the physical, biological and social environment. An impact is essentially any change to a resource or receptor caused by the proposed project, either by a certain project component, or by the execution of a related activity. Hence, the potential impact could be positive or negative in nature, and direct or indirect.

- Positive: impacts that have a beneficial result, such as improvement of the existing baseline conditions and potential development opportunities associated with the project.
- Negative: impacts that have a harmful aspect associated with them such as loss or degradation of environmental resources.
- Direct: impacts which result from a direct interaction between a project activity and the environment.
- Indirect: impacts which may be associated with or are subsequent to a particular impact on a certain environmental attribute or which happen as a consequence of the project.

The Impact Assessment also includes information about the risks and consequences of activities, possible alternatives, and outline in a management plan the steps which can be taken to mitigate, minimize or off-set any potential negative impacts. It should also discuss steps to increase positive impacts and to promote compliance with the principles of environmental management.

Several project activities that would be carried out during pre-construction, construction, operation, and decommissioning phases, might cause an impact on physical, biological, and social environments.

8.1 Associated Positive Impacts

A significant environmental benefit of the adoption of BESS is the reduction of use of fossil fuels and the subsequent reduction in emissions of greenhouse gases. BESS can assist in better energy management including reducing the use of peaking generation (gas peaker plants or diesel generators). Additionally, energy storage can support the extended introduction of variable renewable energy generation by firming, smoothing, and shifting/shaving the power generated by these resources. In doing so, BESS helps to eliminate the need for fossil fuel (coal) base generation. The BESS requires little maintenance once installed and does not produce air emissions when in operation. The compact, containerized technology does not pose a relevant visual impact on the landscape, even less in industrial settings. Lastly, energy storage can provide ancillary services that can significantly reduce the need for spinning reserves and allow the base load generation to operate more efficiently.

In summary:

- Reduced reliance on fossil fuels, as energy is being stored.
- No release of emissions or effluent as a result of the energy storage process.
- Minimal impacts associated with noise generation.
- No additional natural resources required for operation.
- No intensive loss of visual quality (technology not extremely large and cumbersome).
- Lithium-ion batteries require low maintenance.

8.2 Associated Negative Impacts

BESS are mostly self-contained systems that rarely involve significant emissions to air, water or soil during normal operating conditions. Some technologies have the potential for environmental impact or release in upset or emergency conditions. Emissions and other environmental impacts associated with manufacture and construction phases can be significant, especially for battery storage systems. Lastly, the decommissioning of BESS projects can pose a risk for significant negative impact, particularly for storage technologies that involve hazardous substances if materials are not properly disposed of or recycled.

Potentially negative impacts on the respective receptors will be addressed in the following sections.

8.2.1 Biodiversity (flora & fauna)

Removal of vegetation, such as bush clearing may become necessary for site preparation depending on the location and condition of the selected site. However, the flora present on site is most likely to be classified as disturbed and non-natural. From the pictorial evidence and photographic information shared by NamPower, the adjacent Omburu PV site is already de-bushed; the Omburu Substation site may need to be partially cleared from vegetation (bushes as grassland, see Source: NamPower

Figure 5).

No critical wildlife (fauna) is expected to be encountered on site, since the whole project site is in an industrial setting and fenced off. In addition, the footprint of the project is comparatively small. If small mammals or reptiles are encountered, the project implementation is not assumed to have a significant impact on the respective habitat, since the respective individuals are assumed to migrate to the undisturbed surroundings.

NamPower will verify whether the selected (brownfield) site holds a valid ECC for the whole site and/or if certain conditions are included in the ECC.

8.2.2 Geology and soils

The project location will be within the existing NamPower site. No major civil works apart from cable trenches are expected for the implementation of the project; hence only little earth works are needed. During construction, there will be loss or degradation of soil caused by heavy equipment and machinery. However, the soil quality is supposed to be already highly disturbed and compacted. Loss of good quality topsoil or construction-induced erosion is not expected. Thus, the impacts on soils can be classified as minor but will depend on the actual conditions of the selected site and need to be verified, e.g. via a site inspection.

Potential contamination of soils may occur from handling of hazardous substances and waste, see Section 8.2.6.

8.2.3 Hydrology

The project implementation site will be within NamPower property in industrial settings. No open water bodies such as lakes, ponds, rivers or streams are directly or indirectly affected by the proposed project.

Potential contamination of groundwater may occur from handling of hazardous substances, see Section 8.2.6. The ESMP addresses all aspects of design and construction on the selected site to ensure no impact on the hydrology can take place during high rainfall episodes, resulting in potentially polluted run-off.

8.2.4 Visual impact & landscape

The BESS is being installed in compact containers and the whole implementation site will cover an area of approximately 90m x 90m. The completed and operational BESS does not include any components of height and as such is considered not to pose any relevant visual impact on the landscape and its surroundings, even more so as the existing substation facilities are taller in height.

8.2.5 Noise & air quality

8.2.5.1 Air emissions & dust

During the construction phase, a local deterioration of ambient air quality is expected within the immediate vicinity of the project area and along the main access road. The main sources of gaseous exhaust emissions and dust are construction machinery and vehicles, especially in dry conditions, which can affect people; especially nearby the access roads and workers on site. Therefore, dust emissions shall be controlled.

The BESS itself does not produce gaseous emissions that might negatively affect the air quality when operating normally. Emergency cases like extreme high temperatures might lead to leaks, smoke, gas venting, and/or combustion of the cell pack. Manufacturers of large systems have employed sophisticated battery management systems to monitor cell performance and limit operation to safe and acceptable performance ranges. Any potential emergency case needs to be addressed in an Emergency Response Plan by the EPC Contractor.

8.2.5.2 Air-borne noise

The construction activities will cause an increase in ambient noise in the area, caused by increased traffic and operating construction machinery. Just as any other electrical installation, the components of a BESS emit acoustic noise into their vicinity when in operation. The objective of noise emission regulations is to reduce the influence of the assets to the environment and neighbouring civil, commercial and industrial buildings.

Significant air-borne noise may be emitted from the following components of a BESS:

- Transformers: As in power plants and substations, the power transformers in BESS emit a low-pitched noise of 50 Hz depending on the grid frequency.
- Cooling compressors and fans: As the battery room in BESS often requires a ventilation or an air conditioning system to maintain stable temperatures for the batteries, cooling compressors and fans are needed. The inverters and transformers may also be equipped with fans that emit noise. The emitted humming noise may be increased during the occasional start-up of the cooling compressors.

Air-borne noise is well-predictable if the noise emissions of all the components mentioned above is known. It is easy to mitigate through these strategies:

- Distance: Due to the inverse-square law nature of acoustic noise, increasing the distance to neighbouring buildings quickly reduces the level of noise emissions. However, it should be noted that this is not a mandatory requirement. The noise of BESS can be brought to reasonable levels so that an installation of small and large-scale BESS in residential areas is possible.
- Orientation: The components emitting the noise can be placed on a non-populated side of the BESS, if such a side is available at site.

- Component selection: Special low-noise cooling compressors, fans and transformers reduce the noise emission.
- Barriers: Walls and dams can be used to reflect or absorb undesired noise. This measure can also be implemented after the construction has been finished if noise levels are unacceptable (e.g. due to higher noise by aged fans). Furthermore, all BESS components except the cooling compressors and fans can also be placed inside a building to reduce the noise level.

8.2.5.3 Ground-borne noise

Significant ground-borne noise can be emitted from the transformers. This noise has the same frequency as the operating frequency of the grid, i.e. 50 Hz. If required, this noise can be minimized using rubber feet for the transformers. If very strict requirements apply, special low-noise transformers can be selected before construction.

8.2.6 Hazardous substances & waste

The impacts of most concern with battery technologies are associated with the use of hazardous substances. As with all battery technologies, the extraction of specific elements and the production of chemicals that form an important basis of the energy storage process have significant environmental impacts. The impacts of most concern with the operation of Li-ion batteries are associated with the use of hazardous substances in the form of lithium and heavy metals. However, being a closed system, the risks associated with hazardous substances are mainly related to the storage during construction, leakages and the disposal of the hazardous waste at the end of life. Although the occurrence of these impacts may not be highly probable, the severities of such impacts are a cause for concern.

8.2.6.1 Thermal Runway and fire

The largest concern associated with Li-ion batteries is the possibility of thermal runaway and resulting fire. The energy density of the cells and the combustibility of the organic-based electrolyte make these batteries a fire hazard. Excessive charging, discharging, high current, or imbalances between cells can cause overheating in a cell and result in thermal runaway as neighboring cells also overheat. Extreme high temperatures lead to leaks, smoke, gas venting, and/or combustion of the cell pack. Manufacturers of large systems have employed sophisticated battery management systems to monitor cell performance and limit operation to safe and acceptable performance ranges.

A BESS can be both a potential source (i.e. origin) of a fire or a sink of a fire (i.e. spread a fire that originated in another asset) similar to any other electrical installation. Therefore, the same due diligence that is applied in other electrical installations also needs to be applied to BESS.

In addition to this generic fire risk, a BESS causes a specific risk due to the "electrochemical" and chemical energy stored in its cells. The "electrochemical" energy is repeatedly stored and released during charging and discharging whereas the chemical energy is only released in the case of a fire. Despite the claims of some manufacturers, no battery chemistry can be considered inherently safe. Just as other forms of energy, the energy from battery cells bears the capability to be released in an uncontrolled form and needs to be handled accordingly.

To put the fire hazard of a BESS into perspective, the chemical energy is typically three times the "electrochemical" energy of a battery cell. E.g., a BESS unit 40' container with 2 MWh of energy capacity will weight around 25 metric tons, contain 7200 MJ of "electrochemical" energy and 21600 MJ of chemical energy. The total of 28800 MJ of energy when fully charged[7] is roughly equivalent to 650 kg of gasoline.

Subsequently, the risk is manageable, but specific countermeasures need to be taken in order to achieve a satisfactory residual risk. The particular countermeasures depend on the actual battery type and the risk that the BESS poses to itself, neighboring assets and in case of a loss of operation. However, the general approach taken for BESS is similar and explained below.

The principal effort for BESS-specific fire protection is built up in around mitigating any safety related incident before it occurs. This prevention revolves around the following three principles:

1. The cells should not be charged or discharged to voltages beyond their operational range as specified by their manufacturer.
2. The cells should not be exposed to temperatures above or below the range specified by their manufacturer. This both refers to impermissible internal temperature rises (e.g. due to continuous high load currents) and external temperature rises (e.g. due to high ambient temperatures inside the enclosure).
3. The safety concept should be robust against cells that have manufacturing defects, whose properties have degraded during their service life or who have been exposed to mechanical damage from external sources (e.g. earthquakes, dropping).

The specific methods can further be divided into passive and active methods. Passive methods stop a safety related incident through their inherent properties whereas active methods trigger a certain protection function to stop the safety related incident. By principle, passive methods are preferable because they are more reliable and require less maintenance. However, some prevention and mitigation methods such as over temperature protection can only be implemented by active methods due to their principle. Therefore, a mix of both methods is common in contemporary BESS.

In summary, experience and forensic investigation has concluded that most safety related incidents in BESS were not caused by the actual battery cells, but by preventable mistakes in the general electric installation. This shows that a global perspective on BESS safety is important rather than just focusing on the apparent novelty risk of the lithium-ion battery cells.

Although some concern still exists regarding the potential safety issues related to thermal runaway and fire, cell monitoring, battery management, fire detection, and suppression systems typically address these concerns. Over time, consumers will become more comfortable with Li-ion as additional large-scale systems demonstrate long-term reliability, performance, and safety. Some brands of lithium-ion batteries have superior features intended to prevent the uncontrolled rupture of cells under runaway conditions making them inherently safer.

[7] Excluding any other fire loads such as cable insulations etc.

Practical experience in the recent 10 years has shown that the risk posed by BESS can be brought to acceptable levels with proper design, manufacturing and installation. To achieve this goal, a proper quality management and supplier surveillance should be carried out over the entire project span across tendering, awarding, design review, type testing[8], manufacturing, installation, commissioning, operation, maintenance, repair, decommissioning, recycling and disposal.

8.2.6.2 Disposal and recycling

As most batteries contain heavy metals and other toxic substances, it is not desired to dispose of them in general landfills or in the environment. The battery "blades" contain valuable rare earth metals - particularly Lithium and Cadmium that are sealed within gel structures. These are of high value when they reach the end of their working life and should be returned to the manufacturer for recycling.

The major environmental risk is a leakage of the battery cells when they have been disposed of improperly after the decommissioning of the BESS. This leakage may lead to soil and groundwater contamination.

As a lot of materials in batteries can be recycled easily, recycling regulations aim at forcing the separation and re-usage of the materials in a battery in specialized facilities. As an example, 99% of the materials in lead-acid batteries sold in Germany are currently recycled. The recycling quota is lower for lithium-ion batteries, but in the waste treatment process, toxic substances are eliminated before storing the battery waste in landfills.

Most countries have an existing legislation for battery recycling and waste treatment. This legislation often stems from the widespread use of lead-acid starter batteries and batteries used in portable appliances like mobile phones and laptops. Legal systems that have recycling regulations usually require that the vendor or importer of a battery must register and provide a recycling contract and a suitable deposit or a pre-paid recycling contract to the authorities concerned. An example of such a regulation is the EU battery directive, which is available at http://eur-lex.europa.eu/legal-content/EN/TXT/?uri=celex%3A32006L0066

However, these regulations typically only apply to the battery cells themselves, not the entire Battery Energy Storage System. Separate recycling guidelines may be recommendable for civil and electronic waste (e-waste) after the BESS decommissioning.

Decommissioning and disposal (D&D) costs at end of life should be considered and factored into any facility financial model. These costs also vary by chemical/materials involved. Li-ion batteries suffer from a currently weak recycling and repurposing infrastructure due to its low demand. Disposal costs tend to increase with system size.

Currently, there are few systems in place for collection and treatment of advanced batteries, particularly those of the lithium-ion family. Because lithium battery systems currently have negative scrap value, it is important that the decommissioning plan is sufficiently well financed to cover the full costs of decommissioning and removal from site. There is uncertainty within the industry over the availability and suitability of recycling facilities which need to be available within the next 10 years.

[8] Specific safety standards are available for the mitigation methods, e.g. IEC 62619, IEC 62933-5-2, UL 9540 and UL 9540A.

8.2.7 Radiated electromagnetic emissions

As with any other electric device and asset, BESS emit electromagnetic radiation during operation. The purpose of emission regulations regarding these fields is not to reduce them to zero, but to keep their impact on the environment within reasonable limits.

The common objective of regulations regarding electromagnetic emissions is to protect people, assets and the environment outside the BESS from negative impacts. Negative impacts from electromagnetic emissions may include:

- Malfunction of electronic devices: Malfunction of non-critical devices, e.g. flickering of consumer electronics displays, may already occur at low levels. Malfunction of critical devices such as vehicle and plane controls or pacemakers usually only occurs at very high levels that cannot be transmitted to their outside.
- Malfunction of radio-based communication: may occur at very low levels of radiated emission.

Remarks on the scope of this section:

- These emission regulations only cover the so-called non-ionizing radiation in the electromagnetic spectrum. Ionizing radiation (e.g. like from nuclear plants) is usually not an issue with BESS.
- In some regulations, mains-borne (or line-bound) electromagnetic emissions from the BESS to the electricity grid (e.g. flicker, harmonics, pulse voltages) are considered together with the radiated (i.e. air-borne) emissions.
- In some regulations, the electromagnetic emissions inside and outside the BESS are considered together. This section only covers the BESS emissions to the outside of the BESS.
- In some regulations, the electromagnetic immunity, i.e. the resistance to withstand mains-borne and air-borne electromagnetic disturbances from other sources towards the BESS, are considered together with the emissions.

8.2.7.1 High-voltage (HV) and medium-voltage (MV) equipment

Just as in any larger electrical asset like transformer substations, wind power plants and large industrial customers, large-scale BESS contain HV and MV transformers, switchgears, cables and other accessories. These components are typically operated at lower currents, but much higher voltages, than the low-voltage components. Therefore, they have a higher risk of emitting high-level electric fields at the grid frequency (usually 50 Hz).

The countermeasures against these emissions include shielding of the affected components and suitable arrangement of the cables. As this risk is existent in most other electrical assets, the countermeasures are state-of-the-art technology.

8.2.7.2 Inverters and other low-voltage (LV)9 equipment

The power conversion structure between DC and AC in a BESS is very similar to the power conversion in PV power plants and DC-coupled wind power plants. All energy that is fed into the grid from the battery and charged from the grid into the battery passes through a *Power Conversion System* (*PCS*, also referred to as *Inverter*). This PCS is a device that uses fast switching solid-state switches to convert DC to AC and

[9] According to the IEC definition, low voltage refers to voltages up to 1000 V AC and 1500 V DC

AC to DC. Common switching frequencies are in the range of 1 kHz to 4 kHz and the associated rise times of the current are in the range of 10 ns to 300 ns.

These steep current rise times naturally lead to the emission of high-frequency magnetic and electromagnetic fields, which are harder to shield than the low-frequency electrical fields from the HV and MV components. These fields can be radiated from the inverter cabinet itself. They can also be transmitted through the AC low-voltage cabling up to the step-up inverter and the DC low-voltage cabling and radiated from these cables or the transformers and batteries.

Typical risk mitigation strategies include:

- Careful shielding of the inverter cabinet
- Usage of EMC filters of all connections that enter and leave the inverter cabinet, including:
  - AC low-voltage connection to the transformer ("AC filter")
  - DC low-voltage connection to the batteries ("DC filter")
  - Inverter auxiliary power supply
- Inverter data interfaces (may include galvanic separation, e.g. via optocouplers)
  EMC-compliant design and installation of the entire electrical system, e.g.:
  - Low-resistance functional grounding
  - Avoidance of ground loops
  - Appropriate cable management and cable shielding

8.2.7.3 Mitigation

The following methods are common as a proof that the radiated (air-borne) electromagnetic emissions from a BESS are within reasonable boundaries:

- All major components shall be type-tested not to exceed standard emission levels, e.g. according to IEC 61000-6-4.
- The installation of components shall be in compliance with general good practice for EMC reduction.
- It may be desired to carry out an on-site (in situ) emission test of the complete BESS, e.g. according to the limits as stated in IEC 61000-6-4 or in CISPR 11/IEC 55011. As this test can be costly and the test definitions are aimed towards devices (and not assets), it is not a general practice for all BESS, especially not for small-scale assets.

8.2.8 Human Environment

Potential social impacts are all impacts that can positively or negatively influence the livelihood systems of the project affected persons, their land use practices, their access to resources, their social and economic relations, etc. Potential negative impacts to be considered for a project are land acquisition and resettlement, deprivation of access to land or use of resources, changes in land use pattern, exclusion from social groups and increase of vulnerability of impacted persons.

Since the proposed project site at Omburu Substation is located in a rather remote area and within NamPower property, no land acquisition, physical displacement or resettlement is required. In addition, no persons appear to be directly affected by construction and operation activities. The people surrounding the project area seem to utilize their land for cattle and game farming. Restriction of access to land or use of land and resources is not expected, as only existing infrastructure (access road) is

planned to be used and no additional land take is needed. The project implementation will not negatively affect the neighbouring landowners' opportunity to generate their livelihood from the areas; hence no economic loss from restrictions or change of land will take place. Increase in traffic during the construction period and related risks and nuisances to neighbouring landowners are addressed in Section 6.2.2, 8.2.4 and 8.2.5.

There is a risk of sub-standard wages and working conditions depending on the selection of the EPC contractor. It should be ensured in the contractual agreements, that decent wages are paid to the workers and that the working conditions are of decent standards (including H&S standards see next section below). In case of conflicts between workers and employers a mediation process should be implemented, and the workers shall be allowed to use the project grievance mechanism in case of non-respect of core labour standards and shall be encouraged to report non-compliances. In the context of the project the involvement of children in projects or other activities related to the project must be avoided. The EPC contractor must ensure that no child labour is used during the construction activities. The impacts on labour and working conditions arise mostly during the construction phase, during the operation phase standard procedures for NamPower employees will apply.

Potential positive impacts are a general increase and reliability in power supply and possible (temporary) employment opportunities during construction phase. It is anticipated that the project may be able to get a number of unskilled workforces from the local area, but this will depend at least in part on the extent to which the appointed EPC contractor brings external workforce with them. In addition to the impact in the form of employment opportunities, indirectly, there are also opportunities to earn income from work related presence of outside workers because of the increasing demand in respect of accommodation and rental homes, grocery stores or laundry services, and others. During the operation phase the positive impact will be small.

8.2.9 Labor and Working Conditions

Potential Labour and Workers Rights impacts are related to inhumane labour conditions and refusal of human rights. Applicable World Bank safeguard is ESS 2. ESS 2 has the objectives to promote safety and health at work, to promote the fair treatment, non-discrimination and equal opportunity of project workers, to protect workers, including vulnerable workers such as women, persons with disabilities, children (of working age, in accordance with this ESS) and migrant workers, contracted workers, community workers and primary supply workers, as appropriate and to prevent the use of all forms of forced labour and child labour. ESS 2 further has the objectives to support the principles of freedom of association and collective bargaining of project workers in a manner consistent with national law and to provide project workers with accessible means to raise workplace concerns.

The Project shall also meet the following International Labour Organization (ILO) core standards:

- Forced labour (C105);
- Child Labour (C182);
- Discrimination (C111);
- Freedom of Association and the Right to Organize (C 87);
- Equal Remuneration (C100); and
- Minimum Age (C138).

Given that the project's construction and operation involve the employment of (foreign) personnel, the requirements of the ILO conventions are considered in the ESMP. All activities of the involved contractors must comply with the listed labour standards.

8.2.10 Health & Safety

Worker's Health and Safety impacts are addressed by the KfW Sustainability Guidelines and the World Bank ESS2 and ESS4. Construction activities and the potential use of temporary worker's camps pose risks to the health, safety, security and therefore wellbeing of construction workers if not managed appropriately. Generic worker's health and safety issues associated with the use of temporary accommodation sites include those relating to sanitation, disease, fire and cultural alienation.

Similarly, there is the risk of adverse occupational health and safety (OHS) impacts related to personal accident or injury on any construction site. Some of the OHS risks which are likely to arise during the construction phase of the project, and are typical to many construction sites include: exposure to physical hazards from use of heavy equipment; trip and fall hazards; exposure to dust, noise and vibrations; falling objects; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery. Other risks common to electricity infrastructure projects specifically include working in trenches; live power equipment and lines.

Workers on the project are vulnerable to risks to wellbeing, health and safety but they have some capacity to absorb changes and take actions to protect themselves from the main risks. The impact will not extend beyond the life of the project, but the impact is likely to occur if not managed and mitigated. Emergency planning need to cover the construction period as well as the operation phase, including all periods required for maintenance activities.

Health and Safety impacts and security risks for local residents are addressed by WB ESS4. The EPC contractor will need to avoid or minimize community exposure to project-related construction traffic and road safety risks, diseases and hazardous materials during the construction process. Regarding safety issue the BESS project bears the risk that unauthorized persons may get too close to the project construction site. In order to prevent this all working areas and hazardous operation areas must be secured in order to prevent accidents.

Since the outbreak of COVID-19 caused by the novel corona virus and the worldwide pandemic that followed at the beginning of 2020, the world is trying to control the situation and reduce the risks caused by the virus. The influx of workers from other regions may present a higher risk of coming into contact with affected people. Hence, the interaction of workforce with the local communities should be restrained through strict enforcement of Code of Conduct. For some project activities social distancing and robust hygiene measures may be more difficult to implement and thus, may present a higher risk of coming into contact with affected people or spreading COVID-19.

There are numerous guidance documents by international and national institutions describing which precautions need to be taken in which situation. The KfW provided an Info-Sheet regarding general prevention and management of potential environmental, social and occupational health and safety (ESHS) risks related to the Coronavirus (see Annex 2). During all project phases (pre-construction, construction, operation and decommissioning), the actual situation and latest developments constantly need to be studied and addressed respectively. National regulations may change at short notice.

8.3 Summary of Potential Environmental and Social Impacts

The table below reflects a non-exclusive overview of the impacts described above during the various phases of the project. It also indicates the type of impact, either direct or indirect as well as the duration of the impact.

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
Site Preparation and Construction	Land Requirements	BESS will be implemented in a modular system in standard containers; the required area will be ~90m x 90m.	▪ The land requirements will result in site-specific construction issues such as excavation, removal of natural resources, the removal of vegetation, and the permanent land take during construction and operation.	▪ Design optimization to avoid unnecessary land take. ▪ Prioritization of already disturbed, industrial sites. ▪ Restrict construction activities only where necessary.	Direct Impact	Long-term
	Biodiversity	Removal of vegetation for site clearance.	▪ Habitat loss	▪ Limit vegetation clearing to areas within the site boundary.	Direct Impact	Long-term
	Geology and Soils	Construction of foundation and potential improvement of existing access roads require solid foundation/concrete slab. Machinery and vehicles, as well as equipment or project components may leak.	▪ Compaction, soil degradation, loss of topsoil, erosion, soil contamination by hazardous substances, such as chemicals, fuel, lubricants, etc.	▪ Restrict vehicle movements to paved roads and only where necessary. ▪ Handling, transport and storage of hazardous materials according to relevant procedures / development of e-waste management and fire safety and emergency response plan by the Contractor.	Direct Impact	Long-term or short-term with correct mitigation
	Hydrology	Machinery and vehicles, as well as equipment or project components may leak.	▪ (Ground)Water contamination by hazardous substances, such as chemicals, fuel, lubricants, etc.	▪ Design and construction of e.g. drainage systems to ensure no impact on the hydrology can take place during high rainfall episodes. ▪ Handling, transport and storage of hazardous materials according to relevant procedures / development of e-waste management and fire safety and emergency response plan by the Contractor.	Direct Impact	Long-term or short-term with correct mitigation

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
	Air Quality	The main sources of gaseous exhaust emissions and dust are construction machinery and vehicles, especially in dry conditions.	▪ Generation of dust can affect people nearby the access roads and workers on site; potential health implications.	▪ Therefore, dust emissions shall be controlled, e.g. by introducing speed limits; water spraying of dust roads in dry season; provision of dust masks.	Indirect Impact	Short-term
	Noise	The construction activities cause noise by traffic and operating construction machinery.	▪ Noise can affect people nearby the access roads and workers on site; potential health implications.	▪ Use of modern silent equipment; regular maintenance of machinery and vehicles; introducing speed limits; provision of ear protection.	Direct Impact	Short-term
	Human Environment	The construction activities may result in need for local workforce and may bring external workers in the region.	▪ Creation of job opportunities for skilled and unskilled labour. ▪ Generation of income from accommodation and food supply to external workforce.	▪ Job opportunities shall be prioritized for local residents, especially groups of people who live below the poverty line to get the work they can do. ▪ Collaborate with the local government in involving local workers. ▪ Provide training for certain types of work (capacity building). ▪ Prioritize buying food items from local residents, e.g. vegetables to meet consumption needs for employees. ▪ Temporary accommodation facilities must correspond to good practice standards. ▪ Establish a grievance mechanism.	Positive and negative Direct and indirect impact	Short-term, temporary
	Labor and Working Conditions		▪ Risk of sub-standard wages and working conditions depending on selection of EPC contractor. ▪ Risk of child labour as cheap work force and human trafficking. ▪ Risk of gender inequality and gender-based violence (GBV). ▪ Risk of increase of prostitution and sexual abuse and harassment.	▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour.	Positive and negative Direct and indirect impact	Short-term, temporary

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
				▪ The EPC contractor must establish guidelines for the labour recruitment and employment system in line with ILO core standards that include no use of forced labour, no discrimination, no child labour, equal pay for women and men, respect of working hours and respect of freedom of association and right to organize. ▪ Regarding the issue of human trafficking, sexual harassment, GBVand child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. This issue should also be discussed during public consultations in order to create awareness within the communities. ▪ Prohibit the involvement of children (minimum age 18 years) in working directly or indirectly on the project and enforce this prohibition. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law. ▪ Prepare a stand-alone Security Personnel Management Plan. ▪ Establish a grievance mechanism.		

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
	Health & Safety	Potential risks to the health, safety, security and wellbeing of construction workers and local residents.	Infection with Coronavirus Impacts related to personal accident or injury on construction site. Risks which are likely to arise during the construction phase include: exposure to physical hazards from use of heavy equipment; trip and fall hazards; exposure to dust, noise and vibrations; falling objects; exposure to hazardous materials; and exposure to electrical hazards from the use of tools and machinery; working in trenches; live power equipment and lines. Local residents might be exposed to project-related traffic and road safety risks, diseases and hazardous materials during the construction process.	▪ Ensure that all workers have access to adequate, safe and hygienic basic facilities on site. ▪ Promote and enforce frequent handwashing and respiratory hygiene. ▪ Make hand sanitizer and/or ablution facilities with soap available in all areas where risk of transmission is identified (e.g. upon entry to the premises, in canteen, in toilets, etc.). ▪ Develop adequate, site- and work-specific measures to minimize risk of infection with Coronavirus; latest developments and actual situation on ground to be considered. ▪ Communicate good practices to workers and visitors at key areas, such as entry points or lavatories, through posters and signs as well as reminders from designated staff. ▪ Where possible, reduce number of workers in the workplace to enable social distancing, supported by appropriating additional space. ▪ Interaction of workforce with the local communities should be restrained through strict enforcement of Code of Conduct. ▪ Communicate with surrounding communities and supply chain to confirm awareness of the virus and discuss good hygiene practices and precautionary measures. If restrictions on site access will impact the community, e.g. by closing access paths, clearly	Direct Impact	Short and Long-term, mitigation possible

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
				communicate this with community leaders and discuss the implications. ▪ Application of OHS measures during construction. ▪ Establish a grievance mechanism		
	Logistics	Batteries may be probably sourced internationally.	▪ Increased carbon footprint transporting materials from overseas suppliers. ▪ Leakages from transportation vehicles are unlikely but may occur. Such a containment breach may result in high levels of contamination in the area where the spillages occurred and could be situated in a highly sensitive area. ▪ Fugitive emissions from the volatilization of chemicals in transit.	▪ There may be Li-ion battery manufacturers in South Africa. ▪ Material Safety Data Sheet (MSDS) and other standards exist to ensure proper transport of hazardous substances.	Indirect and direct Impact	Long-term or short-term with correct mitigation
Operation	Hazardous Substances	Hazardous substances in the form of chemicals (e.g. sulfuric acid) are an integral part of the workings of batteries. Furthermore, the battery includes the use of heavy metals (lead).	▪ Sulfuric acid is highly corrosive and may result in containment failure. In the event of containment failure, hazardous substance may contaminate surrounding water resources as well as soil resulting in negative impacts to the ecosystem. ▪ Lithium batteries may contain heavy metals such as cobalt and manganese, as well as an organic solvent solution of lithium perchlorate, acetonitrile solution with lithium bromide. In the event of containment failure, hazardous substance may contaminate surrounding water resources as well as soil resulting in negative impacts on the ecosystem. Lithium, for example, causes long-term biodegradation.	▪ BESS should have secondary containment systems that prevent environmental release following spill or damage. ▪ Some lithium-ion batteries under development use an aqueous electrolyte which significantly reduces the hazards associated with organics and acids. ▪ Lithium-ion batteries require battery management systems to monitor and protect cells from overcharging or damaging conditions. ▪ Large BESS systems should be designed with appropriate fire detection and suppression systems.	Indirect and direct Impact	Long-term or short-term with correct mitigation

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
			▪ Lithium batteries are subject to thermal runaway and can rapidly overheat if operated outside of normal parameters. Most lithium batteries use organic electrolytes, which are combustible.			
	Emissions	Emissions may arise due to reactions occurring within the battery.	▪ If overcharged, batteries have a high explosion risk, due to the emission of hydrogen.	▪ Large BESS should be in an isolated location or containerized with battery management, and monitoring systems.	Direct Impact	Short-term
	Noise	The BESS will emit acoustic noise to their vicinity when in operation from power transformers and cooling compressors and fans.	▪ Noise can affect people nearby the access roads, maintenance staff site, neighbours; potential health implications.	▪ Component selection: Special low-noise cooling compressors, fans and transformers ▪ Barriers ▪ Provision of ear protection equipment.	Indirect and direct Impact	Long-term, mitigation possible

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
	Maintenance	Batteries have a shorter lifespan then other technology types and may require more maintenance.	▪ Maintenance of batteries may result in the generation of e-waste which will need to be disposed of. Hazardous waste has severe negative impacts on the environment. ▪ Maintenance of batteries will also have a degree of risk in terms of spillages during the maintenance procedure. These pose risks to the ecosystem and to the health of battery operators due to the hazardous nature of the chemicals used. ▪ Lithium-ion batteries require low maintenance and are generally considered field replaceable components. ▪ When exposed to water and air (moisture), lithium emits flammable gases; therefore, maintenance procedures may result in safety risks.	▪ Maintenance personnel should be properly trained, knowledgeable in hazardous materials and have the necessary equipment (and personal protective equipment) to deal with leaks and spills. ▪ Maintenance of lithium-ion batteries is generally limited to replacement (and disposal) of battery cells at the end of life.		
De-commissioning	Disposal of Waste	Certain materials within the battery can be recycled; however, a significant amount will be disposed of. Hazardous landfill sites are generally the main route for disposal of a hazardous substance. However, other mechanisms are available. These mechanisms include incineration and disposal of the hazardous	▪ The recycling of lithium is an extremely complicated process, as the material is toxic, highly reactive and flammable. Furthermore, due to the high costs of recycling lithium and the associated risks, there is a global absence of lithium recycling. ▪ The disposal of hazardous substances will need to be at a hazardous waste disposal facility. There are only a few of these facilities in the country; therefore, there will be an increase in the	▪ Owners should consider provisions for disposal at end of life to ensure proper disposal. There are currently a limited number of facilities that recycle lithium-ion batteries. ▪ The owner may request the supplier to provide a warranty for certain parts or whole modules. ▪ Some programs provide for disposal and decommissioning of battery systems at end of life. ▪ The project should have a set aside for decommissioning and disposal, e.g. in form of a reserve account.	Indirect and direct Impact	Long-term or short-term with correct mitigation

Phase	Aspect	Description	Potential Impacts	Potential Mitigation	Type of Impact	Duration of Impact
		waste to land (not in a government owned landfill site). These mechanisms will be governed by the National Environmental Waste Management Act (NEMWA).	overall carbon footprint of the technology. ▪ Decreasing the available "airspace" within the hazardous landfill site. ▪ The transportation of the hazardous waste to either a recycling facility or a hazardous waste disposal facility will have associated risks, namely concerning contamination emanating from spillages. ▪ Contaminated run-off emanating from the disposal of hazardous substances to land will be detrimental to the surrounding ecosystem. ▪ Sterilization of land for the disposal of the hazardous substances.	▪ Decommissioning and Disposal costs at end of life should be considered and factored into any facility financial model. Disposal costs tend to increase with system size. ▪ Because lithium battery systems currently have negative scrap value, it is important that the decommissioning plan is sufficiently well financed to cover the full costs of decommissioning and removal from site.		

9 Terms of Reference: EIA

The terms of reference for an assessment must set out the approach that the proponent intends to follow in undertaking an assessment in accordance with the Environmental Management Act (EMA), its regulations and guidelines, and it must include:

a) a description of all tasks to be undertaken as part of the assessment process, including any specialist studies to be included if needed;
b) an indication of the stages at which the Environmental Commissioner is to be consulted;
c) a description of the proposed method of assessing the environmental issues and alternatives; and
d) the nature and extent of the public consultation processes to be conducted during the assessment process.

The project area overview of the identified site and the general environmental and social assessment of key issues conducted in the Scoping process in Phase I led to the assumption that the project is not likely to result in significant impacts which would require a formal environmental assessment.

The selected project location is in an industrial area, a brownfield site within NamPower property. No land acquisition will be required. The existing data and information on the biophysical and social baseline at site led to the conclusion, that no specialist studies should be required to accurately document the site-specific baseline conditions, potential sensitive receptors or selected representative environments.

Project classification into the category “B” as per KfW Guidelines was undertaken, according to the relevance of their potentially adverse environmental and social impacts and risks of the selected site and the chosen technology.

This present documents has been compiled in accordance with the requirements of the EMA and its regulations (see Section 3.1) as to afford the DEA an objective view of expected impacts on the physical, biological and human environment.

In consultation with the proponent and the respective consultant, the MET will decide on whether this project requires a full Environmental Assessment or not. If it is felt that the project is not likely to result in significant impacts and/or that sufficient plans to maximize benefits have been included, there will be no need for a formal environmental assessment. The developed ESMP, as presented in this document, would be deemed sufficient. Alternatively, the Commissioner and/or Board may decide that an Environmental Assessment is required, and they will then discuss the Terms of Reference for the study with the proponent.

The EIA shall be structured to address all required content for a critical and comprehensive assessment.

In line with the EMA, the following structure would apply for the EIA:

1. Executive summary
2. Introduction
3. Methodology / Approach to study
4. Assumptions and limitations / gaps
5. Administrative, legal and policy requirements
6. Project description
7. Description of affected environment / baseline conditions
8. Assessment of potential E&S impacts
9. Management plan (mitigation measures)
10. Monitoring program
11. Stakeholder engagement
12. Conclusion
13. Appendices

10 Environmental and Social Management Plan

The potential environmental and social impacts of the project, as described in Section 8, can be avoided, minimized, mitigated or compensated by performing suitable measures. This chapter deals with the proposed mitigation and monitoring measures (Section 10.2) to be taken during the pre- construction, construction, operation and decommissioning of the project.

It summarizes the anticipated environmental and social impacts and provides details on the measures, responsibilities to mitigate these impacts, and the ways in which implementation and effectiveness of the measures will be monitored and supervised.

10.1 Institutional Requirements

Table 4: Overview of Institutional Entities

AGENCY	RESPONSIBILITY
Office of the Environmental Commissioner (OEC), Ministry of Environment, Forestry and Tourism	Issue of Environmental Clearance Certificate (ECC) based on the review of the Environmental Assessments (EA) reports prepared in accordance with the Environmental Management Act (2007) and the Environmental Impact Assessment Regulations, 2012. Conduct participation and consultation process that allows affected people and interested stakeholders to express their views and concerns on project risks, impacts and the proposed mitigation measures and public disclosure of project documents related to environmental and social risks.
Ministry of Mines and Energy (MME)	Is responsible for development and implementation of wider electricity industry legislation and institutional mechanism including – the overall exercise control over the electricity supply industry and to regulate the generation, transmission, distribution, use, import and export of electricity in accordance with prevailing Government policy so as to ensure order in the efficient supply of electricity.
Electricity Control Board (ECB)	Falling under the Ministry of Mines and Energy (MME). The Electricity Control Board (ECB) is a statutory regulatory authority established in 2000 under the Electricity Act 2 of 2000; which has subsequently been repealed by the Electricity Act, 4 of 2007; the latter Act having expanded the ECB mandate and core responsibilities. The core mandate of the ECB is to exercise control over the electricity supply industry with the main responsibility of regulating electricity generation, transmission, distribution, supply, import and export in Namibia through setting tariffs and issuance of licenses. The ECB executes its statutory functions through the Technical Secretariat headed by the Chief Executive Officer.
NamPower	NamPower is a state-owned enterprise, registered and operating according to the Companies Act. NamPower's core business is the generation, transmission and energy trading within the Southern African Power Pool (SAPP). NamPower supplies bulk electricity to mainly Regional Electricity Distributors (REDs), and to Local Authorities, Farms and Mines (where REDs are not operational) throughout Namibia.
Regional Electricity Distributors (REDs) North Regional Electricity Distributor (NORED)	A RED is a regional electricity distributing company tasked with supplying electricity to the residents in a specific region. The proposed project falls within the NORED license area. NORED has nodes in the towns of Ondangwa, Okakarara, Omaheke, Gobabis, Outjo, Khorixas, Kamanjab, Otavi, Grootfontein, and has about 30 000 customers with over 150 employees.
Ministry of Agriculture, Water and Land Reform	The Directorate of Resource Management within the Department of Water Affairs (DWA) at the MAWF is currently the lead agency responsible for management of surface and groundwater utilization through the issuing of abstraction permits and wastewater disposal permits. DWA is also the Government agency responsible for water quality monitoring and reporting.

10.2 ESMP

Phase I was conducted independently of location and at a generic level, and as a result the location of Omburu Substation and Li-ion battery technology was defined. The following tables present an environmental and social management plan which includes:

a) information on any proposed management, mitigation, protection or remedial measures to be undertaken to address social and environmental impacts that have been identified including objectives in respect of the rehabilitation of the environment and closure;
b) as far as is reasonably practicable, measures to rehabilitate the environment affected by the undertaking of the activity or specified activity to its natural or predetermined state or to a land use which conforms to the generally accepted principle of sustainable development; and
c) a description of the way the applicant intends to modify, remedy, control or stop any action, activity or process which causes adverse social impacts, environmental pollution or degradation, and offset social impacts and remedy the cause of pollution or degradation and migration of pollutants .

Management and monitoring measures are presented for pre- construction, construction, operation and decommissioning phases. This distinction allows providing the different project actors with compartmented and, consequently, easier-to-understand information about their responsibilities.

Table 5: ESMP - Mitigation and Monitoring Measures during Pre-construction

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Land Requirements	A plot of 90m x 90m of land is foreseen on NamPower property at Omburu Substation site. No land acquisition is required for the project site. It may become necessary to widen / improve the existing gravel access road to the site.	▪ Avoid to the extent possible additional land take of both formal and informal landowners/land users. ▪ If additional land take - temporary or permanent - is inevitable (e.g. for associated facilities, construction work activities) no forced eviction should take place and owners should be compensated prior to access to land. ▪ Engage with the local community to understand the land ownership and land use.	NamPower / Contractor	A grievance mechanism may be required.
Vegetation clearing	The land requirements result in site-specific construction issues such as the removal of vegetation. In case of the Omburu brownfield site, vegetation clearing might be restricted to bushes and shrubs; small trees are present at site.	▪ Limit vegetation clearing to areas within the site boundary where it is strictly necessary.	Contractor	Site inspection prior to commencement of activities. Marking the borders of works site boundaries.
		▪ Clarify with responsible authorities whether a license is needed. ▪ Describe the methods of vegetation clearance. ▪ Ensure that no chemicals/pesticides are used, burning of vegetation is restricted etc. ▪ Do not clear vegetation more than two months in advance of operations.	Contractor	Site inspection prior to commencement of activities. Site inspection during site clearance. No use of fires or chemicals on site; usage of warning signs.
		▪ Avoid clearing of endangered species.	Contractor	Site inspection prior to commencement of activities and classification of type of plants present on site.
Archaeological Chance Finds	No archaeological chance find would be expected at Omburu site.	▪ Ensure all finds of cultural heritage (e.g. graves, old ceramic, old building fragments) are reported immediately to the relevant authority and avoid excavation in the ultimate neighbourhood of a chance find, fence the chance find and await instructions from the competent authority.	Contractor	Site inspection during excavation activities. Notification records to relevant authority. Training records, Records about chance finds.
Human Environment	The construction activities may result in need for local workforce. Potential risks that may occur related to the arrival of workers from outside are	▪ Job opportunities shall be prioritized for local residents, especially groups of people who live below the poverty line to get the work they can do. ▪ Collaborate with the local government in involving local workers.	NamPower / Contractor	Site inspection during pre-construction activities. Training records. Grievance records.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
	the risk of human trafficking, GBV, child labour and sexual abuse.	▪ Provide training for certain types of work (capacity building). ▪ Prioritize buying food items from local residents, e.g. vegetables to meet consumption needs for employees. ▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour. ▪ Temporary accommodation facilities must correspond to good practice standards. ▪ Establish a grievance mechanism. ▪ Regarding the issue of human trafficking, sexual harassment, GBV and child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law. ▪		Developed guidelines related to human trafficking, sexual harassment, GBV and child abuse. Security Personnel Management Plan developed.
Labor and Working Conditions	All Project phases involve the employment of personnel. All activities of the involved parties must comply with the listed ILO core standards.	▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour. ▪ The EPC contractor must establish guidelines for the labour recruitment and employment system in line with ILO core standards that include no use of forced labour, no discrimination, no child labour, equal pay for women and men, respect of working hours and respect of freedom of association and right to organize. ▪ Regarding the issue of human trafficking, sexual harassment, GBV and child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. This issue should also be discussed during public	NamPower / Contractor	Site inspection during pre-construction activities. Guidelines for labour recruitment and employment system in line with ILO cores standards. Guidelines related to human trafficking, sexual harassment, GBV and child abuse available at project site and included in training material.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
		consultations in order to create awareness within the communities. ▪ Prohibit the involvement of children (minimum age 18 years) in working directly or indirectly on the project and enforce this prohibition. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law. ▪ Establish a grievance mechanism.		Security Personnel Management Plan developed. Review of grievance records. Visual inspection on regular basis.
Health & Safety (H&S)	Construction activities may pose a risk to the health, safety and well-being of workers on site and members of neighbouring communities.	▪ Contractor shall develop and implement a site-specific Health & Safety Management Plan. ▪ Health & Safety manager on duty. ▪ Provide adequate, timely and regularly updated training and briefings for workers on safety precautions. ▪ Notice of commencement of construction to the Ministry of Labour at least 30 days prior to the commencement of works ▪ Information of nearby residents about upcoming works and the associated risks by means of stakeholder engagement, disclosing of relevant project-related information, as well as proposed prevention, mitigation and emergency response measures. ▪ Installation of warning and prohibition signs and fences around the project sites at contact points with local population. ▪ Construction site shall be fenced, and the entrance gates shall be guarded by security staff in order to prevent any unauthorized access to the site, thus also minimizing possible impacts on community health. ▪ Development and implementation of a Traffic Management Plan (including regulations for truck movements, transport of workers, short-term closure of roads (if necessary), potential blocking of access to private and/or communal areas, potential blocking of movement of cattle, etc.). ▪ Inform population of settlements along public roads in advance, in case of transporting heavy equipment.	NamPower/ Contractor	Notification records to relevant authority (e.g. road authority). To be consulted on site: Workers Code of Conduct, Fire Safety and Emergency Response Plan, Traffic Management Plan; and Health and Safety Management Plan. Security Personnel Management Plan. A grievance mechanism may be required. Training records. Site Inspections.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
		▪ Establish worker code of conduct to help prevent friction or conflict with communities. The religious, cultural, and social activities of the local communities shall not be disturbed. This is especially important in the case that the workers do not share the same cultural, religious and social customs. ▪ Security arrangements to be guided by principles of proportionality, good international practice and national law. ▪ Develop and implement a site-specific Fire Safety and Emergency Response Plan. ▪ Operate accessible Grievance Redress Mechanism and document all grievances and follow up until resolution in grievance logbook. Appropriate staffing to be planned.		

Table 6: ESMP - Mitigation and Monitoring Measures during Construction

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Soil	BESS foundation and access roads require construction of solid foundation/concrete slab, resulting in compaction of soils, soil degradation, loss of topsoil, erosion, etc. In case of Omburu brownfield site, soil may be classified as degraded and probably compacted already.	▪ Ensure that work site boundaries and limits are in accordance with plans and technical design as agreed upon in advance. All construction activities should be carried out within boundaries. ▪ Restrict vehicle movements to paved roads and only where necessary. ▪ Method statement for operating small batching plants, etc. ▪ Restrict excavation activities during periods of intense rainfall to avoid erosion.	Contractor	Site inspection prior to commencement of activities.
	Machinery and vehicles, as well as equipment or project components may leak, resulting in soil contamination by hazardous substances, such as chemicals, fuel, lubricants, etc.	▪ Handling, transport and storage of hazardous materials according to relevant procedures / development of e-waste management and fire safety and emergency response plan by the Contractor.	Contractor	Site inspection. e-Waste Management and Fire Safety and Emergency Response Plan available on site.
Hydrology	No open water body is affected at Omburu site.	▪ Avoid streams (seasonal streams as well) in accordance with plans and technical design as agreed upon in advance. ▪ Ensure appropriate containment and storage of construction wastewater, including sanitary water. ▪ No untreated effluent is discharged.	NamPower/ Contractor	Site selection and technical design phase. Site inspection.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
	Machinery and vehicles, as well as equipment or project components may leak, resulting in (ground)water contamination by hazardous substances, such as chemicals, fuel, lubricants, etc.	▪ Ensure that means of protection are in place to avoid or minimize adverse effects on groundwater and surface water, natural drainage and the water quality in areas within the works area. ▪ Design and construction of e.g. drainage systems to ensure no impact on the hydrology can take place during high rainfall episodes. ▪ Use temporary bunding to reduce the risk of sediment, oil or chemical spills to the receiving waters. ▪ Work-related method statements to define methods to minimize impacts to the extent possible. ▪ Provision of spill prevention tools and materials. ▪ Training of staff in handling of hazardous materials. ▪ Handling, transport and storage of hazardous materials according to relevant procedures / development of e-waste management and fire safety and emergency response plan by the Contractor.	Contractor	Site inspection during works. Training records, Incident and Accident Records. e-Waste management and fire safety and emergency response plan available on site. Spill prevention tools and materials on site.
Noise and Air Quality	The main sources of gaseous exhaust emissions and dust are construction machinery and vehicles, especially in dry conditions. Generation of dust can affect people nearby the access roads and workers on site as well as neighbouring properties; potential health implications.	▪ Dust emissions shall be controlled, e.g. by introducing speed limits. ▪ Sensitize drivers. ▪ Water spraying of dust roads in dry season. ▪ Provision of dust masks to workers. ▪ Provide emissions control equipment where applicable (e.g. filters).	Contractor	Speed controls, warning signs. Prior to commencement of works and each time new equipment/vehicle is used at the site. Review of grievance records. Visual inspection on regular basis.
	Fugitive emissions from the volatilization of chemicals in transit.	▪ MSDS and other standards exist to ensure proper transport of hazardous substances. ▪ Train staff in handling of hazardous materials.	Contractor	Training records, Incident and Accident Records.
	The construction activities cause noise by traffic and operating construction machinery. Noise can affect people nearby the access roads and workers on site as well as neighbouring properties; potential health implications.	▪ Use to the extent possible vehicles in appropriate technical condition; regular maintenance of machinery and vehicles. ▪ Introducing speed limits, sensitize drivers. ▪ Provision of ear protection to workers. ▪ Ensure vehicles are switched off when not in use. ▪ Schedule operating times according to stakeholders' needs.	Contractor	Engines switched off during breaks and after work finished. Site inspections. Review of grievance records.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Logistics & Transport	Batteries may be sourced locally or internationally, depending on the selected technology. Transporting materials from overseas suppliers will increase carbon footprint.	▪ There may be battery manufacturers in Namibia or South Africa.	NamPower / Contractor	Selection of battery suppliers.
	Leakages from transportation vehicles are unlikely but may occur, e.g. by accident during loading process. Such a containment breach may result in high levels of contamination in the area where the spillages occurred and could be situated in a highly sensitive area (e.g. marine harbor).	▪ MSDS and other standards exist to ensure proper transport of hazardous substances. ▪ Prepare and implement a Fires Safety and Emergency Response Plan. ▪ Prepare and implement a Spill Prevention Procedure. ▪ Train staff in handling ofhazardous materials. ▪ Provision of spill control tools.	Contractor	Training records, Incident and Accident Records. Spill Prevention Procedure and Spill Control Tools available.
	Construction vehicles movement (loaders, trucks, lifting equipment, transportation of construction workers, etc.)	▪ Use to the extent possible vehicles in appropriate technical condition and ensure regular maintenance. ▪ Ensure vehicles are switched off when not in use. ▪ Schedule operating times according to stakeholders' needs.	Contractor	Engines switched off during breaks and after work. Proper work planning and project management. Site inspections. Review of grievance records.
Waste	Construction activities will result in the generation of various waste types and volumes (packaging materials, metal, plastic, timber, paper, organic waste, human waste, etc.)	▪ Minimize the waste production to the extent possible. ▪ Identify waste management facilities. ▪ Good housekeeping practices. ▪ Train staff in waste management. ▪ Ensure disposal through waste contractors licensed for treatment/ removal/ recycling of each of the waste types. ▪ Site organization, installation of waste collection/segregation/storage facilities ▪ Obtaining of respective license and permits in advance. ▪ E-Waste Management Plan prepared by Contractor before commencement of works, including waste inventory/register/logbook.	Contractor	Inspection of waste management facilities on site; site inspections (housekeeping). Proof of contractors' certifications. Review of waste disposal records. Training records. E-Waste Management Plan available.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
	Construction activities will require transport, storage, handling and disposal of potentially harmful substances, causing pollution of water, soil or pose a risk to workers' health.	▪ Appropriate and safe storage of fuels, construction materials, wastes and any materials that can cause spills. ▪ Train staff in handling of hazardous materials and spill prevention. ▪ Safe storage of materials with limited access only for qualified personnel. ▪ Spill response procedure. ▪ Spill prevention and response equipment in place.		Inspection of waste management facilities on site; site inspections. Training records.
Human Environment	The construction activities may result in need for local workforce. Potential risks that may occur related to the arrival of workers from outside are the risk of human trafficking, GBV, child labour and sexual abuse.	▪ Job opportunities shall be prioritized for local residents, especially groups of people who live below the poverty line to get the work they can do. ▪ Collaborate with the local government in involving local workers. ▪ Provide training for certain types of work (capacity building). ▪ Prioritize buying food items from local residents, e.g. vegetables to meet consumption needs for employees. ▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour. ▪ Temporary accommodation facilities must correspond to good practice standards. ▪ Establish a grievance mechanism. ▪ Regarding the issue of human trafficking, sexual harassment. GBV and child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law.	NamPower / Contractor	Site inspection during construction activities (including accommodation facilities). Training records. Grievance records. Implementation of Security Personnel Management Plan.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Labor and Working Conditions	All Project phases involve the employment of personnel. All activities of the involved parties must comply with the listed ILO core standards.	▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour. ▪ The EPC contractor must establish guidelines for the labour recruitment and employment system in line with ILO core standards that include no use of forced labour, no discrimination, no child labour, equal pay for women and men, respect of working hours and respect of freedom of association and right to organize. ▪ Regarding the issue of human trafficking, sexual harassment, GBV and child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. This issue should also be discussed during public consultations in order to create awareness within the communities. ▪ Prohibit the involvement of children (minimum age 18 years) in working directly or indirectly on the project and enforce this prohibition. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law. ▪ Establish a grievance mechanism.	NamPower / Contractor	Site inspection during construction activities. Review of grievance records. Visual inspection on regular basis.
Health & Safety	Construction activities may pose a risk to the health, safety and well-being of workers on site and members of neighbouring communities.	▪ Contractor shall develop and implement a site-specific Health & Safety Management Plan. ▪ Health & Safety manager on duty. ▪ Provide adequate, timely and regularly updated training and briefings for workers on safety precautions. ▪ Information of nearby residents about upcoming works and the associated risks by means of stakeholder engagement, disclosing of relevant project-related information, as well as proposed prevention, mitigation and emergency response measures.	NamPower/ Contractor	Notification records to relevant authority (e.g. road authority). Review of grievance records.. Training records. Site Inspections.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
		▪ Installation of warning and prohibition signs and fences around the project sites at contact points with local population. ▪ Construction site shall be fenced, and the entrance gates shall be guarded by security staff in order to prevent any unauthorized access to the site, thus also minimizing possible impacts on community health. ▪ Development and implementation of a Traffic Management Plan (including regulations for truck movements, transport of workers, short-term closure of roads (if necessary), potential blocking of access to private and/or communal areas, potential blocking of movement of cattle, etc.). ▪ Induction to the workers, especially drivers to follow the traffic rules e.g. speed limit 30km/h, and to provide specific attention while passing houses, towns, villages and any other locations with sensitive recipients. ▪ Optimization of transportation management to avoid needless truck drives (as part of Traffic Management Plan). ▪ Control of the transport safety by means of road safety program for employees and community members targeting fatigue and safe driving, providing safety training for the drivers, ensure regular maintenance of vehicles. ▪ Restrict working hours to daytime hours, but not between 7pm and 6am, to avoid noise impacts. For residents the noise levels may not exceed 50 dB (A) during daytime and 45 dB (A) during night. ▪ Inform population of small villages along public roads in advance, in case of transporting heavy equipment. ▪ Establish worker code of conduct to help prevent friction or conflict with communities. The religious, cultural, and social activities of the local communities shall not be disturbed. This is especially important in the case that the workers do not share the same cultural, religious and social customs. ▪ Security arrangements to be guided by principles of proportionality, good international practice and national law.		

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
		▪ Develop and implement a site-specific Fire Safety and Emergency Response Plan.. ▪ Regular community liaison/ stakeholder engagement activities shall be undertaken during construction. ▪ Operate accessible Grievance Redress Mechanism and document all grievances and follow up until resolution in grievance logbook. Appropriate staffing to be planned.		
	COVID-19 caused by the corona virus: for some project activities social distancing and robust hygiene measures may be more difficult to implement and thus, may present a higher risk to workers and community members of coming into contact with affected people or spreading COVID-19.	▪ Ensure that all workers have access to adequate, safe and hygienic basic facilities on site. ▪ Promote and enforce frequent handwashing and respiratory hygiene. ▪ Make hand sanitizer and/or ablution facilities with soap available in all areas where risk of transmission is identified (e.g. upon entry to the premises, in canteen, in toilets, etc.). ▪ Develop adequate, site- and work-specific measures to minimize risk of infection with Corona-Virus; latest developments and actual situation on ground to be considered. ▪ Communicate good practices to workers and visitors at key areas, such as entry points or lavatories, through posters and signs as well as reminders from designated staff. ▪ Where possible, reduce number of workers in the workplace to enable social distancing, supported by appropriating additional space. ▪ Interaction of workforce with the local communities should be restrained through strict enforcement of Code of Conduct. ▪ Communicate with surrounding communities and supply chain to confirm awareness of the virus and discuss good hygiene practices and precautionary measures. If restrictions on site access will impact the community, e.g. by closing access paths, clearly communicate this with community leaders and discuss the implications.	NamPower/ Contractor	Regular toolbox talks. Training records. Site Inspections. Review of grievance records. Regular health check-ups. Close coordination with local Health Authority; notification records to relevant authority.

Table 7: ESMP - Mitigation and Monitoring Measures during Operation

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Landscape	The operational BESS is being installed in compact containers and does not include any components of height. The existing substation facilities are taller in height.	▪ no visual impact expected	-	-
Noise and Air Quality	The BESS will emit acoustic noise into their vicinity when in operation from power transformers, cooling compressors and fans. Noise can affect stakeholders and cause potential health implications.	▪ Component selection: Special low-noise cooling compressors, fans and transformers. ▪ Erection of physical barriers ▪ Provision of ear protection equipment to maintenance staff.	NamPower	Regular noise measurements.
Labor and Working Conditions	All Project phases involve the employment of personnel. All activities of the involved parties must comply with the listed ILO core standards.	▪ Promote fair treatment, non-discrimination and equal opportunity of project workers, including vulnerable workers such as women, persons with disabilities, migrant workers, etc. as appropriate and to prevent the use of all forms of forced labour and child labour. ▪ The EPC contractor must establish guidelines for the labour recruitment and employment system that comply with ILO core standards that include no use of forced labour, no discrimination, no child labour, equal pay for women and men, respect of working hours and respect of freedom of association and right to organize. ▪ Regarding the issue of human trafficking, sexual harassment, GBV and child abuse, the project shall make guidelines and also monitor outsiders not to be involved in these illegal activities. This issue should also be discussed during public consultations in order to create awareness within the communities. ▪ Prohibit the involvement of children (minimum age 18 years) in working directly or indirectly on the project and enforce this prohibition. ▪ In case security services are contracted, assure that those providing security are not implicated in past abuses, are	NamPower / Contractor	Site inspection during operation. Review of grievance records. Visual inspection on regular basis. Implementation of Security Personnel Management Plan.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
		adequately trained, have an appropriate conduct towards the citizens and other workers, and act within the applicable law. ▪ Establish a grievance mechanism.		
Hazardous Substances	Hazardous substances in the form of chemicals are an integral part of the workings of batteries. Lithium batteries may contain heavy metals such as cobalt and manganese, as well as an organic solvent solution of lithium perchlorate, acetonitrile solution with lithium bromide. In the event of containment failure, hazardous substance may contaminate surrounding water resources as well as soil. Lithium, for example, causes long-term biodegradation.	▪ Some lithium-ion batteries under development use an aqueous electrolyte which significantly reduces the hazards associated with organics and acids. ▪ Lithium-ion batteries require battery management systems to monitor and protect cells from overcharging or damaging conditions. ▪ Large BESS systems should be designed with appropriate fire detection and suppression systems.	NamPower	Depending on the selected technology / supplier.
	Emissions may arise due to reactions occurring within the battery. If over-charged, batteries have a high explosion risk, due to the emission of hydrogen. This poses risks to both air quality and to the health of battery operators and workers on site.	▪ Large BESS should be in an isolated location or containerized with battery management, and monitoring systems. ▪ Fire Safety and Emergency Response Plan, depending on the selected technology.	NamPower	Depending on the selected technology / supplier.

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Maintenance / Waste	Maintenance of batteries may result in the generation of waste which will need to be disposed of. Hazardous waste has severe negative impacts on the environment. Maintenance of batteries will also have a degree of risk in terms of spillages during the maintenance procedure. These pose risks to the ecosystem and to the health of battery operators due to the hazardous nature of the chemicals used. Lithium-ion batteries require low maintenance and are generally considered field replaceable components. When exposed to water and air (moisture), lithium emits flammable gases; therefore, maintenance procedures may result in safety risks.	▪ E-Waste management plan to be developed, outlining disposal and recycling procedures (e.g. recyclable metals). ▪ Maintenance personnel should be properly trained, knowledgeable in hazardous materials and have the necessary equipment to deal with leaks and spills. ▪ Maintenance of lithium-ion batteries is generally limited to replacement (and disposal) of battery cells at the end of life. ▪ Fire Safety and Emergency Response Plan, depending on the selected technology. ▪ The owner may request the supplier to provide a warranty for certain parts or whole modules, in case of failure of parts before end-of-life time. ▪ The project should have a set aside for decommissioning and disposal, e.g. in form of a reserve account.	EPC Contractor	Depending on the selected technology / supplier.
Overheating / Fire / Lightning	Lithium batteries are subject to thermal runaway and can rapidly overheat if operated outside of normal parameters. Most lithium batteries use organic electrolytes, which are combustible.	▪ Fire Safety and Emergency Response Plan, depending on the selected technology.	NamPower	Depending on the selected technology / supplier.

Table 8: ESMP - Mitigation and Monitoring Measures during Decommissioning

Topic / Potential Impact	Description	Mitigation & Management	Responsibility	Monitoring Procedure & Means of Verification
Visual Impact & Landscape	Modularized and packaged systems offer ease of system removal from site for disposal at end of life. Site contamination is unlikely.	▪ Site restoration would include infrastructure removal and revegetation of cleared areas, where possible using native species. ▪ Rehabilitate borrow areas, backfill material stockpile sites and access roads, where applicable. ▪ Spill Prevention Plan and respective equipment in place. ▪ Train staff in handling of hazardous materials and spill prevention.	NamPower	Site inspection
Waste	Disposal and/or recycling will highly depend on the type of battery. Container and infrastructure might be reusable. The materials used in Li-ion batteries are typically considered non-hazardous waste. The metals in the system can be recycled, but they do not represent a high salvage value. Certain materials within the battery can be recycled; however, a significant amount will be disposed of. Hazardous landfill sites are generally the main route for disposal of a hazardous substance. However, other mechanisms are available. These mechanisms include incineration and disposal of the hazardous waste to land (not in a government owned landfill site). These mechanisms will be governed by the NEMWA. The transportation of the hazardous waste to either a recycling facility or a hazardous waste disposal facility will have associated risks (contamination emanating from spillages).	▪ The disposal of hazardous substances will need to be at a hazardous waste disposal facility. There are only a few of these facilities in the country and will require a specific license. ▪ The recycling of lithium is an extremely complicated process, as the material is toxic, highly reactive and flammable. Furthermore, due to the high costs of recycling lithium and the associated risks, there is a global absence of lithium recycling. Owners should consider provisions for disposal at end of life to ensure proper disposal. There are currently a limited number of facilities that recycle lithium-ion batteries. Because lithium battery systems currently have negative scrap value, it is important that the decommissioning plan is sufficiently well financed to cover the full costs of decommissioning and removal from site. ▪ Environmental regulations prohibit disposal of hazardous waste in general landfills, thus need to be disposed of at a hazardous landfill facility. ▪ Some programs provide for disposal and decommissioning of battery systems at end of life. The project should have a set aside for decommissioning and disposal in form of a reserve account. ▪ The owner may request the supplier to provide a warranty for certain parts or whole modules. ▪ Measures to be defined in an EWaste Management Plan, adjusted to the specific battery technology and transport routes.	EPC Contractor / Battery cell supplier	Depending on the selected technology / supplier.

11 Cost Estimate of ESMP implementation

Physical, biological and social management, mitigation and monitoring measures will be carried out during the pre-construction, construction and operation phases. The measures for physical and biological impacts overlap for the largest part, and therefore the price depiction shown below covers both issues.

Decommissioning could range from partial to full removal of all BESS components; thus, costs cannot be estimated at this point of time. Decommissioning shall be done based on a Decommissioning Plan, which shall also include a respective estimate of costs.

The total estimated cost for the management and monitoring plan, including the applicable VAT of currently 10% and a contingency budget of 5%, is 23,100 USD. The total cost estimation can be taken from the following table.

Table 9: Total Estimated Costs for Environmental and Social Management & Monitoring Plan

Activities	Estimated Cost (USD)		
	Pre-construction phase	Construction phase	Operation phase
Management	1,500	2,000	-
Physical and Biological Environment	2,000	3,000	-
Social Environment	2,000	1,000	-
Monitoring	-	2,000	2,000
Training of local staff in HSE monitoring	2,000	1,500	1,000
Total	7,500	9,500	3,000
Total estimated cost	**20,000**		
VAT 10%	2,000		
Total incl. VAT 10%	22,000		
5% Contingency Budget	1,100		
Grand total	**23,100**		

12 Summary and Conclusion

The purpose of the initial scoping was to determine the key environmental and social issues (physical, biological and socio-economic), which are generally related to the activities of the proposed project with the potential to contribute to, or cause, possibly significant impacts.

The draft scoping in Phase I considered a potential brownfield site as project area and aimed to identify the receptors which would most likely be affected by the project activities and to assess the nature of the expected impacts on the same.

Phase I considered the provided data and publicly available information on various battery types. The information was reviewed in detail and complemented by further desktop research of available data, reflecting the 'draft nature' of the project phase, which was neither battery-type nor site-specific.

Phase II focused on those key issues identified in Phase I and the impact assessment was adjusted according to information on existing environmental and social baseline conditions of the specific, selected project location at Omburu Substation in Erongo region and the characteristics of the chosen Lithium-ion battery technology. A more detailed mitigation and monitoring management plan to avoid, control, mitigate and monitor the environmental and social impacts was developed, supplemented by estimated overall costs of implementation of the same.

The assessment is yet to be complemented by engagement of stakeholders and public participation.

From the steps undertaken in Phase I + Phase II and based on the information available to date on battery technologies and general conditions of brownfield sites, it appears that the implementation of the BESS project will only have minor environmental and social impacts, which could be reasonably mitigated to an acceptable level.

Annex 1

Curriculum vitae of the Environmental Assessment Practitioner (EAP)

Annex 2

Corona virus disease (COVID-19), Info-Sheet