

**ENVIRONMENTAL AND SOCIAL MANAGEMENT AND
MONITORING PLAN (ESMMP)**

FOR

THE PRE-CONSTRUCTION AND CONSTRUCTION PHASES

FOR THE

**ESTABLISHMENT AND OPERATION OF AN ANIMAL FEED
AND BIOCHAR MANUFACTURING PLANT**

ON

**PORTION 1 (3 HA) OF PORTION 15 OF THE FARM
OTJIWARONGO TOWNLANDS SOUTH NO. 308**

Submitted to:

Namibia Green Gold Processing (Pty) Ltd



by:

Integrated Environmental Management Solutions CC.



5 FEBRUARY 2020

Project	Environmental and Social Management and Monitoring Plan (ESMMP) for the Pre-Construction and Construction Phases to Establish and Operate an Animal Feed and Biochar Manufacturing Plant on Portion 1 (3 Ha) of Portion 15 of the Farm Otjiwarongo Townlands South No. 308
Report date	5 February 2020
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Table of Contents

1.	ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN..	4
1.1.	Aim.....	Error! Bookmark not defined.
1.2.	Approval.....	4
1.3.	PRE-CONSTRUCTION PHASE ESMMP.....	6
1.4.	CONSTRUCTION PHASE ESMMP.....	9
1.5.	OPERATIONAL PHASE ESMMP.....	12
1.6.	NGGP’s Environmental and Social Framework.....	16
1.6.1.	E&S Policy Framework/ Responsible Investing Policy.....	16
1.6.2.	ISO-based Standard Operating Procedures (SOPs).....	17
1.6.3.	Excellence in Design for Greater Efficiencies (EDGE).....	17
1.6.4.	Contractual Measures and Environmental Contracts	Error! Bookmark not defined.

Table of Figures

Figure 1:	The property (blue rectangle) where NGGP would be located.....	5
Figure 2:	Illustration of incorporating ESG in the investment process, project preparation, and operations.....	16

1. ENVIRONMENTAL AND SOCIAL MANAGEMENT AND MONITORING PLAN

1.1. Objectives

This Environmental and Social Management and Monitoring Plan (ESMMP) details the commitment by NGGP, as provided for in the Environmental Management Act (2007) and its Regulations (2012), to avoid and mitigate any potential negative impacts.

The main features of the Plan include the **key issues**, the identified **potential impacts**, the **proposed mitigation**, the **responsible party/ person**, **timeline** and **estimated budget**.

The objective of this ESMMP: **to avoid and mitigate negative impacts and, as far sustainable, replicate the positive impacts such as;**

- Annual de-bushing at 6% of national encroacher biomass;
- Creation of sustainable, decent and green employment;
- Contribute towards restoration of ecosystems and landscapes;
- Improve groundwater replenishment;
- Affordable, nutritionally balanced and certified animal feed;
- Foreign earnings from export-grade biochar.

As mentioned throughout the Scoping Report, there are ISO-based draft standard operating procedures (SOPs) in place, inclusive of rigorous monitoring requirements of value chain processes and outputs. This data and information that would be collected over the first 2-3 years (i.e. by 2022/23) would serve as evidence of the implementation of ISO 9001, 14001 and 45001. This is critical to enable ISO certification of the plant by latest 2023.

1.2. Approval

This ESMMP is a working document as NGGP would review and revise it as appropriate such that it addresses the key issues of the production system and processes. The ESMMP is a subset of Baobab Capital's Environmental and Social Policy Framework and, is part of the company's implementation of the UN Principles for Responsible Investing. All NGGP staff would be sensitized to the ESMMP and, its implementation would be incorporated in the job descriptions of specific staff members.

The implementation guidance and supervision would be the responsibility of the NGGP Plant Manager while quarterly reporting would be presented to and approved by the Board of Directors.



Figure 1: The property (blue rectangle) where NGGP would be located.

1.3. PRE-CONSTRUCTION PHASE ESMMP

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Transport and access	Increased traffic load between Otjiwarongo and the site due to movement of staff, materials and equipment. Increased risk of accidents is not regarded as a significant potential impact, however important to plan and avoid times of heavy traffic movement.	<ul style="list-style-type: none"> - Monitor the traffic for one week to note the trends in road use from 07:00 to 18:00 with aim to identify the most optimal times for movement of staff, materials and equipment. - Inquire with Otjiwarongo Municipality regarding the use of the new access road (See Fig. 1); if not possible yet, inquire about the date when the road would be open for public use. 	Traffic monitoring for 5-day work week to note trends in road use and traffic load.	Project Manager, Atenu Developments	N\$1,000 Estimated costs for installing a person to do the monitoring.
Noise and vibration	Transport and operation of earth moving and excavating equipment will cause noise and vibration during the site preparation, estimated to last at most 3 weeks. The area experiences periodic industrial-scale noise and vibration when the train passes along the adjacent railway line and when Cheetah Cement carries out blasting.	<ul style="list-style-type: none"> - Determine option to use the railway to deliver earthmoving and excavating equipment and, transport of the feed mill and biochar containers. - Develop a schedule for transportation via the train. - Develop a schedule for the use of equipment. 	TransNamib consulted by 12 Feb 2020 Schedule in place by 15 Feb 2020 Schedule in place by 15 Feb 2020	Project Manager, Atenu Developments. NGGP Representative	N\$0
Ground conditions	The infrastructure will cover an area not exceeding 10,000 m ² , based on the architectural drawings and; would cause irreversible negative impacts to top soil and inhabitant flora and fauna. This impact is considered negligible, short-term and geographically confined.	<ul style="list-style-type: none"> - Restrict land clearance and site preparation only to the space needed inclusive of contingency for temporary storage, ablution and staffing facilities. 	10 Feb to 15 Mar 2020	Project Manager, Atenu Developments.	N\$0

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Water resources	Infrastructure development requires the use of water. Namibia currently experiences a severe drought and the rainy seasons have been sub-optimal over the past decade, as compared to historical records.	<ul style="list-style-type: none"> - Sensitize construction team about water scarcities and the efficient use of water, e.g. avoid leaks, close taps thoroughly and, do not leave water exposed to direct sun to avoid evaporation; - Ensure that water used for curing of concrete does not runoff and is lost to the environment; - Explore the use of semi-purified water for concrete mixes and, the safeguards needed to protect humans; - Measure the water use to note the actual consumption and, to infer as cubic meter of water used per square meters of construction. 	10 Feb to 30 Apr 2020	Project Manager, Atenu Developments.	<p>N\$10,000</p> <p>Estimated for flow meters to measure water use and protective gear in case the Municipality permits the use of semi-purified water for cement mixes.</p> <p>Measuring water use can suggest the volume of water (Litres) used per square meter of construction.</p>
Electricity resources	This phase will require limited electricity use. Most equipment will be diesel-powered.	<ul style="list-style-type: none"> - Sensitize construction team about efficient use of electricity and associated safety measures; 	10 Feb to 20 Mar 2020	Project Manager, Atenu Developments.	N\$0
Air pollution	Excavation and earth moving activities will generate dust while the machines will emit noxious gases. Based on the baseline data, Feb-Mar has the lowest amount of wind and, the direction is mostly easterly, hence dust and emissions will disperse away from the town. The potential of dust and emissions inhalation by workers may pose a health risk, while the potential of impaired visibility due to dust and emissions may pose risk of occupational and vehicle accidents.	<ul style="list-style-type: none"> - Sensitize all employees to the importance of environmental and occupational health and safety and, personal protective equipment (PPE); - Ensure employees are supplied daily with adequate personal protective equipment (PPE) and that they wear it at all times; - Ensure certified operators for the earthmoving and excavating equipment; - Ensure direct supervision of earthmoving and excavating activities to avoid accidents. 	10 Feb to 30 Apr 2020	Project Manager, Atenu Developments.	<p>N\$10,000</p> <p>Estimated for PPE.</p>

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Ecology	Earthmoving and excavating activities will cause irreversible impacts to top soil, flora and fauna. This includes indigenous and endemic plants, grasses and trees, rodents, reptiles, insects and birds.	<ul style="list-style-type: none"> - Identify and remove trees with assistance of Directorate of Forestry. - Keep the protected, indigenous and non-encroacher trees that would not affect construction; - Restrict the earthworks and excavation only to areas where needed. 	10 Feb to 20 Mar 2020	Project Manager, Atenu Developments.	N\$10,000 Estimated as total fines payable for the removal of protected trees.
Socio-economics	Site preparation will have a minimal positive socio-economic impact through employment, wages and sourcing of goods and services in Otjiwarongo.	<ul style="list-style-type: none"> - Sensitize subcontractors and workers to the short-term nature of the phases; - Abide by minimum wages and other employee rights; - Keep all records of wages and procurements as evidence of positive socio-economic impacts. 	10 Feb to 20 Mar 2020	Project Manager, Atenu Developments.	N\$0
Waste	Solid wastes will be generated during site preparation. This applies to the construction and operational phases.	<ul style="list-style-type: none"> - Distribute waste collection bins in designated and clearly marked areas so that all wastes are disposed properly. 	10 Feb to 20 Mar 2020	- Project Manager, Atenu Developments.	N\$2,000 Estimated fees payable to Otjiwarongo Municipality for issuance of waste bins.

1.4. CONSTRUCTION PHASE ESMMP

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Transport and access	Increased traffic load between Otjiwarongo and the site due to movement of staff, materials and equipment. Increased risk of accidents is not regarded as a significant potential impact however, it is important to plan and avoid times of heavy traffic movement.	<ul style="list-style-type: none"> - Monitor the traffic for one week to note the trends in road use from 07:00 to 18:00 with aim to identify the most optimal times for movement of staff, materials and equipment. - Inquire with Otjiwarongo Municipality regarding the use of the new access road (See Fig. 1); if not possible yet, inquire about the date when the road would be open for public use. 	Traffic monitoring for 5-day work week to note trends in road use and traffic load.	Project Manager, Atenu Developments	See the Pre-Construction Phase for budget.
Noise and Vibration and, Visual/ Aesthetic	An industrial crane would be required to raise and mount the pillars for the warehouses, install the roof trusses and roofing sheets and, to stack the 7 containers for assembly of the feed mill. The equipment will emit vibrations and sound while, the towering crane can be regarded as negative visual or aesthetic impact. This impact would be short-term, insignificant and 4 km outside the town.	<ul style="list-style-type: none"> - Schedule in place for the use of the crane in a time-efficient manner. - Ensure a certified operator at all times; - Ensure direct supervision during the use of the crane. 	<p>by 15 Feb 2020</p> <p>20 Mar – 30 Jun 2020</p> <p>20 Mar – 30 Jun 2020</p>	Project Manager, Atenu Developments. NGGP Representative	N\$0
Ground conditions	The infrastructure will cover an area not exceeding 10,000 m ² , would permanently displace resident flora and fauna. This impact is considered common for infrastructure particularly in industrial zones and, rated negligible, short-term and geographically confined.	<ul style="list-style-type: none"> - Construction would comply with the approved plans and thus restricted to 10,000 m² or less. - Quantity Surveyor to set progress milestones in line with industry standards. 	20 Mar – 30 Jun 2020	Project Manager, Atenu Developments.	N\$0

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Water resources	<p>Infrastructure development requires the use of water. Namibia currently experiences a severe drought and the rainy seasons have been sub-optimal over the past decade, as compared to historical records.</p> <p>Existing studies¹ suggest water consumption as high as 2,000 liters/m²</p>	<ul style="list-style-type: none"> - Sensitize construction team about water scarcities and the efficient use of water, e.g. avoid leaks, close taps thoroughly and, do not leave water exposed to direct sun to avoid evaporation; - Ensure that water used for curing of concrete does not runoff and is lost to the environment; - Explore the use of semi-purified water for concrete mixes and, the safeguards needed to protect humans; - Measure the water use to note the actual consumption and, to infer as cubic meter of water used per square meters of construction. 	<p>10 Feb to 30 Apr 2020</p> <p>15 Feb 2020</p>	<p>Project Manager, Atenu Developments.</p> <p>NGGP Representative.</p>	See the Pre-Construction ESMMP.
Electricity resources	This phase will require limited electricity use. Most equipment will be diesel-powered except for the cement mixers and power/ electrical tools (e.g. drills, grinders, saws, etc.)	<ul style="list-style-type: none"> - Restrict the use of electricity as far possible and switch off electricity when tools/ equipment not in use; - Consider generators running on CO₂-free bio-fuels given the cost of generating power is below the current tariff (N\$) per kilowatt-hour (kWh). 	10 Feb to 30 Jun 2020	Project Manager, Atenu Developments.	N\$0
Air pollution	<p>Machines running on fossil fuels will generate and emit noxious gases which impact is deemed negligible, minor and short-term.</p> <p>Based on the baseline data, Feb-Mar has the lowest amount of wind and, the direction is mostly easterly, hence emissions will disperse away from the town.</p>	<ul style="list-style-type: none"> - Sensitize all employees to the importance of environmental and occupational health and safety and, personal protective equipment (PPE); - Ensure employees are supplied daily with adequate personal protective equipment (PPE) and that they wear it at all times; - Ensure certified operators for the earthmoving and excavating equipment; 	10 Feb to 30 Jun 2020	Project Manager, Atenu Developments.	<p>N\$5,000</p> <p>Estimated to refresh the PPE.</p>

¹ [Assessment of water resource consumption in building construction in India](#), in Ecosystems and Sustainable Development VIII.

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
		- Ensure direct supervision of earthmoving and excavating activities for efficient use.			
Ecology	Cement mix will be used for the foundation of the buildings which would have irreversible impacts on habitats and related microcosms.	- Keep the protected, indigenous and non-encroacher trees that would not affect construction; - Restrict the earthworks and excavation only to areas where needed.	10 Feb to 30 Apr 2020	Project Manager, Atenu Developments.	N\$0
Socio-economics	About 60 persons will be involved in the construction process, inclusive of brick layers, plumbers, equipment operators, electricians, steel workers, handy men, and professional staff (engineers, QS). NGGP intends to source majority of labour and services from Otjiwarongo which would deliver positive, short-term benefits to residents and local business.	- Sensitize subcontractors and workers to the short-term nature of the phases; - Abide by minimum wages and other employee rights; - Keep all records of wages and procurements as evidence of positive socio-economic impacts.	29 Feb to 30 Jun 2020	Project Manager, Atenu Developments.	N\$0
Waste	Solid wastes will be generated during site preparation. This applies to the construction and operational phases.	- Distribute waste collection bins in designated and clearly marked areas so that all wastes are disposed properly. - Ensure weekly waste disposal at the designated municipal site.	29 Feb to 30 Jun 2020	- Project Manager, Atenu Developments.	N\$5,000 Estimated for replacement of damaged bins and the procurement of additional ones.

1.5. OPERATIONAL PHASE ESMMP

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Transport and access	Increased traffic load between Otjiwarongo and the site due to movement of staff. Increased risk of accidents is not regarded as a significant potential impact however, it is important to plan and avoid times of heavy traffic movement.	<ul style="list-style-type: none"> - Staff employed at NGGP would be advised on best times to travel on the B1 road based on the data collected during pre-construction. - Inquire with Otjiwarongo Municipality regarding the use of the new access road (See Fig. 1); if not possible yet, inquire about the date when the road would be open for public use. 	Annual	NGGP Staff	N\$0
Noise and Vibration	The noise and vibration generated by the feed mill and biochar retorts could have long-term negative impacts on the health of employees and surrounding fauna.	<ul style="list-style-type: none"> - Monitor the noise and vibration for three months using sound level meters. - Ascertain the legal sound threshold (in decibels) for industrial operations. - Determine with the data if the noise and vibration is within limits for industrial areas. - If not, seek advice from technology developers how to minimise noise. - Apply advice provided and inform MET. 	<p>May to July 2020</p> <p>By 15 Jun 2020</p> <p>By 30 Jul 2020</p> <p>Immediately.</p> <p>Immediately once solution applied.</p>	Project Manager, Atenu Developments. NGGP Representative	TBD following monitoring and confirmation of compliance with legal sound threshold.

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
Ground conditions	NGGP's infrastructure would be permanent with irreversible impacts due to construction and operations.	- Plant indigenous trees based on advice from DoF as part of greening and support of Namibia's Nationally Determined Contributions target on arboriculture.	20 Mar – 30 Dec 2020 <i>Ongoing improvement of the surrounding natural environment.</i>	NGGP Management	N\$50,000 Estimated budget for arboriculture and landscaping over 2-year period.
Water resources	NGGP will use an estimated maximum 7,500 litres of water per month during year 1, running 8-hour daily production shifts. Majority of this water, ave. 250 litres per day will run in a closed circuit to generate and release steam for blending and pelletizing of feed inputs. NGGP aims to upscale production annually to achieve a minimum of 50,000 tonnes of feed per year, by 2025 requiring 24-hour production shifts. This would imply monthly water use of 30,000 litres. This could have a significant impact on the available water for Otjiwarongo.	- From year 2, NGGP would be in a financial position to invest in a rainwater harvesting system, that is linked to a water purification and reuse technology. - Initial research suggests that Eco Water Technologies Namibia is a well-suited local manufacturing company that can supply, install and maintain a turnkey solution. Cost estimates for a 7,500 capacity system is in the region of N\$250,000-400,000.	1 May 2021	NGGP Management	TBD by 1 May 2021
Electricity resources	NGGP will use an estimated maximum 600 kW electricity per year during year 1, running 8-hour daily production shifts.	- From year 3, NGGP would be in a financial position to invest in a renewable energy (RE) system with batteries.	1 May 2022	NGGP Management	TBD by 1 May 2022

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
	NGGP aims to upscale production annually to achieve a minimum of 50,000 tonnes of feed per year, by 2025 requiring 24-hour production shifts. This would imply annual electricity use of 1-2 Megawatts (MW). This could have a significant impact on the available electricity for Otjiwarongo.	- Initial research suggests that SolSquare, HopSol and many others local companies can supply, install and maintain a turnkey RE solution. Cost estimates for a 1 MW generation system with batteries is in the region of N\$8.2 million.			
Air pollution	NGGP's containerized biochar retort system is not expected to emit any greenhouse gases. This will be ascertained during plant testing and commissioning.	<ul style="list-style-type: none"> - Monitor the production of biochar for at least three months to observe if there are any emissions. - If so, contact the technology providers and substantiate with video evidence. - Implement advice from the technology provider to reduce or avoid emissions. - If no emissions are observed report to MET. 	<p>May to Jul 2020</p> <p>Immediately.</p> <p>Immediately once received.</p> <p>Immediately.</p>	NGGP Management	TBD by 15 Aug 2020
Ecology	NGGP's infrastructure would be permanent with irreversible impacts due to construction and operations.	- Plant indigenous trees based on advice from DoF as part of greening and support of Namibia's Nationally Determined Contributions target on arboriculture.	<p>20 Mar – 30 Dec 2020</p> <p><i>Ongoing improvement of the surrounding natural environment.</i></p>	NGGP Management	<p>N\$50,000</p> <p>Estimated budget for arboriculture and landscaping over 2-year period.</p>
Socio-economics	NGGP will directly benefit about 50 people through the entire value chain; from harvesting to product development, packaging, marketing, distribution and sales.	<ul style="list-style-type: none"> - Abide by, or improve minimum wages, employee benefits and ensure their rights; - Commit annual support to local interventions to improve social wellbeing, participate in social events and combat prevailing social 	Ongoing	NGGP directors, management and staff.	TBD

Key Issue	Potential Impact	Proposed mitigation	Timeline/ Frequency/ Duration	Responsible Person/ Party	Budget (N\$)
	<p>NGGP aims to upscale production annually to achieve a minimum of 50,000 tonnes of feed per year, by 2025 requiring 24-hour production shifts.</p> <p>NGGP intends to source majority of short-term labour, services and goods from Otjiwarongo for operations which would deliver positive, long-term benefits to residents, the local, regional and national economies.</p>	<p>ills (e.g. alcoholism, ant-gender-based violence).</p> <ul style="list-style-type: none"> - Implement annual staff capacity development programmes and exposures. 			
Waste	Solid wastes will be generated during ongoing operations.	<ul style="list-style-type: none"> - Distribute waste collection bins in designated and clearly marked areas so that all wastes are disposed properly. - Implement a waste sorting and collection system. 	Ongoing	NGGP General Manager	<p>N\$15,000</p> <p>Annual estimated for budget for the waste sorting, collection and disposal system. To be adjusted as needed.</p>

1.6. NGGP’s Environmental and Social Framework

1.6.1. E&S Policy Framework/ Responsible Investing Policy

In 2017 Baobab Capital (Pty) Ltd. (BC) adopted and adapted the World Bank/ IFC Equator Principles as the Responsible Investing/ Environmental and Social Policy.

BC is a Namibian-owned investment firm that is a signatory of the United Nations Principles for Responsible Investing (UNPRI). NGGP is a subsidiary or sister company of BC. The Principles are shown below:

- Principle 1: We will incorporate Environmental, Social and Governance (ESG) issues into investment analysis and decision-making processes.
- Principle 2: We will be active owners and incorporate ESG issues into our ownership policies and practices.
- Principle 3: We will seek appropriate disclosure on ESG issues by the entities in which we invest.
- Principle 4: We will promote acceptance and implementation of the Principles within the investment industry.
- Principle 5: We will work together to enhance our effectiveness in implementing the Principles.
- Principle 6: We will each report on our activities and progress towards implementing the Principles.

UNPRI has a strong focus on investment related to delivering on the Sustainable Development Goals (SDGs). Baobab’s ESG work plans link portfolio company level performance outcomes to the SDGs.

Environmental, Social and Governance (ESG) issues are at the core of the PRI and BC embraces ESG as a catalyst to harness Namibia’s bio-economic opportunities. The below image illustrates the blend of addressing investment risk, focusing on investment returns, while equally focusing on the value addition of ESG.

CONSIDERING ESG ISSUES WHEN BUILDING A PORTFOLIO (known as: ESG incorporation)		
ESG issues can be incorporated into existing investment practices using a combination of three approaches: integration, screening and thematic.		
Integration	Screening	Thematic
Explicitly and systematically including ESG issues in investment analysis and decisions, to better manage risks and improve returns.	Applying filters to lists of potential investments to rule companies in or out of contention for investment, based on an investor's preferences, values or ethics.	Seeking to combine attractive risk-return profiles with an intention to contribute to a specific environmental or social outcome. Includes impact investing.

Figure 2: Illustration of incorporating ESG in the investment process, project preparation, and operations.

1.6.2. ISO-based Standard Operating Procedures (SOPs)

NGGP has draft **Standard Operating Procedures (SOPs)** in place that are developed by an ISO Specialist, in consultation with Namibia Standards Institute (NSI) and based on ISO 9001 (**Quality Management System**), 14001 (**Environmental Management**) and 45001 (**Occupational Health & Safety Management**). In November 2019, a Namibian Forest Stewardship Council (FSC) certification system was officially launched which would enable NGGP to export to premium markets such as Europe and the USA.

1.6.3. Excellence in Design for Greater Efficiencies (EDGE)

The building design meets the International Finance Corporation's (IFC) green buildings standard, "EDGE", **Excellence in Design for Greater Efficiencies**. EDGE is an online platform, a green building standard and a certification system for more than 160 countries. The EDGE application assisted NGGP to determine the most cost-effective options for designing green within a local climate context, i.e. to achieve lower energy and water costs and, to avoid GHG emissions. EDGE buildings can achieve up to 20% less energy use, 20 percent less water use, and 20 percent less embodied energy in materials.

The EDGE certification is in line with NGGPs sustainability principles while an added benefit would be lower utility bills. According to the IFC, **current buildings generate 19% of energy related GHG emissions and consume 40% of globally generated electricity**. By 2050, the built environment is expected to double due to high population growth and urbanization trends. Most of this growth will occur in emerging markets, particularly in middle-income countries like Namibia.

1.6.4. Implementation and Adherence to the ESMMP

NGGP shall add the ESMMPs as proposed above as amendment to all contracts for the pre-construction, construction and operational phases of the business.

The contracting company, Atenu Developments would be responsible for implementation of the Pre-construction and Construction Phase ESMMPs. Progress reporting for these phases would include a review of implementation of the ESMMP to address any challenges and harness opportunities.

ESG roles and responsibilities are included in the draft job descriptions for NGGP staff. During the Operational Phase of the company, the Plant Manager would be responsible for implementing the ESMMP along with the ISO-based SOPs and other standards and certifications (e.g. FSC, EU Brand Certifications).