PPP and Climate Change Mitigation and Adaptation Screening Assessment Report for the Auta Balefi Waste Management Facility, Karu

1. Project Summary

Primary Purpose of the Project

The Auta Balefi Waste Management Project is primarily established to revolutionize municipal solid waste (MSW) management in Nasarawa State, Nigeria. The project unfolds in three phases, beginning with the recycling of non-degradable plastic waste and progressively expanding to full MSW processing, including the production of organic compost and waste-to-power generation. The ultimate goal is to transition from conventional waste disposal methods to a comprehensive waste management system that not only addresses environmental concerns but also promotes economic activities and community well-being.

Alignment with National Climate Change Targets

The project's specific goals closely align with Nigeria's national climate change mitigation and adaptation targets by addressing waste-related challenges. By aiming to end landfilling of untreated waste, encouraging environmentally friendly technologies, and promoting a transition to a circular economy, the Auta Balefi Waste Management Project contributes to the reduction of greenhouse gas emissions from the waste sector. Additionally, the inclusion of nature-based solutions underscores the project's alignment with broader climate policies...

Contribution to Low GHG Emissions

The Auta Balefi Waste Management Project actively contributes to achieving negative, zero, or very low greenhouse gas (GHG) emissions through innovative waste management practices. The emphasis on recycling non-degradable plastic waste reduces the need for landfilling, mitigating the release of methane—a potent GHG. As the project progresses to full MSW processing, it incorporates efficient waste sorting, recycling, and composting techniques, minimizing emissions associated with traditional waste disposal methods. The waste-to-power generation phase further reduces the carbon footprint by converting waste into a renewable energy source.

Mitigation Features for Net Zero Future

The project incorporates key mitigation features that position it towards a transition to a net-zero future. This includes the utilization of renewable energy sources, such as the waste-to-power generation system, which not only addresses waste management but also contributes to the local energy grid. Additionally, the emphasis on circular economy principles, efficient waste sorting, and

sustainable waste treatment practices align with the broader vision of minimizing resource consumption and promoting a regenerative approach. The Auta Balefi Waste Management Project serves as a pioneering initiative in the region, showcasing how integrated waste management can play a pivotal role in achieving a sustainable, net-zero-emission future.

2. Overview of Screening Output

For inclusion in the State PPP Pipeline, a preliminary project screening was conducted using United Kingdom Nigeria Infrastructure Advisory Facility's (UKNIAF's) Project Screening Tool. The Project Screening Tool Kit incorporates **Poverty, Gender and Social Inclusion & Climate Change** (PGESI & CC) considerations and captures UKNIAF's Project Screening criteria for Public Private Partnership (PPP) Investment projects

The screening tool is based on the well-known international standards used by infrastructure investors for gender and climate smart investing, such as the Development Impact and Environmental & Social (E&S) risk due diligence framework of the CDC Group, the IFC's Performance Standards, and the 2X Criteria developed by the 2X Challenge initiative for gender-smart investing. *(See Annexure 1 for basic information about the tool and the Decision Criteria)*.

The output from the project screening shows low commercial viability potential, medium development impact, and low environmental, social, and climate risk.

The project has an overall score of 77%, an E&S score of 93%, and a Climate Mitigation & Adaptation score of 100%. This is above the minimum required for the project to be selected and to proceed in the PPP Lifecycle. It is recommended therefore to proceed in the PPP Lifecycle. See detailed scoring output in Annexure 2

Below is the summary result of screening the project with UKNIAF's Project Screening tool. Detailed output is in the Annexure.

Table 1: Preliminary Environmental and Social Risk Assessment Outcome

Key Assessment Criteria	High, Medium, Low
Commercial Viability	
Strategic Alignment	High
Market Demand	Low
Commercial Viability	Medium
Complexity	High
Lenders' Interest	Low
Development Impact Assessment	
SDG Fit	High
Sector Fit	High
GESI Impact	High
Poverty Impact	Medium
Climate Impact	Low

Key Assessment Criteria	High, Medium, Low
E&S Risk Assessment	
Exclusion List met? (Y/N)	Yes
Compliance with local laws / develop E&S Management Systems	High
Environmental Pollution or Destruction	Low
Negative impact to heritage, resettlement, and indigenous communities	Low
Adverse impacts from Climate Change and/or high emissions	Low
Material E&S risks (biodiversity, climate, other)	Low

3. Project Overview

Description	
Project Title	Auta Balefi Waste Management Facility, Karu
MDA	**Key MDA** Nasarawa Waste Management Agency **Other MDA** Nasarawa Investment and Development Agency
Project Locations	Karu, Nasarawa State
Sector	Sanitation and Energy

The Federal Ministry of Environment established an integrated waste management facility at Auta Balefi, Karu LGA of Nasarawa State, as part of its policy targeted at supporting state government in bridging infrastructural and institution gaps in municipal solid waste management system.

The project was established as a Community Based Waste Recycling Plant in Karu as part of government's policy drive targeted at bridging infrastructural and institutional gaps in Municipal Solid Waste (MSW) management.

The project has three phases.

Phase I - Recycling of non-degradable plastic waste (ongoing)

Phase II - Expansion into full municipal solid waste (MSW) (planned)

Phase III – Production of organic compost and Waste-to-Power Generation (planned)

The Nasarawa State Government intends to leverage Public Private Partnership to efficiently manage the facility, and kick of the second and third phases of the project.

Based on a full due diligence the equipment on the site at the Karu facility are:

i. One (1) Plastic Recycling machine (Pelletizer) 150kg – 400kg / hr with washing component
ii. Two (2) 15 cubic meter skip loading truck Volume 1100-1500L, Capacity between 45,000-48,000ML
iii. Two (2) roll on roll Specialized receptacle (10cmb)
iv. One (1) x 250KVA generator
v. 50 colour coded 240 Litre waste recycling bin

The aim of the project is to recycle post-consumer mixed plastics waste into a new product (Pellets). The Vision of the Project Organization is to handle a minimum of 120kg per hour of processing capacity (which is the minimum capacity of the existing recycling equipment in the facility) through a mechanical recycling process. The goal of the project in Phase 1, is to recycle plastic and convert to

pellets thereby improving the local environment, offer continuous employment to individuals from socially and economically disadvantaged groups, unlock the market for Pellets in Nasarawa State and other States across the country as well as regional and international markets and create Internally Generated Revenues (IGRs) for the Nasarawa State Government through the concession fees that will be paid to the State by the Concessionaire.

Collection from multiple sources, Segregation at Source, Washing & Drying, Crushing / Shredding / Processing, Cooling, Cutting and Moulding to the finished pellet products. The specifications for the recycling of non-degradable plastic waste has been set forth by a preceding project. The specification for the other recyclable materials will be embedded in the process and equipment for the overall facility starting in phase 2. This equipment is designed to sort and provide input to the proposed Waste to Power incinerator. After sorting, the rest of the solid waste will be carried over to the combustion chamber.

Part of the services to be offered by the private partners are designed to reduce the requirement for public disposal for plastic and landfill disposal of plastics packaging waste. Landfills are overburdened with other forms of waste, therefore separation of the plastic at the landfill will be an issue and less efficient. The aim is to encourage separation of solid waste at source specifically at commercial locations prior to delivery to the facility.

The waste suitable for reprocessing at the facility includes all plastic products including:

a) Polythene

b) High Density Polyethylene

c) Low Density Polyethylene

d) Polystyrene

e) Polyethylene terephthalate (PET)

f) Polyurethane

g) Polypropylene

The waste itself goes through a series of processes prior to the final moulding stage at which point the products are recovered as pellets. The goal is always to create an opportunity for the communities, both domestic and commercial, to make a significant contribution towards protecting the environment and creating a more sustainable future.

The service will involve converting plastic waste to plastic pellets which can be used in the casting of plastic products such as chairs and tables. Left over plastics from the manufacturing process of plastic goods such as polyethylene film and bags can be recycled into pellets and re-introduced into the main production operation in multiple plastic products, manufacturing processes and industries that utilize plastic to create everyday products that are used by the population. This increase economic activity and reduce the dependence on imported plastic products utilized by manufacturing companies in the country.

The main economic advantages of this project is the reduction of solid wastes (starting with plastic products), increase of value added refuse; reduction of environment and social problems at the disposal site; utilization of solid waste to generate domestic and commercial plastic products, improvement of solid waste management services and creation of employment opportunities.

Direct Beneficiaries

i. Project will help the Nasarawa State Government deliver on its policy goals to create a cleaner environment and increase economic activities by being one of the first states to unlock the potential in the Waste Management sector.

ii. Project will increase the Internally Generated Revenue (IGR) in the State as the Concessionaire will pay a Concession Fee to the Government

iii. The project would give a good platform and job opportunities for hundreds and thousands of rag pickers and their families.

iv. The facility will create hundreds of direct and indirect jobs in Nasarawa State and direct knowledge transfer from global centres of excellence.

v. Nasarawa residents will be trained about plastics and hazardous waste handling and safety measures.

vi. Cleaner communities and environments in line with the global SDG goals

Indirect Beneficiaries

i. Local Environment: The proposed project will contribute to a cleaner, sustainable local environment, contributing to achieving clean surface and ground water, healthy soils, and clean air. A clean local environment will immediately benefit the most vulnerable groups of society whose livelihoods often depend on the natural resources available locally.

ii. Micro-Entrepreneurship: There will also be opportunities for the start-up of micro-enterprises in recycling, e.g. recycling of paper, cartons, bottles, etc.

iii. A huge benefit of recycling plastic is conservation of petroleum. Large amount of petroleum is needed for making new plastic products, and around 40% of the petroleum consumption can be reduced by recycling old and discarded plastic.

iv. Even the landfill space can be saved through recycling. It is said that removal of one ton of plastic for recycling spares a landfill space of around 7.5 cubic yards.

v. The benefits of recycling plastic include a reduction in the emission of greenhouse gases. In other words, greenhouse gases are emitted while burning petroleum, and if the amount of petroleum used in making plastic is reduced through recycling, the emission of these gases will also reduce by saving the environment

vi. The Federal Government of Nigeria (FGN) will also be a beneficiary as it will help them meet their environmental goals by supporting the States and Geopolitical zones.

PHASE II - EXPANSION INTO FULL MUNICIPAL SOLID WASTE MANAGEMENT

After the execution and operations of Phase 1 which is the recycling of plastic and conversion to pellets, the project will expand its service offerings to the recycling and processing of full municipal solid waste (MSW). This service will go beyond just focusing on plastics to handle the other types of MSW (paper, metal, and glass). There will be a multiplier effect at this phase because it will take care of the broader waste products in the State thereby increasing further economic activities, creating more jobs, improving the health standards and the environment in the community and the State.

The sorting process is designed to provide input to the pelletizer and the combustion chamber for the waste to power process. This sorting stage will provide a seamless separation of recyclable waste that can be converted into other materials for industrial use.

PHASE III – PRODUCTION OF ORGANIC COMPOST, WASTE-TO-POWER GENERATION

The third phase of the project will be processing of organic compost, creation and incineration of Refuse Derived Fuel (RDF) for power generation. The State, just like most parts of the country, experiences a lack of reliable and consistent power. The provision of Waste Management Service will not only create a healthier, cleaner, and safer environment but can also be converted to RDF and be used as a source of energy for the State.

The Waste to Power process is the most involved stage of the project. This process will require input from the sorting lines as shown above to activate the combustion process. Beyond the process flow, this third phase requires technical expertise that will be carefully orchestrated by private partner in line with federal and local health and safety stakeholders, Ministry of Power, and the legislative stakeholders.

4. Climate Change Mitigation and Adaptation of Project

Climate Mitigation

The Auta Balefi Waste Management Facility, established by the Federal Ministry of Environment in Nasarawa State, holds significant climate mitigation potential through its innovative waste management approach. The facility, designed as a Community Based Waste Recycling Plant, is structured in three phases, each contributing to environmental sustainability and climate action.

Phase I

The primary focus of Phase I is the recycling of non-degradable plastic waste through mechanical processes, resulting in the production of pellets. The project organization aims to handle a minimum of 120kg per hour, promoting continuous employment, environmental improvement, and revenue generation.

Reduction of Solid Wastes: The project targets plastic waste, a major contributor to solid waste. By recycling and converting it into pellets, the initiative directly reduces the volume of solid waste, aligning with global waste reduction goals.

Value-Added Refuse: Through the creation of plastic pellets, the project adds value to refuse, transforming it into a resource that can be used in the manufacturing process of various plastic products.

Reduced Dependence on Imported Plastics: The initiative aims to decrease reliance on imported plastic products by promoting the use of locally recycled materials, thus reducing carbon emissions associated with transportation and production.

Creation of Employment Opportunities: The project contributes to the local economy by creating direct and indirect jobs, fostering economic growth, and supporting sustainable livelihoods.

Local Environment: A cleaner, sustainable environment benefiting vulnerable groups.

Conservation of Petroleum: Recycling contributes to petroleum conservation, reducing greenhouse gas emissions.

Landfill Space Savings: Recycling reduces the need for landfill space, promoting efficient waste management.

Phase II - Expansion into Full Municipal Solid Waste Management:

Comprehensive Waste Handling: By extending services to various waste types, the project addresses a broader spectrum of waste management, reducing the overall environmental impact.

Multiplier Effect: The expansion introduces a multiplier effect, positively influencing economic activities, job creation, and environmental quality.

Phase III – Production of Organic Compost, Waste-to-Power Generation:

The third phase involves processing organic compost and Waste-to-Power Generation. This stage not only enhances waste management but also contributes to addressing energy challenges in Nasarawa State.

Organic Compost Production: Utilizing organic waste for compost reduces methane emissions from landfills and provides a valuable soil conditioner.

Waste-to-Power Generation: Converting waste to power offers a sustainable energy source, reducing reliance on traditional energy and mitigating greenhouse gas emissions.

Climate Adaptation

The Auta Balefi Waste Management Facility, in its entirety, serves as a climate-resilient model for waste management. By integrating adaptive strategies into each phase, the facility not only contributes to climate adaptation but also demonstrates the importance of building resilient and sustainable systems in the face of a changing climate. This comprehensive approach to waste management has the potential to position Nasarawa State as a leader in climate-smart waste management practices in Nigeria.

Phase I - Recycling of Non-Degradable Plastic Waste

Resilient Waste Management Infrastructure: By focusing on recycling non-degradable plastic waste, the facility contributes to building resilient waste management infrastructure. This adaptation strategy ensures that the waste management system can withstand and recover from climate-related challenges.

Employment for Vulnerable Groups: Providing continuous employment to individuals from socially and economically disadvantaged groups enhances community resilience. Economic empowerment supports these groups in adapting to the changing economic landscape influenced by climate variations.

Localized Economic Diversification: The creation of a market for recycled plastic pellets within Nasarawa State and beyond enhances economic diversification at the local level, providing an adaptive response to potential economic disruptions.

Phase II - Expansion into Full Municipal Solid Waste Management

Diversification of Waste Streams: Handling various waste types, including paper, metal, and glass, prepares the facility to adapt to changes in waste composition influenced by climate-related factors.

Enhanced Community Health: The comprehensive waste management approach positively impacts community health, offering an adaptive response to potential health challenges exacerbated by climate change, such as the spread of vector-borne diseases.

Job Creation and Economic Resilience: The expansion introduces a multiplier effect, creating more jobs and enhancing economic resilience. This adaptive strategy ensures that the community can sustain economic activities despite potential climate-induced disruptions.

Phase III – Production of Organic Compost, Waste-to-Power Generation:

Organic Compost for Soil Resilience: The production of organic compost enhances soil resilience, a critical adaptation strategy. Healthy soils are better equipped to withstand climate-induced changes, including extreme weather events.

Waste-to-Power as a Reliable Energy Source: The Waste-to-Power Generation phase addresses energy challenges, offering a reliable energy source that can adapt to fluctuations in traditional energy availability influenced by climate factors.

ANNEXURE 2: ABOUT THE PROJECT SCREENING TOOL AND DECISION CRITERIA

About the Screening Tool

The Project Screening Tool Kit incorporates Poverty, Gender and Social Inclusion & Climate Change (PGESI & CC) considerations and captures UKNIAF's Project Screening criteria for Public Private Partnership (PPP) Investment projects.

The quality of existing infrastructure to support Nigeria's productivity and competitiveness have been categorised as poor; constraining; disproportionately accessible to the poor; and extremely vulnerable climate change risks. Closing Nigeria's infrastructure gaps in a way that can sustain equitable human development requires a re-orientation in designing and delivering commercially viable PPP infrastructure projects that integrate more "responsible" considerations. These responsible considerations look beyond the typical 'Value for Money' and 'affordability' tests to focus on 'doing no harm' and 'leaving no-one behind' in order to attract private sector funding. It will integrate climate smart, environmental & socio-economic considerations in the current PPP delivery approach.

In this light, the Project Screening tool outlines a systematic approach for selecting, prioritising, categorising, assessing, & managing PPP projects that focus on climate adaptation and effective management of Environmental & Social issues while integrating opportunities for increasing developmental impact through meeting poverty reduction, gender equality and social inclusion targets. The Project Screening toolkit is based on the international standards used by infrastructure investors for gender and climate smart investing. It will be used by the UKNIAF team to engage with the Nigerian government and member of the investment community.

Decision Criteria

The maximum score for each Assessment Area is 100%, and the overall score will be determined by the sum of all weights taken from each thematic area (Commercial Viability, 20%; Climate Change, 25%; E&S Risk, 25%; Gender Equality, 15%; Poverty Reduction, 15%) which is also a maximum of 100%. For a project to be selected, it must meet a set of criteria, which includes;

i. ***Have a minimum overall score of 70%***
ii. ***Have a minimum score of 60% on Climate Change and Adaptation criteria***
iii. ***Have a minimum score of 60% on environmental and social factors***

The second and third criteria are critical to avoid a scenario where a project that scores very low on key E&S and CC issues but scores high on other thematic areas still proceeds to be selected. This would be a major risk to the project, UKNIAF and the people of Nigeria.

ANNEXURE 2: OUTPUT FROM PROJECT SCREENING

Summary Sheet – *Auta Balefi Waste Management Facility, Karu*

1: Investment Details	
Investment Name	*Auta Balefi Waste Management Facility Karu*
Project Owner	*Nasarawa Waste Management Bureau*
Location	*Karu, Nasarawa State*
Investment Category	*Minor*
Investment Tenor (years)	*20*
Investment Size (USD)	*$21 Million*
Investment Sector	*Water and Sanitation*
Date	*12/03/2023*

2. Exclusion List	
Does the project to be invested in participate in any activities listed in the exclusion list? (click here)	No

OVERALL SCORE	77%

SCORE

COMMERCIAL VIABILITY (20%)	50%

3. Strategic Alignment	
Project has high strategic importance	1
Project delivers public infrastructure or service in a priority sector	1
Project fills a clear and substantiated critical Infrastructure gap or service deficiency	1
Existing legal framework accomodates private sector participation in the project	1
MDA can finance the project's operating and maintenance costs out of its recurrent budget	0

4. Market Demand	
Market appetite to support the project is proven	0
Government has successfully delivered similar PPP projects	0
Project has secured funding commitments from non-IGR sources	0

5. Complexity	
Project is a brownfield project	1
Project output requirements are clearly defined in tangible or measurable terms and are verifiable	1
Project affects, or is affected, by the delivery of other critical infrastructure project(s)	1

6. Lenders Interest	
Project meets all or parts of lenders' commercial requirements	0
Interest rate risk (fluctuation of loan interest)	0

Project is exposed to currency exchange rate risk	0

Environmental and Social Risk (25%)	93%

7. Provisional E&S Risk Categorization	
Does the project operate in a High, Medium or Low Risk Sector?	1

8. Potential Environmental & Social Risks	
Air Emissions: Significant levels of air emissions that may breach of local regulations or World Bank/IFC Standards	1
Solid Waste Management: Potential generation of waste that can significantly affect the living conditions of local communities or ecosystems or may have an impact on ambient environmental conditions (i.e. air, surface and groundwater, and soils)	1
Water Quality / Management: Significant impact on availability and/or quality of water resources to local communities or habitats	1
Community Health, Safety & Security: Significant risk to local communities due to heavy industrial transport activities	1
Community Health, Safety & Security: Significant risk to local communities due to exposure to communicable diseases from operations or movement of migrant workers (e.g. HIV/AIDS, or water borne diseases such as malaria or cholera).	1
Community Health, Safety & Security: Need for consultantion with, and disclosure to, the public in relation to the investment operations and its potential impacts in accordance with appropriate procedures. Specifically acknowledging stakeholder engagement of women as a subset of the community.	1
Operation in remote areas: Operations in remote areas (or with supply chains that affect such areas) which introduce infrastructure (e.g. roads, electricity, etc.) or increase activities in such areas.	0

Land Acquisition: Significant changes in use of the land (e.g. from agricultural land or residential premises to industrial use, or vice versa) that requires prior agreement and informed consultation with stakeholders	1
Resettlement and economic displacement: Operations will require people to move from their homes, or will result either in the loss of economic assets (e.g. crops, fields), or access to livelihoods that leads to loss of income,	1
Wildlife and natural habitats: Impacts on protected areas or other natural habitats. Potential introduction of invasive alien species, major changes to ecosystem services	1
Indigenous Peoples: Direct or indirect impacts on indigenous / vulnerable peoples (i.e. distinct social and cultural groups with identities that are distinct from dominant groups in national societies).	1
Cultural Heritage: Operations will impact on cultural heritage e.g. building on sites with archaeological, historical, cultural, or religious value) or intangible cultural heritage (e.g. by impacting a minority community such that its language, performing arts, customs are affected).	1
Social Licence to Operate/Track Record: Scale, location and project operations may raise concerns from local or international communities (e.g. newspaper articles, NGO action, etc.) or project will be located in areas where there is a history of tension and activism over oil & gas development (including locations where plant damage, closure or public campaigns have occurred)	1

Climate Mitigation & Adaptation (25%)	**100%**

9. Climate Change Risk, Mitigation & Adaptation	
Potential vulnerability of the project to Climate Risk	1
Does the program contribute towards the NDC's taregt to achieve Climate Mitigation in at least 2 areas?	
*Contribute to net change in Greenhouse Gas Emissions (tCO2e) – tonnes of GHG emissions **by x%** (KPI 6)*	1
*Reduce deforestation of degradation **by x%** (KPI 8, 10)*	1
*Promote energy saving **by x%** (KPI 16)*	1

Improvement of electricity generation grid (NDC)	1
Does the program contribute towards NCD's target to achieve Climate Adaptation in at least 2 areas?	
Promote Climate Smart Agricultural practices	1
*Improve access to clean energy for **x people**, clean low carbon emission technology **for x people** (MW)*	1
*Mobilise up to **NGN x of** public or private finance funds with the main objective to reduce climate change or impacts of climate change (KPI 11, 12)*	1
*Integrate Climate Change in any national planning process **with defined policy / program outputs** (KPI 13)*	1
*Promote knowledge of climate change issues, mitigation and adaptation approaches **with clear expected policies / projects outputs** (KPI 14)*	1
Gender Equality (15%)	**63%**
6. Development Impacts (Gender Impact, Climate Adaptation Considerations)	
Project will integrate **at least 30% share of women** in the workforce	1
Project will diversify supply chain to include **at least 30% of women** entrepreneurs	1
Women in Senior Management will represent **at least 40% share** or Women on Board / Investment Committee **will represent 30%**	1
Program will contribute to women's access to at least 2 of the following services (select as appropriate)	
*Increase access to internet services for **x people***	0
*At **least 30% of the DFI loan proceeds** to financial institutions support invesments for women entrepreneurs*	1
*Increase access to safe transportation for **at least x women and girls in the community***	0
*Increase access to life skills training and job placement assistance for **at least x women** and girls in the community*	1
*Increase access to community clinical preventive and emergency services **for at least x women** and girls in the community*	0
Poverty (15%)	**60%**
6. Development Impacts (Poverty Reduction Impacts)	

Project will create **at least x jobs** – especially green and inclusive jobs – and access to jobs for vulnerable people (KPI 5)	1
Project will improve access to food nutrition and personal security for **at least x p**oor and vulnerable people	0
Project will provide or improve access to infrastructure and clean energy for **at least x** poor and vulnerable people (KPI2)	1
Does the program contribute to reducing poverty for the poor and vulnerable & Climate Adaptation in at least 1 of the following ways	
*Project will improve access to finance for **at least x** poor and vulnerable*	0
*Project will improve access to markets for **at least x** poor and vulnerable people*	1