United Nations Development Programme

Project Document for nationally implemented projects financed by the GEF/LDCF/SCCF Trust Funds

Project title: NAMA on Integrated Waste Management and Biogas in Uganda		
Country: Uganda	**Implementing Partner:** Ministry of Energy and Mineral Development	**Management Arrangements:** National Implementation Modality (NIM)
UNDAF/Country Programme Outcome*:* CP Outcome: 3.1. By end 2020, natural resources management and energy access are gender responsive, effective and efficient, reducing emissions, negating the impact of climate-induced disasters and environmental degradation on livelihoods and production systems, and strengthening community resilience.		
UNDP Strategic Plan Output: Output 1.4: Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented.		
UNDP Social and Environmental Screening Category: High Risk	**UNDP Gender Marker:** GEN2: gender equality as significant objective	
Atlas Project ID/Award ID number: 00100437	**Atlas Output ID/Project ID number:** 00103399	
UNDP-GEF PIMS ID number: 5574	**GEF ID number:** 9210	
Planned start date: June 2017	**Planned end date:** May 2022	
LPAC date: 20 January 2017		
Brief project description: This project aims to provide environmental benefits and reduce greenhouse gas emissions from improper and inadequate management and treatment of wastewater and organic waste in towns, municipalities and agro-processing industry in Uganda. The project combines demonstration and investment in integrated waste treatment and biogas plants in agro-processing industry and municipalities (including biogas-based, on-grid electricity generation) with institutional strengthening, capacity building for improved waste management, and an improved regulatory framework		

so that interventions are sustainable and can be replicated in other municipalities and across agro-processing industry. The Lifetime tonnes of CO_2eq reduced from renewable electricity production is expected to be 223,000 tonnes of CO_2eq and from methane reduction the GHG reductions are estimated at 1,542,000 tonnes CO_2eq over the lifetime of investments – yielding a total reduction of 1,766,000 tonnes of CO_2eq.

FINANCING PLAN	
GEF Trust Fund *or LDCF or SCCF or other vertical fund*	USD 2,170,030
UNDP TRAC resources	USD 900,000
Cash co-financing to be administered by UNDP	0
(1) Total Budget administered by UNDP	**USD 3,070,030**
PARALLEL CO-FINANCING (*all other co-financing that is not cash co-financing administered by UNDP)*	
Government	USD 938,000
Private investors	USD 12,050,000
Other international donors	USD 900,000
Other national stakeholders	USD 350,000
(2) Total co-financing	**USD 14,238,000**
(3) Grand-Total Project Financing (1)+(2)	**USD 17,308,030**

SIGNATURES		
Signature:	**Agreed by Government**	**Date/Month/Year:**
Signature:	**Agreed by Implementing Partner**	**Date/Month/Year:**
Signature:	**Agreed by UNDP**	**Date/Month/Year:**

I. TABLE OF CONTENTS

List of figures

List of tables

List of Acronyms and Abbreviations

APR	Annual Progress Report
AWP	Annual Work Programme
CC	Climate Change
CCM	Climate Change Mitigation
CDM	Clean Development Mechanism
CDR	Combined Delivery Report
CH_4	Methane
CO	Country Office (UNDP)
COP	Conference of Parties (UNFCCC)
CO_2	Carbon Dioxide
CO_{2eq}	Carbon Dioxide Equivalents
CPAP	Country Programme Action Plan
DSA	Daily Service Allowance
EE	Energy Efficiency
ESMF	Environmental and Social Management Framework
ESMP	Environmental and Social Management Plan
ESIA	Environmental and Social Impact Assessment
FODER	Fund for Renewable Energy Development
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse Gas
GRM	Grievance Redress Mechanism
GWh	Gigawatt (GW)-hours (1 x 10^6 kWh)
HQ	Headquarter (UNDP)
IWM	Integrated Waste Management
kWh	kilowatt (kW)-hours
LNG	Liquid Natural Gas
LOA	Letter of Agreement
LPAC	Local Project Appraisal Committee
MOU	Memorandum of Understanding
MRV	Measuring, Reporting and Verification
MSW	Municipal Solid Waste
MTR	Mid-term Review
MW	Megawatt (1 x 10^3 kW)
MWh	Megawatt (MW)-hours (1 x 10^3 kWh)
M&E	Monitoring and Evaluation
NAMA	Nationally Appropriate Mitigation Action
NGO	Non-Governmental Organization
NIM	National Implementation Modality
NPD	National Project Director
NPFE	National Portfolio Formulation Exercise
PAC	Project Appraisal Committee
PC	Project Coordinator
PIF	Project Identification Form
PIR	Project Implementation Review
PM	Project Management
PIU	Project Implementation Unit
PND	National Development Plan
PO	Project Officer

PPA	Power Purchase Agreement
PPG	Project Preparation Grant
PPR	Project Progress Report
PRODOC	Project Document
PSC	Project Steering Committee
RE	Renewable Energy
RCU	Regional Coordinating Unit
RP	Responsible Party
RTA	Regional Technical Advisor
SECU	Social and Environmental Compliance Unit
SEPD	Stakeholder Engagement and Public Disclosure
SES	Social and Environmental Standards
SESA	Strategic Environmental and Social Assessment
SESP	Social and Environmental Screening Procedure
SNC	Second National Communication
SRF	Strategic Results Framework
SRM	Stakeholder Review Mechanism
STAP	Scientific Technical Assistance Panel (GEF)
TA	Technical Assistance (GEF)
TE	Terminal Evaluation (GEF)
TORs	Terms of Reference
TNA	Technology Needs Assessment
TNC	Third National Communication
UNDAF	United Nations Development Assistance Framework
UNDG	United Nations Development Group
UNDP	United Nations Development Program
UNFCCC	United Nations Framework Convention for Climate Change
UNIDO	United Nations Industrial Development Organization
USD	United States Dollar
W	watt

Exchange rates used:

USD per EUR	1.121
Ugandan shillings (UGX) per USD	3,333

II. DEVELOPMENT CHALLENGE

Country Situation and Development Context:

1. Uganda has sustained one of the world's fastest economic growth rates over the last two decades. In just 15 years, Uganda's economy has grown from US $6.2 billion in 2000 to more than US $25 billion today. The Ugandan economy is forecast to grow at a rate of approximately 5.9% in FY16/17. Growth is expected to increase to 6.8% in FY17/18, and thereafter stay on an upward trajectory into the medium term, if major infrastructure projects are implemented as planned, and private investment intensifies with oil-related activities.[1] Over the last 15 years, GDP per capita has expanded from US $255 to US $657. In purchasing power parity terms, GDP per capita now stands at US $1,800. At the same time, Uganda's urbanization is accelerating with the urban population growing at an average annual rate of 6.8 per cent between 2002 and 2014[2]; a greater proportion of future economic activity can be expected to be located in urban areas, including the central and the eastern regions, which will continue to attract people from rural areas.

2. While two decades of strong economic growth have undoubtedly brought tangible improvements to the lives of many Ugandans, there is a pressing need for more broad-based and inclusive growth that fully incorporates environmental sustainability principles. Robust economic expansion, while bringing many benefits, has also brought with it some unforeseen urban environmental challenges, most notably traffic congestion, air pollution, and a mounting waste management problem. The emergence of a middle class with new consumption preferences, coupled with remarkably high population growth[3] and urbanization rates have put a strain on the ability of local government to keep up with infrastructure and urban service delivery requirements. Rapid population growth and urbanization have also led to the development of slums and informal settlements with little or no formal infrastructure. Furthermore, rapid growth has also led to fast growing demand for electricity (around 9% per annum).

3. The impact of growth is especially pronounced in the waste sector. As the level of consumption has increased in tandem with higher income levels and high population growth and urbanization rates, so too has the quantity of waste generated, especially in Uganda's towns and municipalities. If we take the example of the Kiteezi landfill in Kampala, currently the only licensed waste disposal and treatment facility in the capital, the landfill receives around 1,000 tonnes of waste per day. However, the IFC estimates that this represents a collection efficiency of only 50%, with some 730,000 tonnes of waste being generated in the city each year. Approximately 70% of the waste generated is organic. The Kampala Capital City Authority (KCCA), which is responsible for waste collection and transport, estimates that only approximately 1% of the waste is 'informally' recycled, which consists primarily of plastics which are sold to local and international recyclers.[4]

4. The agro-processing industry, including sugar manufacturers, fish processing factories, and livestock slaughterhouses, produces substantial quantities of solid organic waste and wastewater, much of which is discharged into the environment without any treatment. Although more than 100 facilities have permits allowing them to discharge treated wastewater, compliance with effluent standards is low. Many other facilities are operating without permits. By some estimates, 90% of the collected wastewater of Kampala is discharged without any treatment. Due to its effects on fisheries and urban water supply, the Ugandan government considers pollution from wastewater as a major urban environmental management problem, directly impacting two million Ugandans dependent on Lake Victoria, with indirect impacts on 40 million people who live in the lake basin.

[1] Source: The World Bank, see: http://www.worldbank.org/en/country/uganda/overview (accessed 23/06/16).

[2] While the vast majority of Ugandans still live in rural areas, in 2014 (when last measured) the annual urbanization rate reached a staggering 5.36%.

[3] The overall population growth rate of 3.24% ranks Uganda 9th in the world in that category.

[4] IFC/KCCA (2013) Kampala Solid Waste Management Project: Technical & Environmental Diagnostic Report

5. Uganda's carbon dioxide emissions in the year 2000 amounted to 11.8 million metric tons, of which the waste sector contributed 693,000 metric tons.[5] There is a clear, discernible trend of increasing volumes of waste and concurrently, escalating emissions from the waste sector. During the period 1994-2005, GHG emissions from the waste sector increased by 72%.[6] Economic growth, population increase, and urbanization are considered the key factors leading to growing volumes of waste in urban areas in Uganda. Except for Kampala, where solid waste is disposed in a landfill, all other urban centres have over the years been disposing solid waste in burrow pits instead of constructed landfills, with no control of methane emissions. There is also no direct policy on methane mitigation from waste. Most waste streams are uncontrolled and open and flow directly into the environment without any treatment. Open dumping and burning of solid waste are a common practice in many parts of the country, resulting in the uncontrolled release of local air pollutants and GHG emissions. Furthermore, landfills are improperly managed for the collection of GHG emissions. Considering the adverse health and environmental impacts, the Government of Uganda considers pollution from wastewater and solid waste as a priority concern.

6. There are key gender and marginalised peoples issues that have been identified in the solid and liquid waste sector in Uganda including; many women and marginalised people are employed in the informal waste sector in and around urban areas, few women are in decision-making positions in the solid and liquid waste sector, women's voices about proper and integrated waste management often go unheard, yet they are very often the people dealing (generating and informally recovering) household and institutional solid waste, lack of access to and control over income, and limited skills in solid waste recovery and reuse results in women's inability to get attracted, or invest and participate in waste management solutions or even access the benefits from resources recovered from waste after recycling. The national gender policy (1997) was formulated with a main objective to mainstream gender in the national development process in order to improve the social, legal / civic, political, economic and cultural conditions of the people, especially of women.

7. The Uganda Vision 2040[7] – together with the five-year National Development Plans (NDP)[8], explicitly seek to pursue climate-resilient and low-carbon development paths including effective management of GHG emissions from waste and waste water. A National Climate Change Policy (NCCP) – approved by the Ugandan Cabinet in April 2015 – aims to harmonise climate change action across all sectors and levels of governance, from central to local Government, including addressing issues related to decentralized waste management. In addition, both Vision 2040 and the NCCP prioritise green growth and a green economy. In line with these efforts to harmonise climate change action, Uganda is currently preparing a Green Growth Development Strategy with the assistance of UNDP. Uganda's Government has estimated that 30% of the cost of climate action over the next 15 years can be met from national sources whilst the 70% gap will need to be met by substantial international finance including resources from the GEF[9].

8. The UNDP/GEF Project is in line with the Uganda vision 2040, the five-year NDP and the NCCP by addressing the underlying development issue and the global environmental problem of greenhouse gas emissions resulting from improper and inadequate management and treatment of wastewater and municipal solid waste in towns and municipalities in Uganda. The Project is cross cutting and addresses seven of the 2015 Sustainable Development Goals (SDGs) of the United Nations including: 5) Gender equality; (6) clean water and sanitation; (7) affordable and clean energy; (9) industry innovation and infrastructure; (11) sustainable cities and communities; (12) responsible consumption and production; (13) climate action.

Baseline scenario:

9. Under a business-as-usual scenario, the volume of waste generated in urban areas of Uganda would continue to grow unabated. The three underlying trends driving the ever-proliferating waste generation in Uganda's cities – namely economic expansion, rapid population growth and urbanization – are expected to continue. GDP growth

[5] Uganda Second National Communication to UNFCCC.
[6] Uganda Second National Communication to UNFCCC.
[7] See: http://npa.ug/wp-content/themes/npatheme/documents/vision2040.pdf
[8] See: http://npa.ug/wp-content/uploads/NDPII-Final.pdf
[9] CDKN, Uganda Country Newsletter, 2016. http://cdkn.org/wp-content/uploads/2016/09/UGANDA_Country-newsletter_WEB.pdf

reached 5% in 2015[10] and projects economic growth to average 6.5% in 2016-17, before accelerating to an average of 7.2% in 2018-19 (see Table 1).

Table 1: Economic growth forecast for 2015-19

Economic growth						
%	2014[a]	2015[a]	2016[b]	2017[b]	2018[b]	2019[b]
Real GDP growth	4.8	5	6.4	6.6	7.1	7.3

Source: The Economist Intelligence Unit. [a] Actual. [b] EIU forecasts

10. It is projected that Uganda's urban population will increase from six million in 2013 to over 20 million in 2040 (see Table 2). A recent World Bank report notes that that while cities can help propel growth, the speed of urbanization is challenging and can lead to congestion and strain infrastructure, lowering productivity.[11] A study by the National Water and Sewerage Corporation estimates that under a business-as-usual scenario[12], the biochemical oxygen demand load to the environment could increase by as much as 370% by 2052, using 2008 as the baseline.[13]

Table 2: Urbanization in numbers:

- Uganda's urban population has doubled in the last 20 years.
- By 2040, 21 million people will live in urban areas in Uganda.
- Kampala is projected to become a mega-city of more than 10 million by 2040.
- 70 percent of non-agricultural GDP in Uganda is generated in urban areas.
- At least 60 percent of the urban population in Uganda live in slums.
- By 2013, 38 percent of the urban population was connected to the electricity grid.

Source: World Bank (2015) "The growth challenge: Can Ugandan cities get to work?

11. In the absence of the UNDP/GEF project, under the business-as-usual scenario, the approach to waste management would continue to be disorganized, haphazard and under-resourced. As noted, it is estimated that municipal authorities collect less than half of the waste generated in urban areas. A recent household survey conducted by Makerere University showed that uncollected waste is mostly burnt (74.1%) or dumped (15.2%) in open places. Fewer than one-third of industries and factories have wastewater treatment facilities or discharge permits. Efforts to reduce and sustainably manage urban waste flows would be sporadic and would not be sufficient to address the prevailing barriers. Under this scenario it is extremely unlikely that the market for waste-to-energy projects such as biogas would develop.

12. As a consequence, in the business-as-usual scenario, private developers of renewable energy projects will unlikely enter the MSW sector to implement and operate biogas-based power systems. Institutional and financial support for these initiatives is limited and knowledge of energy projects within the waste sector is insufficient. In order to develop a market for MSW biogas-based on-grid electricity generation, a number of key market interventions are necessary to remove barriers to project development. This would result in continual growth in methane emissions from waste sources, a limited supply of renewable energy from biogas sources, and other negative environmental impacts such as water pollution.

Policy and regulatory

Waste sector

[10] See: http://www.worldbank.org/en/country/uganda

[11] World Bank. 2015. *The growth challenge: Can Ugandan cities get to work?* Washington, DC: World Bank Group. http://documents.worldbank.org/curated/en/145801468306254958/The-growth-challenge-Can-Ugandan-cities-get-to-work

[12] This scenario assumes that no action is put in place to target waste reduction, reuse, indiscriminate dumping of solid waste and illegal discharge of wastewater.

[13] Biochemical oxygen demand (BOD) is a measure of the quantity of oxygen used by microorganisms (e.g., aerobic bacteria) in the oxidation of organic matter. Natural sources of organic matter include plant decay and leaf fall. BOD can also be used as a gauge of the effectiveness of wastewater treatment plants.

13. Whilst major electricity sector reforms have redefined the role of Government in the electricity sector as enabler for private investments in the sector (including private sector biogas for electricity production projects), this is not the same case for the municipal waste sector. In combination with rapid population growth and urbanization rates, gaps in waste sector regulation, management and enforcement has led to a plethora of waste management problems.

Table 3: Policy and legal framework for solid waste management in Uganda

- Solid Waste Management Strategy December, 2002,
- Local Governments Act (1997) revised in 2004.
- Environment (Waste Management) 52/1999
- Public Health Act, Cap.281
- Solid Waste Management Strategy December, 2002, as revised in (2006).
- The constitution of Uganda 1995 (amended 2005)
- The National Environment Act, Cap 153.
- The National Environment regulations – currently under review
  - Waste Management
  - Audit
  - Minimum Standards for Soil Management of Soil Quality
  - Noise Standard and Control
  - Conduct and Certification of Environmental Practitioners
  - Environmental Impact Assessment
- The National Environment Instrument S.1 153 - 4
- Renewable Energy Policy (2007) (REP) – currently under review (if decided that municipalities should explore waste to energy options)
- The Uganda Water Act (1997)
- The Water regulations S.1 No 152 (1998)
  - Water Resources
  - Water Discharge

demands. Where services are poor or non-existent the communities have often exhibited their own rudimental waste management methods involving the open burning of solid wastes, disposal of waste in open drains or clandestine dumping. Similarly, waste recovery, recycling, re-use, and composting are practiced by waste producers in informal ways.

15. Waste management is not mainstreamed into local development plans and there is a lack of fiscal decentralization for waste management from central Government. To achieve effective waste management in urban areas of Uganda, there is a need for genuine decentralization where urban councils are empowered, have capacity for resource mobilization and apply participatory planning. Empowering of urban councils should be devoid of local manipulative politics. Furthermore, community members must be sensitised, awareness raised and participation in waste reduction at source, waste sorting at source and paying for waste collection.

16. Every owner or occupant of a dwelling or commercial premises is responsible for waste generated at those premises until it is collected by either the local council, its appointed agents or operators licensed by the council. At the national level the 1995 Ugandan Constitution empowers local governments to levy, charge, collect and appropriate fees and taxes for investment in infrastructure and service delivery such as solid waste management. However, the constitution does not prescribe how much and how such fees can be collected especially for solid waste. At the municipal level many solid waste management ordinances empower councils to levy and collect fees for the collection and disposal of solid waste payable by the person or entity generating waste. However, no municipal councils collect fees for the collection and disposal of solid waste, whilst the NWSC collects a fee for disposal of liquid waste.

17. Data in Kampala shows willingness of urban residents to pay for solid waste (between 1,000 and 3,000 shillings (USD $0.3 – USD $0.9) in formal settlements and between 200 and 500 shillings (USD $0.06 – USD $0.15) in informal settlements to private collectors to collect)[14]. Landlords of most informal settlement houses also do not provide for solid waste management facilities for their tenants.

18. The inability to develop and enforce effective integrated waste management (IWM) regulation including the introduction of a tipping fee is a key factor that prevents the establishment of proper solid waste management systems as well as can serve as an impediment to implementation of waste-to-biogas technology.

Renewable energy sector

19. The Ministry of Energy and Mineral Development (MEMD) is pushing forward the use of renewable energy sources, in line with Uganda's Renewable Energy Policy. The policy aims to increase the use of renewable energy to 61% of the total energy consumption by the year 2017. Uganda's installed electricity generating capacity stands at 850 MW, with peak demand of 510 MW. The electricity mix is dominated by hydropower, with a 60% share, followed by fossil fuels (mainly heavy fuel oil and diesel) at 21% and other renewable sources at 19%. Uganda has one of the most liberalized power sectors in Africa. In 2001, the state-owned Uganda Electricity Board was unbundled into the Uganda Electricity Generation Company Limited (UEGCL), the Uganda Electricity Transmission Company Limited (UETCL) and the Uganda Electricity Distribution Company Limited (UEDCL). The unbundling also created a regulatory authority, the Electricity Regulatory Authority (ERA) overseeing the sector.

20. Uganda has approximately 1,400 - 1,500 km of transmission lines (over 33kV), which the government aims to double; there are plans to upgrade existing transmission lines and develop a 220kV "ring" around Lake Victoria in conjunction with Kenya and Tanzania. Distribution is regulated and cost-reflective tariffs are utilized. The average tariff to consumers is $0.17/kWh ($0.11/kWh for industrial users), with the first 15 units of power subsidized. Grid connection for Independent Power Producers is often wrought with grid connection costs including construction/engineering costs and permits and licencing.

21. Uganda has a renewable energy policy in place with renewable energy feed-in tariffs published and in use with an independent power sector regulator. The Renewable Energy Feed in Tariff (RE FIT) for biogas is USD $0.115 per kWh.[15] IPPs will sign a 20-year standardized power purchase agreement (PPA) with the Uganda Energy Transmission Company Limited (UETCL). In addition, the GET-FIT program offered qualified biomass renewable energy project developers a feed-in tariff top up of an additional USD $0.01 per kWh. This project has now concluded and there are no immediate plans for additional funding rounds. Although biomass / municipal solid waste is considered one of the priority renewable energy technologies in Phase 2 of the RE FIT program, under the baseline scenario, the application of biogas technology for MSW treatment and energy generation is expected to increase very slowly due to the barriers presented below and the lack of successful examples (See: Annex P for review of existing projects in the region). Moreover, the progressive implementation of the NEMA programme may translate into a lost opportunity if biogas energy technology is not included. GEF support is therefore particularly relevant as the waste sector currently lacks the required knowledge and expertise to integrate renewable energy technologies into the MSW management solutions offered under the baseline activities.

22. Independent Power Producers (IPPs) in Uganda enter into a Power Purchase Agreement (PPA) with the Uganda Electricity Transmission Company Ltd. (UETCL) and an Investment Agreement (IA) with the government. The PPA defines terms and conditions for grid access, priority feed-in of electricity and the commitment of UETCL to buy electricity at the Feed in Tariff (FiT) level determined by the Electricity Regulatory Authority (ERA). Bankable PPAs and IAs as well as the related Direct Agreements are key for successful structuring of independent power producers, especially when they are project financed. Uganda now has a standardized set of legal PPA documents. It is important to note that in order to conclude the PPA and connect to the grid, a minimum of 0.5 MW capacity is required (though there may be room for negotiation on this threshold). It is expected that Uganda will soon

[14] WaterAid Uganda, Solid Waste Management Study in Bwaise II Parish, Kawempe Division, 2011

[15] See Uganda REFIT Guidelines: http://www.getfit-uganda.org/app/download/3005814/Uganda-REFIT-Guidelines-2012-Final.pdf

become second only to South Africa as the country with the most independent power producers (IPPs) in Sub-Saharan Africa.[16]

Biogas digester technology:

23. The potential for waste-to-energy from organic waste and waste-water from municipalities and agro-processing industry is abundant in Uganda. In Uganda, as in the rest of East Africa (See Annex P), biogas technologies are largely found at the household level (low-tech). Medium sized (mid-tech) biogas technology is continuing to grow. There are fewer than 10 examples of large scale (high-tech) biogas installations in East Africa, of these they are not well known and their operation is often haphazard. In most, but not all cases, these initiatives are linked to some form of international assistance. In other cases, where these are self-financed systems, the driving force are the returns on investment because of either environmental laws that dictate the necessity of biogas technology or there are cost benefits over other forms of waste processing and disposal. In Uganda, as seems to be the case in the rest of East Africa, there is very limited experience with anaerobic digestion of the organic fraction of MSW.

Associated baseline projects

24. A number of government initiatives and strategies are underway in Uganda supported by international development organizations.

25. ***UNDP Uganda Sustainable, Inclusive Economic Development Programme***: The programmes main goal is to strengthen natural resources management, resilience to climate change and disaster risks, while expanding livelihood and employment opportunities for excluded groups. For sustainable development to occur, government's planned investments in the priority sectors must be matched with rapid progress in addressing environmental degradation, climate change and gender inequality. The Sustainable, Inclusive Economic Development (SIED) portfolio will strengthen capacities for natural resources management, climate change resilience and disaster risk reduction, whilst expanding livelihoods and creating employment opportunities through empowerment of youth, women and other vulnerable members of the population. The programme is aligned to the priorities of the National Development Plan (NDP II -2015/16-2019/20), whose priority sectors include agriculture, tourism; and minerals and extractives. The programme supports government in the areas of; i. Climate Change Response and Disaster Risk Reduction. ii. Inclusive Green Growth for Poverty Reduction (IGGPR).

26. The *Climate Change Response and Disaster Risk Reduction Programme* aims to support national efforts aimed at addressing these in time, the United Nations Development Programme's Climate Change Response and Disaster Risk Reduction Programme has been developed to focus on promoting climate resilient development. The programme will put emphasis on suppressing climate and disaster stresses on the economy by increasing capacity of selected communities to manage Climate change as well as natural disasters. This will be through; -

    - Integrating Climate Change Adaptation (CCA) and Disaster Risk Reduction (DRR) in government policies and legal frameworks;
    - Promoting policy implementation, planning, coordination, monitoring, and evaluation
    - Increasing capacities for adoption and adaptation of emerging technologies to combat climate change and disaster.
    - Empowering citizens to engage more in climate change mitigation.

27. The *Inclusive Green Growth Programme:* The objective of the programme is to support government's efforts natural resource management as well as livelihoods and job creation. This will be achieved through building and expanding capacities in natural resource management, particularly among women and the younger generations, in a way that promotes entrepreneurship, livelihood and job creation. Under this portfolio, UNDP will advocate for;

    - Improved livelihoods and expanded employment opportunities
    - Increased capacity, and improved accountability for sustainable natural resources management;
    - Empowered public and private sector institutions to effectively participate in East African regional peace and trade enhancement processes.

[16] GET Fit Uganda Annual Report 2014.

28. From a gender perspective, the SIED portfolio focuses on the following areas of intervention:

- Build capacities of women's organisations in providing training, advisory services and business networking skills to women entrepreneurs.
- Increase women's involvement in the design and implementation of programmes that promote decent green jobs and waged employment
- Harness women's local knowledge to protect, sustain and manage the environment and natural resources
- Support government agencies to integrate the gender perspective into the design and implementation of climate change strategies, mitigation and adaptation plans.

29. ***NEMA Composting Project:*** Recognizing the magnitude and urgency of the waste management challenge, the National Environment Management Authority (NEMA) initiated the Uganda municipal solid waste composting project in 2005, with the primary aim of improving the management of municipal solid waste by turning the biodegradable portion of the waste into compost manure for agricultural use through a cooperation agreement with 17 municipalities in the country. The project was registered in April, 2010 by the Clean Development Mechanism Executive Board (CDM EB) of the UNFCCC as a Clean Development Mechanism (CDM) Program of Activity PoA. Solid waste compost plants with an optimum capacity of 70 metric tonnes per day have been constructed in 12 municipalities. At the PIF stage the composting project was envisaged as the primary baseline initiative of the UNDP-GEF project. Research during project preparation revealed a number of issues at the composting sites. For example, (i) demand for compost seems low; (ii) there was no pre-sorting of organic material before reaching the site and thus the manual labour required to run such a system will likely be uneconomical. To date, the NEMA programme has not considered biogas energy plants in the selected municipalities. So there is an opportunity for the GEF project to link to and expand upon the activities under the NEMA project.

30. ***Promotion of Renewable Energy and Energy Efficiency Programme (PREEP):*** PREEP was commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) to support MEMD over the period 1999-2017. PREEP is supporting the renewable energy and energy efficiency private sector landscape. With the assistance of GIZ, PREEEP carries out the following: capacity building measures for MEMD as a contribution to improved policies, budget planning, monitoring and evaluation; energy policy advocacy; improvement of market structures for renewable energy technologies; promotion of energy efficiency; dissemination of renewable and energy efficient products and services; promotion of climate change mitigation strategies for government and private sector. Currently, the programme is also assisting MEMD to establish energy focal points in 17 pilot districts. Especially under its component "Market Structures", PREEEP has supported the development and sustainability of existing and newly established private sector associations, amongst them the Uganda National Biogas Alliance (UNBA). UNBA currently has four regional associations and represents over 160 members. Members include enterprises, engineers and dealers from the domestic as well as the institutional and commercial sector.

31. However, the PREEEP programme has not exploited the energy potential from MSW and sewage sludge and does not address specific barriers for renewable energy technologies.

32. ***Kampala Sanitation Program:*** The National Water and Sewerage Corporation (NWSC), assisted by the African Development Bank and KfW are developing the Kampala Sanitation Program including the construction and operation of Nakivubo Waste Water Treatment Plant (hydraulic capacity 45,000 m^3/day). The project comprises a comprehensive program incorporating sewer network expansion complemented by improved collection of sludge from pit latrines and septic tanks and sewage treatment particularly targeting the informal and unplanned areas of Kampala. The activities planned under this project will improve the sanitation condition of Kampala through collection of sewage generated in the densely populated parts of the city and subsequent treatment of the sewage to recommended standards for effluent discharge at the Nakivubo Waste Water Treatment Plant (currently under construction). The treatment plant includes the development of a biogas plant supplied by sewerage sludge, including a twin-engine biodigester. Research conducted during project preparation revealed that the digester will only work at 30% of its optimum capacity due to the nature of the feedstock and rate of supply to the digester being of lower quality and quantity than when designed.

33. ***Uganda Support to Municipal Infrastructure Development Program Project (USMID):*** The Ministry of Lands, Housing and Urban Development, with financial assistance from the World Bank is implementing the USMID project. The objective is to enhance the institutional performance of Local Governments (LGs) to improve urban service delivery. The program includes two grant flows to Municipalities: (i) the Municipal Development Grant (MDG) for investment in urban infrastructure, designed in such a way as to leverage and incentivize improved institutional and delivery performance of these bodies; (ii) the Municipal Capacity Building Grant (MCBG) which will provide Municipalities with the resources to access the capacity building inputs that are required for them to achieve the performance that the MDG will incentivize. The program will also involve a range of administration, oversight and support activities to be undertaken by the relevant central government entities responsible for the various elements of the implementation of the Program. The first phase of the USMID will run over a period of six years (FY 2013/14 – FY 2018/19) at a total cost of US$160 million. As part of the programme, IWM plans have been developed for 14 municipalities who have demonstrated the capacity to handle the increased investments under the programme.[17] However no consideration has been given to waste-to-energy opportunities, in particular the use of the organic component of municipal waste streams has not been considered.

34. Swedish International Development Cooperation Agency (Sida): Challenge Fund for Renewable Energy, Loan Guarantees and Portfolio Guarantees and Innovations against Poverty grants: The Swedish International Development Cooperation Agency is very active in providing financial support for renewable energy technologies. Sida is currently establishing a performance-based "challenge fund" grant mechanism for renewable energy. An entity yet to be selected will in turn manage the implementation of the fund. The 'Challenge Fund' will provide grant funding to SMEs that invest in or manufacture renewable energy technology including biogas for energy. Sida also offers a Loan Guarantees and Portfolio Guarantees mechanism for SMEs which invest in or manufacture renewable energy technology. The Portfolio Guarantees cover loans from conglomerations of SMEs whereas the Loan Guarantees cover one SME. Loan Guarantees are assessed on a case-by-case basis depending on need and relevance to Sida and the national development agenda. Portfolio Guarantees are negotiated with local banks that then issue loans to the SMEs or projects. The value of the guarantees has not yet been set. The guarantee programme will be implemented by a partner who will also provide Technical Assistance (TA) to SMEs linked to financing options for SMEs. The provision of loan guarantees is a separate contribution that aims at working with local banks (in case of portfolio guarantees) and individual developers (for big ticket loans). Linked to this programme, USAID is exploring options to provide TA to local financial institutions in order to develop capacity of staff to assess loans for renewable energy developers. These programmes also cover biogas for energy. However, no biogas energy projects have yet applied for funding under either programme.

35. Sida is also operationalizing the *Innovations Against Poverty (IAP)* grant programme. IAP is a broader grant programme targeting innovations in a couple of countries (Uganda being one of these countries for the upcoming phase). The size of grants is expected to be between EUR 50,000 and EUR 200,000 (USD $56,065 – USD $224,260). Funds are not earmarked for power generation exclusively. These funds are available to innovations in agriculture, renewable energy, water sanitation and hygiene (WASH). Further details are expected once the programme is officially launched.

36. ***KFW: Climate finance readiness support project:*** The Frankfurt School-UNEP Centre has been engaged by GIZ to support the Government of Uganda by assessing the costs, benefits and risks of obtaining access to climate funds, in particular the Green Climate Fund (GCF), under direct, regional, multilateral and international access. The team will review the international fund landscape and respective fund access requirements, as well as the capacity gaps of the national climate finance institutions to meet these requirements. The study will assess the aptness of Ugandan institutions to take on climate finance related tasks against guidelines and best practices set out by the GCF. This will lead to recommendations for the preparation of national institutions to access and implement climate funds in the medium to long term and contribute to the definition of roles and responsibilities of the different stakeholders to access climate finance.

[17] The municipalities include: Arua, Gulu, Lira (Northern Uganda); Soroti, Moroto, Mbale, Tororo, Jinja (Eastern Uganda); Entebbe, Masaka (Central); Mbarara, Kabale, Fort Portal and Hoima (Western Uganda).

37. ***SNV Netherlands Development Organisation*** has been involved in market development for biodigesters for the last 20 years – the focus has been and remains domestic digesters. SNV's programme has constructed close to 7,000 digesters. SNV provides a technical advisory role in the programme whilst the programme is implemented by Biogas Solutions Uganda ltd. SNV's training programme has delivered training to over 100 masons who have been trained on how to construct low-tech digesters and have some basic knowledge of the function of biodigesters.

38. ***Kampala Capital City Authority and IFC Integrated Solid Waste Management Project in Kampala:*** IFC is currently providing advisory services to the Kampala Capital City Authority for the implementation of an integrated solid waste management project in Kampala, which may include part or all of the following components:

- Waste collection
- Recycling and composting
- Landfill operations and closure of the existing landfill
- Construction and subsequent operations of a new landfill
- Beneficial use of landfill methane for generation of electricity and potential generation of Clean Development Mechanism carbon credits.

39. IFC assistance will cover all project pre-investment activities including due diligence review, transaction structuring, marketing and promotion, contract preparation and development of bid/tender documents, as well as supporting the client during the bidding process up to the award of the concession contract. IFC hopes to work with UNDP to integrate a biodigester in the new landfill.

Barrier analysis

40. While there are clear benefits for integrated waste management, there are a number of barriers in place impeding the widespread application of effective waste management practices, including biogas energy technology and wastewater treatment. These include barriers are related to:

41. Institutional capacity (related to the waste management sector)

- Budgetary allocations for waste management are low. Waste management receives less than 10% of urban authority budgets. As a result, Urban Councils are generally ill equipped and lack the technical and financial capacity to successfully manage waste. It also means that many urban centres lack functioning solid waste and wastewater management systems, let alone an organized recycling system.
- The waste sector is plagued by inefficient institutional coordination and a lack of cooperation among stakeholders in MSW management. In many cases, there are overlapping mandates between the environment agencies and local government authorities with respect to licensing and monitoring of solid waste management operations.

42. Technical capacity

- Lack of technical capacity to carry out key project activities such as the preparation of bankable feasibility studies and market assessments. Locally the market is thin on project finance skills.
- In Uganda, as seems to be the case in the rest of East Africa, there is very limited experience with anaerobic digestion of the organic fraction of MSW. In particular, there is limited capacity in terms of the control over feedstock. Biodigesters require a stable flow of feedstock, elimination of potential biological and chemical inhibitors such as heavy metals and antibiotics, as well as adequate process control over temperature and moisture. As a result, it is likely that additional investment in equipment and control systems as well as adequate training of operators is necessary. Furthermore, there is currently little control over logistics of organic waste streams including the option to process only waste streams from selected, controlled sources such as slaughterhouses and markets or co-digestion from multiple sources, which should be viewed as an integral part of a MSW biodigester facility.
- Additional investment in equipment and control systems, training of operators, as well as integrated logistics controls are particularly important for the practical aspects of high-tech biogas project implementation and

operation. This is largely attributable to the limited level of exposure to high-tech biogas technologies by decision makers and construction, operation and maintenance personnel. Whilst there is some theoretical knowledge of high-tech biodigesters in Uganda, operational and practical knowledge is lacking. Biogas Technology is by nature interdisciplinary. One has to understand (to varying degrees) many different disciplines linked to biodigester operation such as engineering, biology, physics, mathematics, agriculture, sociology and economics. One also needs numerous handicraft skills like plumbing, information technology, and construction skills. In Uganda, the main element missing for high-tech digesters to be implemented, operated and scaled up is the know-how and experience.

43. Technology

- Municipalities are hampered by the fact that they have inadequate equipment and solid waste handling facilities. In the largest municipalities, technology for waste sorting, including recycling is non-existent, and sorting by hand is largely done by the informal waste sector.
- There is a lack of successful examples of biogas-based, on-grid electricity generation. For those examples that do exist, there have been a number of technical difficulties, particularly in regards to operational aspects. There is no experience in Uganda with the legal, operational and financial structuring of biogas energy projects in the MSW sector. This is linked with all other barriers.

44. Information barriers

- Linked to technological barriers, and the lack of successful examples of biogas-based, on-grid electricity generation, stakeholders in the waste sector generally have limited knowledge of waste-to-energy systems. The majority of municipalities and waste operators are aware of the potential uses of biogas production from MSW streams, however they do not fully understand the technology. All stakeholders, including the MEMD team, lack information about technical, legal, economic and financial aspects of biogas energy projects.
- Information barriers were also identified in respect to coordination and the exchange of information between key stakeholders including government institutions. As a consequence, existing human and institutional capacities are not always effectively used or made available to project proponents in the provinces.
- Weaknesses were also identified with respect to specific know-how in the field of energy, necessary to ensure effective project development and for engaging policy makers at the policy framework level necessary to support MSW-based biogas.

45. Policy, legal and regulatory

- Across Uganda, key policy and enforcement gaps exist in municipal and city council Solid Waste Management Ordinances. For example, Section 5(1) of the Kampala Solid Waste Management ordinance prohibits depositing of waste anywhere it may become a public health nuisance. However, the ordinance is insufficiently enforced despite the existence of law enforcement officials and the threat of fines and imprisonment. This is because the process of enforcing the penalty takes a long time, leaving many who dump waste illegally unpunished. The ordinance also proposes a fee for solid waste to be borne by the generator of solid waste. However, it does not provide a mechanism for collecting these fees – making fee collection unrealistic.
- The growing populations and industries in municipalities in combination with no mechanism for fee collection and a lack of enforcement under municipal ordinances leaves an increasing volume of solid waste generated in municipalities unchecked.
- The current policy and market framework for renewable energy projects is focused on wind, solar and hydro-electric technologies. No special concessions are made for biogas technologies and their potential benefits. Benefits of avoided externalities are not monetized under the current policy and market framework. Systemic factors (investment climate) and regulatory and technical constraints (grid access and transmission infrastructure) would need to be addressed in parallel.

46. Finance

- The municipal sector in Uganda is extremely cash constrained with very limited resources to invest in infrastructure. Private sector investment (likely through public private partnerships and the involvement of leveraged finance from financial institutions) would be necessary to develop municipal biogas projects. Furthermore, a lack of equity of local project developers during the project start-up phase is also an issue. As there are currently no grid-connected biogas plants in Uganda and only limited experience with biogas plants for the waste sector, the local commercial banking sector is not familiar with this type of project. Consequently, financial institutions are reluctant to provide financing for these investments and a considerable amount of paperwork and research is required before offering a loan.

- During project preparation, pre-feasibility analyses were carried out on potential municipality biogas projects (see Annex N): The results of economic and financial analyses on biogas reveals they are economically viable but not financially viable without a grant and/or a substantial tipping fee. Whilst sources of potential municipal solid waste and waste water for power production were identified, in order to realize this level of potential, private sector investment (private-public partnerships) likely in combination with leveraged finance from financial institutions would be necessary. Non-leveraged Internal Rates of Return (IRRs) were estimated to be in the range of 10 – 11% without an off-taker fee for waste (a tipping fee) and 12-13% with a tipping fee of US $5.00 per tonne of organic waste. Leveraged IRRs with a grant provided by the UNDP-GEF project could reach 17 – 20% (depending upon financing terms). Leveraged IRR without a grant and a 40%/60% equity-to-debt ratio would be approximately 14%. Based upon experience in other markets, it is estimated that a discount rate of at least 20% should be applied – meaning that an investment without a grant is unlikely to be sufficiently attractive.[18] Similarly, efforts to mobilize private sector investment for other renewable energy projects and rural electrification in Uganda have also proven unsuccessful due to insufficient financial returns. A World Bank project on rural electrification found that early efforts to mobilize private sector to invest in rural electrification were unsuccessful due to insufficient financial returns.[19] For this reason, public sector engagement at the national and local level is important to ensure market conditions are improved to attract private sector investment in municipally based biogas projects.

47. Delivery models

- Linked to the above finance barriers, there is a lack of economically and financially viable business models. In Uganda there are no examples of public private partnerships (PPPs) for MSW-based biogas production. PPPs can play an important role for market development of MSW-based biogas systems. Models should focus on maximization of potential benefits and revenues, and rationalization of operation to minimize operational costs. The municipality and the concessionary can share revenues, thereby contributing to making the local waste management operations more sustainable. PPPs can fit into an integrated approach to organic waste streams by processing organic waste at the point of origin with potential reintegration of residues into local productive systems (as is the case with wastewater from sugar cane production and other such agro-processing industry).

[18] The discount rate to be applied is consistent with the prevailing rate in Ghana for example: See http://www.sciencedirect.com/science/article/pii/S1110062116300940. In more advanced markets such the U.S. the discount rate could be as low as 8%: See for example http://www.tandfonline.com/doi/full/10.1080/23317000.2014.969456, or in Greece, a discount rate of 12% is applied: See https://eclass.duth.gr/modules/document/file.php/TMC233/%CE%92%CE%B9%CE%B2%CE%BB%CE%B9%CE%BF%CE%B3%CF%81%CE%B1%CF%86%CE%AF%CE%B1/Investment%20tool%20for%20biogas%20production%202010.pdf. However, given that the market for waste is not as mature in Uganda, a higher discount rate is appropriate. A discount rate of 20% is also consistent with experience with investors in other developing markets by the experts involved with developing the project proposal.

[19] World Bank Project Information Document, accessed 19/07/16, see:http://www-wds.worldbank.org/external/default/WDSContentServer/WDSP/AFR/2015/04/15/090224b082dcabbf/1_0/Rendered/PDF/Project0Information0III000P133312.pdf

This approach would avoid organic waste ending up as a public liability. However, there currently is a lack of support for PPP in the waste sector.

- Up until now, there has been very limited private sector engagement in the waste sector, with the exception of waste collectors under licence by local authorities. Where solid waste management infrastructure exists, it is owned, controlled and operated by local government authorities, and the system is generally inefficient and usually does not reach a large percentage of town and city residents.

48. Awareness

- There is inadequate awareness of industry and households on the importance of reducing waste and disposing of waste properly due to inadequate sensitization.
- There are currently no avenues for effective community participation in waste management planning.

III. STRATEGY

Approach of the project

49. Work conducted under the Project Preparation Grant (PPG) was aimed at complementing information and validating the underlying assumptions of the Project Identification Form (PIF), as well as engagement with counterparts. Based on the findings of the PPG some adjustments were made to respond to the changes in Project context and the needs identified, as summarized in the following paragraphs.

50. The original PIF assumed that the market conditions could easily be established to pilot MSW-based electricity generation through public private partnerships in Jinja, Mbare and Mbarara. However, technical and financial screening during the PPG phase revealed that demonstration sites in these municipalities were not technically or financially feasible as the market context was less developed than assumed at PIF stage. A prefeasibility assessment, including technical assessment and financial modelling revealed that demonstration sites in demonstration sites in Ugandan municipalities (with the exception of the new Kampala landfill) were not technically or financially feasible due to: a lack of investment capital; low capacity to implement projects (for example the municipal composting project); and, an inability to attract private sector investment due to unattractive internal rates of return (IRR) on investments given the current market situation. For more information, see Annex N. In response to this strengthened understanding of the development challenge, it is considered that the most appropriate response is to adjust the project approach to one of staged demonstration of biogas for energy generation, capacity development of municipalities, market facilitation and municipal level project pipeline development to ensure delivery of outcomes are robust and remaining project risks are controlled. The project aims to facilitate innovation and technology transfer, with supportive policies and strategies.

Theory of Change

51. As outlined in the Development Challenge, market conditions for MSW-based biogas are such that municipal based demonstration plants are not currently technically or financially feasible (the exception is the proposed Kampala landfill). As it stands, planned developments in the waste sector will not adequately consider the calorific potential of the organic component of waste streams, waste-to-energy solutions or the mitigation of GHG emissions from waste. Importantly, the technical capacity to integrate high-tech biogas technology solutions into integrated waste management plans does not exist, and available finance for renewable energy technologies does not target waste to energy systems. While the PIF proposed the establishment of demonstration plants in three municipalities, a prefeasibility assessment, including financial modelling of the three proposed sites as well as other potential municipal MSW biogas sites revealed that municipal pilot projects were not financially or technically recommended

at the sites identified in the PIF. This was due to: a lack of investment capital; low capacity to implement projects (for example the municipal composting site project); and likely difficulties in setting up a system to obtain sufficient feedstock. For more information, see Annex N. As such, the project, with the support of UNDP and key project partners, takes a strategic and staged approach.

52. The projects theory of change approach, including linkages between the development challenge and the immediate, underlying and root causes as well as the implementation of the UNDP strategy and development goal, is presented schematically in Figure 1 which describes the barriers to a functioning market as well as the interventions within the project to remove those barriers.

Institutional strengthening and capacity building

53. Firstly, interventions aim to increase the institutional and technical capacities of selected municipalities for effective IWM of municipal waste and wastewater. Capacity development is a fundamentally important aspect of the initiative in order to bring about the sought after transformation in how waste is managed. Technical assistance by an appropriate expert team will support capacity building activities for municipalities, NEMA, MEMD and MLHUD, as well as to prepare the amendments required for integration of biogas energy into relevant national policies, plans and associated processes at national and municipal level.

54. At the municipal level waste management plans have a key role to play in achieving sustainable waste management. The USMID Project's recent work has included drafting of IWM plans for the 14 municipalities. However, due to capacity constraints and a lack of information these plans have largely not included considerations of waste-to-energy potential. For those 14 municipalities with drafted IWM Plans, quality data related to the quantity and composition of waste streams is lacking. Where necessary the UNDP/GEF project experts will review and compile existing data (and supplementary data where necessary) on organic quantity and composition of waste streams in preparation for updating of the IWM plans to include waste to energy considerations.

55. Fundamentally important to a sustainable business model for IWM and MSW-based biogas business models are disposal/off-taker fees for waste disposal. Therefore, the project will provide targeted municipalities with necessary technical assistance to introduce disposal/off-taker fees for waste disposal.

56. In order to promote MSW biogas technology among municipalities, project developers, industry and the general public a sensitisation campaign will be conducted on the importance of sustainable waste management in general and on the benefits of MSW biogas technology.

57. Sustained commitment of national authorities, provincial and municipal stakeholders as well as support to integrate biogas energy systems into national and municipal level programmes and ordinances are critical factors to achieve this intended change.

Demonstration and investment

58. The second phase of the project focuses on demonstration and investment, with the aim to address barriers related to technical and financial feasibility as well as reconcile the fact that there are currently no feasible delivery models and PPPs for MSW-based biogas plants in operation. The project intends to (I) Demonstrate the productive use of organic components of municipal and agro-processing waste streams, wastewater and sewerage sludge; (II) Demonstrate their technical maturity and the sustainability of the chosen business models; (III) Generate operational experiences for further optimization and as input for policy development.

59. The project will provide financial and technical assistance to operational and currently planned biogas facilities, to utilise the organic component of MSW streams. The project will demonstrate the technical and financial feasibility of high-tech biogas plants using three innovative types of business model including integrated wastewater treatment, municipal waste management, and agro-processing wastes. In parallel, the project will address the identified barriers hindering successful establishment and operation of MSW-based biogas plants including:

- Policy framework barriers: will be overcome by including financial incentives such as tipping fees and tax incentives as part of operational business models;

- Technical and regulatory barriers: related to permitting procedures, power purchase agreements and grid connection of biogas systems will be overcome by providing technical assistance to overcome these issues
- Financial barriers: will be addressed by providing investment financing for the three demonstration plants
- Capacity barriers: will be addressed by providing training and support for local operators of MSW-based biogas energy systems.

60. The first two phases of the project will establish technical capacity, create enabling policy conditions and promote biogas technology and business models amongst municipalities and agro-processing partners leading to increased demand and capacity for MSW-based biogas systems. The project will drive demand and capacity for MSW-based biogas energy systems based on standardized systems and approaches (with context adapted systems and approaches) to ensure quality is maintained.

61. Critical factors to achieving the demonstration of viable business models for MSW-based biogas include: (I) sustained commitment of national authorities and provincial and municipal stakeholders; (II) project activities can be implemented as planned; and, (III) adequate technical and operational performance of installed biogas systems.

Scaling up the use of MSW-based biogas technologies and knowledge management

62. In the third phase, once their technical, operational and economic feasibility has been demonstrated, the focuses on scaling up the use of MSW-based biogas technologies through the establishment of a grant and technical assistance fund to address financial and technical barriers preventing the establishment of MSW-based biogas plants and PPP. The fund will be available to project developers, financial institutions (FIs) and international financial institutions (IFIs). The eligibility of biogas technology may be a point of negotiation with a number of IFI lenders for private sector projects (including PPPs). Consequently, access to finance will be removed as a barrier to develop the market for MSW-based biogas and a pipeline of MSW based biogas plants (based on business models demonstrated earlier) will be developed.

63. By the time of project closure, it is expected that: (i) the installed demonstration MSW-based biogas energy systems will be in operation and technically reliable; (ii) a pipeline of MSW-based biogas projects has been identified, with technical support provided to at least 5 additional municipalities with investment capital mobilized; and (iii) lessons learned from pilots have been documented and disseminated. Lastly, in order to ensure scalability and replication of successful pilots, the project will assist with the development of a long-term municipal biogas plan and knowledge management products (e.g. lessons learned studies) will be developed, compiled and disseminated.

Alignment with UNDP Uganda, country programme (2016-2020)

64. The project theory of change is aligned with that of the UNDP Uganda, country programme (2016-2020)[20] contributing to the Uganda Sustainable, Inclusive Economic Development Programme supporting the government in the areas of Climate Change Response and Inclusive Green Growth for Poverty Reduction (IGGPR). Specifically, the project contributes to the goal of the Climate Change Response and Disaster Risk Reduction Programme by empowering citizens to engage more in climate change mitigation. Likewise, the project contributes to the Uganda Inclusive Green Growth Programme by expanding capacities in natural resource management, particularly among women and the younger generations, in a way that promotes entrepreneurship, livelihood and job creation as well as increasing women's involvement in the design and implementation of programmes that promote decent green jobs and waged employment (for more details see: Annex G: Environmental and Social Management Framework (ESMF). Likewise, indicators from the country programmes "Results and resources framework for Uganda (2016-2020)" are integrated into the UNDP/GEF results framework (see: Annex VI).

[20] UNDP Uganda, country programme (2016-2020). See: http://www.africa.undp.org/content/dam/rba/docs/Programme%20Documents/uganda-CPD-2016-2020-en.pdf

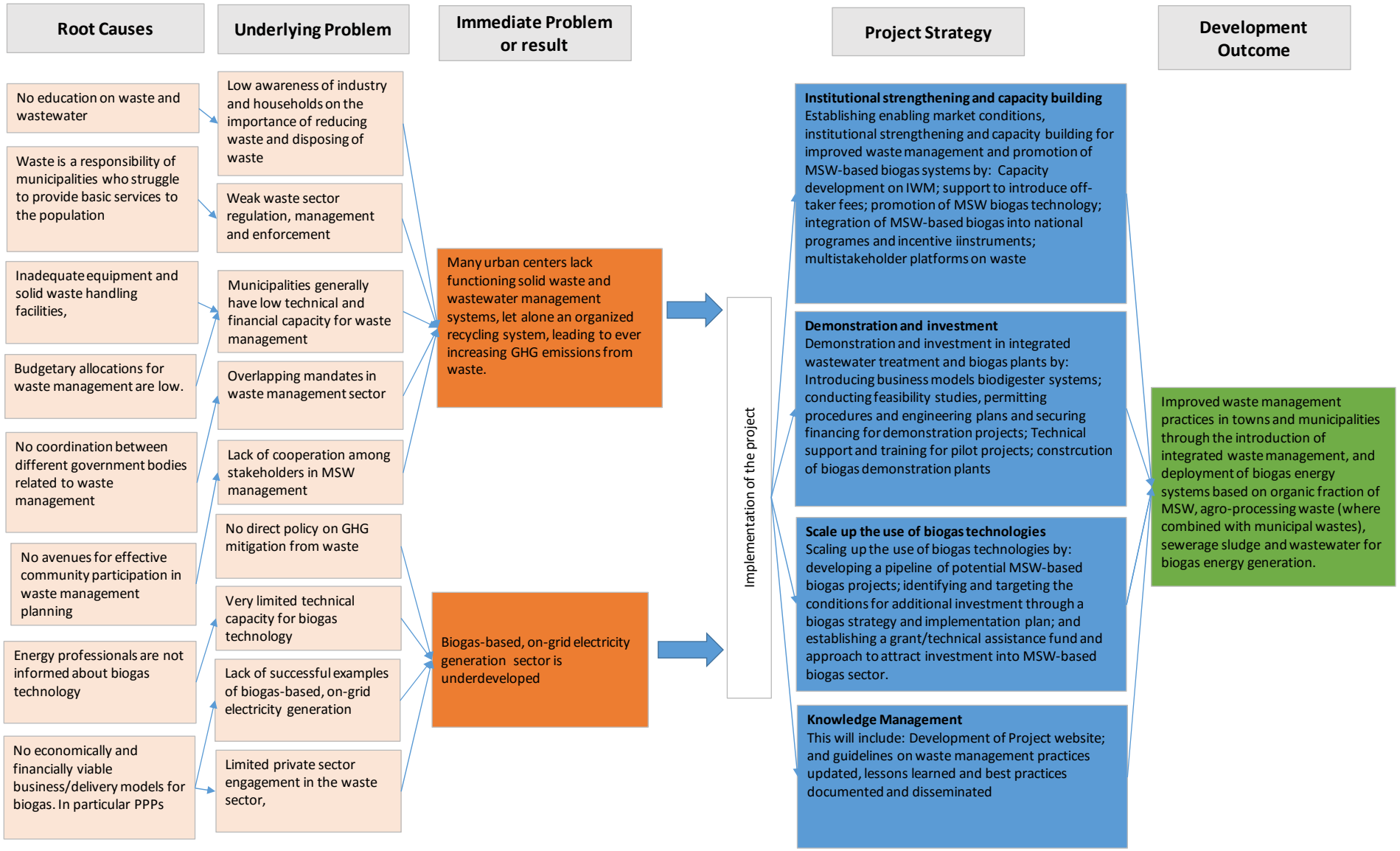

Figure 1: Theory of Change diagram for the project – including root causes, barriers / underlying problems, and project strategy to remove those barriers.

IV. RESULTS AND PARTNERSHIPS

i. Expected Results:

Project Objective:

65. The overall objective of the project is improved waste management practices in towns and municipalities through the introduction of integrated waste management, and deployment of biogas energy systems based on organic fraction of MSW, agro-processing waste (where combined with municipal wastes), sewerage sludge and wastewater for biogas energy generation.

Expected benefits:

66. Relevant global environmental benefits include support to transformational shifts towards a low-emission and resilient development pathway. With a total installed capacity of at least 2.90 MW at the demonstration sites, it is estimated that together the three biogas plants will produce about 20,300 MWh of electricity per year. The grid emission factor in Uganda has been estimated as 0.550 tCO_2/MWh.[21] Thus, the annual GHG emission reductions would be approximately 11,165 tonnes of CO_2eq from producing renewable energy. Over the expected useful life of the biogas plants of 20 years, the direct GHG emission reduction from the GEF project from producing renewable electricity would be 223,300 tonnes of CO_2eq.

67. Additionally, the burning of biogas (which contains methane) results in a significant reduction on CO_2eq since every tonne of methane has a warming potential of 21 times that of CO_2. It is estimated that for every MWh of electricity produced, 3.80 tonnes of CO_2eq reduction would occur due to the reduction of methane which would otherwise be produced through decomposition of organic wastes in landfills. The annual direct emissions reduction from the elimination of this methane is estimated to be 77,150 tonnes of CO_2eq. Over a 20-year lifetime of a plant, the total emissions reductions due to methane avoidance would be an additional 1,542,000 tonnes of CO_2eq. Combining the reductions from renewable electricity production with the methane reduction, the annual benefits would be 88,315 tonnes CO_2eq – or 1,766,000 tonnes CO_2eq over a 20-year investment period.

68. Using a conservative replication factor of 2 based only on the direct GHG reductions from renewable energy, the consequential GHG emission reduction using the bottom-up approach would be 3,533,000 tonnes of CO_2eq. Using a top-down approach, the consequential GHG emissions reductions are estimated to be 3,771,000 tonnes of CO_2. Additional detailed calculations are provided in Annex L.

69. In addition to global environmental benefits, biogas interventions also have many positive impacts on the local environment. Biogas production reduces landfill waste and as a result, it can dramatically reduce odours. The use of an anaerobic digester can protect water quality since it lowers pathogen levels. Moreover, the bio-fertilizer by-product is a nutrient-rich fertilizer that can be used in the agricultural sector to increase crop yield. Biogas production also brings many economic benefits. It can create jobs, it turns a cost item (waste treatment) into a revenue-generating opportunity, and it can operate in conjunction with composting operations.

Project structure:

70. The project is comprised of four interrelated components that together will translate the strategy outlined in section III into the impacts the project is expected to achieve. The four following components that have been designed to systematically address the relevant barriers previously identified in Section II.

Component 1: Establishing enabling market conditions, institutional strengthening and capacity building for improved waste management and promotion of MSW-based biogas systems

71. Financing: US $250,000 requested from the GEF and US $588,000 co-financing.

[21] Based on CDM combined margin approach, from IGES database as cited in the GEF EE tool here: http://www.stapgef.org/revised-methodology-for-calculating-greenhouse-gas-benefits-of-gef-energy-efficiency-projects-version-1-0/

72. The objective of Component 1 is to enhance the knowledge, technical and managerial capacities of Ugandan municipalities, NEMA and MLHUD to support the deployment of biogas energy systems based on organic fraction of MSW, agro-processing waste (where combined with municipal wastes), sewerage sludge and wastewater for biogas energy generation. Given the decentralized nature of waste management, support is necessary at both the municipal and national level to address the identified policy, regulatory and market constraints for MSW based biogas systems.

73. GEF funding under this output will be used for technical assistance by an appropriate expert team to support capacity building activities for municipalities, NEMA, MEMD and MLHUD, as well as to prepare the amendments required for integration of biogas energy into national policies and municipal ordinances. The expert team will also provide assistance to activities related to the establishment of financial incentive instruments under Component 1. The expert team will design and submit proposals to enhance the regulatory framework to promote increased uptake of IWM and biogas technology. The expected composition of the expert team is described in Annex E under the Terms of Reference for key roles in the project.

74. The baseline project for Component 1 is the MLHUD, USMID Programme, which is supporting 14 municipalities who have demonstrated the capacity to handle the increased investments under the programme as well as to develop IWM plans. Likewise, given that the current market situation for MSW-based biogas is in its infancy, the UNDP/GEF Project will specifically focus on a selected five of these municipalities likely to be selected out of the following: Kampala, Jinja, Mbale, Mbarara, Gulu, Masaka who have sufficient waste for MSW-based biogas projects and have shown willingness and capacity to participate in the baseline IWM (USMID) project.[22]

Output 1.1 Capacity development of municipalities other waste sector stakeholders on integrated waste management

75. Capacity development is a fundamentally important aspect of the initiative in order to bring about the sought after transformation in how waste is managed. Capacity development activities will include workshops and exchange visits between municipalities and will cover topics such as the importance of effective waste management, waste flow surveys, waste management planning, the importance of introducing disposal/off-taker fees, potential technology options, attracting investment, and participatory approaches as well as exchanges/learning visits between municipalities. As part of the monitoring and evaluation plan for the project, the municipalities' awareness of biogas technology and capacity to undertake IWM will be assessed in an objective manner at the outset and termination of the project (likely via a self-reporting survey).

Activity 1.1.1 – Workshops for municipalities and other waste sector stakeholders

76. Five 2-day workshops will be provided to municipalities and other waste sector stakeholders with the aim of: i) developing their capacity to undertake IWM in line with their IWM plans; and ii) implementing and managing MSW-based biogas measures. Three national training days held in Kampala will cover the following topics: effective waste management, waste flow surveys, waste management planning, the importance of introducing MSW disposal/off-taker fees, potential technology options, attracting investment, and participatory approaches, among others. The Urban Authorities Association of Uganda (UAAU) will provide training programme administration, training facilities and coordinate with municipalities.

Activity 1.1.2 – Exchange visits between municipalities

77. Early mover municipalities (those who begin to develop biogas projects) will play host to exchanges/learning visits from other municipalities who show initiative to develop biogas projects. Exchanges/learning visits will be facilitated by the UAAU. It is expected that 3 such exchange visits will occur.

[22] If the Project Board decides that these municipalities are no longer appropriate for the implementation of the project (due to a lack of demonstrated commitment, difficulties with the commitment co-financing, or other considerations deemed to be sufficiently problematic by the Project Board) a decision can be taken by unanimous consent of the Project Board to change the municipalities in which the project will focus its resources.

Output 1.2 Support towns and municipalities on the design and development of waste management plans and introduction of MSW disposal/off-taker fees

78. Waste management plans have a key role to play in achieving sustainable waste management. Their main purpose is to give an overview of all waste generated, by specific waste streams, and treatment options for the waste by the various actors along the waste management value chain (see Figure 2).

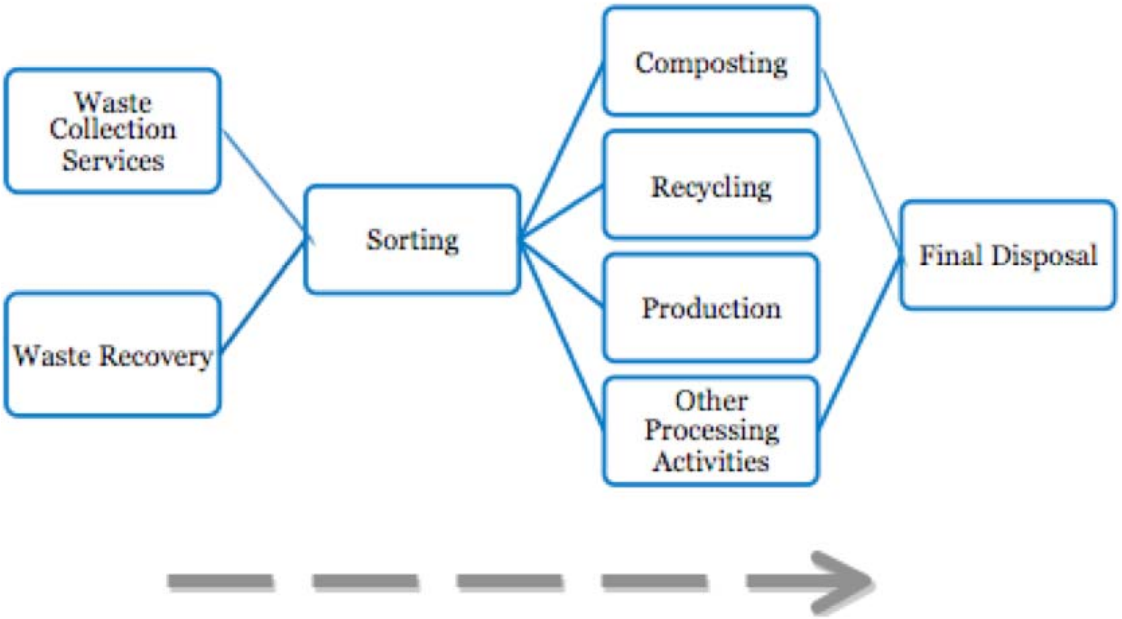

Figure 2: Waste Management "Value Chain"

79. The original project design envisaged providing support to municipalities in collecting data related to the quantity and composition of waste streams in their jurisdiction (to support feasibility analysis for MSW-based biogas projects) as well as providing guidance in developing Integrated Waste Management plans, including the selection of appropriate technology. Since PIF submission, the Ministry of Lands, Housing and Urban Development (MLHUD) Project *"Uganda Support to Municipal Infrastructure Development"* (USMID) has been working with 14 out of the 22 municipalities who have demonstrated the capacity to handle increased investments under the programme.[23] The USMID Project's recent work has included drafting of IWM plans for the 14 municipalities. However, due to capacity constraints and a lack of information these plans have largely not included considerations of waste-to-energy potential. For those 14 municipalities with drafted IWM Plans, quality data related to the quantity and composition of waste streams is lacking.

80. Fundamentally important to a sustainable business model for IWM and MSW-based biogas business models are disposal/off-taker fees for waste disposal. The PIF did not include the need for MSW disposal/off-taker fees that are important for improving the business case for waste disposal – aiding in the financial sustainability/profitability of biogas projects. Related to these issues, the following activities will be undertaken:

Activity 1.2.1 – Review and compile existing data on organic quantity and composition of waste streams for IWM plans for five municipalities (where necessary) to include waste to energy considerations

81. USMID is currently undertaking a diagnostic assessment of the waste management value chains and will soon complete IWM plans for the 14 municipalities. In the next step (early 2017), USMID/MLHUD will begin strategic action planning for the implementation of the IWM plans and will work alongside UNDP to include provisions for waste-to-energy considerations in the waste collection, sorting and production sectors of the waste stream. The

[23] The municipalities include: Arua, Gulu, Lira (Northern Uganda); Soroti, Moroto, Mbale, Tororo, Jinja (Eastern Uganda); Entebbe, Masaka (Central); Mbarara, Kabale, Fort Portal and Hoima (Western Uganda).

International Waste Management expert and National Waste and Biogas expert will review the IWM plans for five municipalities for data set completeness on the organic quantity and composition of waste streams. Where necessary the experts will review and compile existing data (and supplementary data where necessary) on organic quantity and composition of waste streams in preparation for updating of the IWM plans under activity 1.2.2.

Activity 1.2.2 – Provide guidance in updating and developing waste management plans including the selection of appropriate biogas technology

82. Following the review of IWM plans and collection of supplementary data, the International Waste Management expert and National Waste and Biogas expert will then provide recommendations for biogas production from liquid and solid waste including the selection of appropriate technology for the five selected municipalities. Support will also be provided by the National Institutional Development Expert to assist municipalities introduce regulations and compliance for resource separation of waste streams.

Activity 1.2.3 – Support to introduce MSW disposal/off-taker fees and enforcement frameworks at the municipal level

83. The International Waste Management expert and National Waste and Biogas expert will support the five municipalities to introduce MSW disposal/off-taker fees. Activities will include conducting analysis of "willingness to pay," providing recommendations for changes to local ordinances to include disposal/off-taker fees and recommendations for enforcement frameworks. Options will also be explored to include existing waste collectors in the model of fee collection under activity 2.1.1 and applied in activity 2.2.2.

Output 1.3 Promotion of MSW biogas technology among municipalities, project developers, industry and the general public

84. A sensitisation campaign will be conducted on the importance of sustainable waste management in general and on the benefits of MSW biogas technology in particular, involving the municipalities, project developers, agro-processing industry and the general public. One of the key principles of the campaign is that waste management is not only about compliance but also a social responsibility that eventually leads to behavioural change. The following activities will be carried out to achieve this output:

Activity 1.3.1 – Development of sensitisation campaign

85. The National Communications Expert will (in cooperation with the rest of the expert team) develop: i) a strategy for the sensitisation campaign; ii) promotional materials including producing brochures, and technical assistance to develop materials; and, iii) hold numerous public events (likely 2 each in 5 municipalities over the project period – with a total of 10 events) with a wide range of stakeholders invited and aligned with activity 1.1.1. Local project partners will be responsible for delivery of the campaign. The Private Sector Foundation Uganda (PSFU) will represent the national partner in private sector development and will promote the benefits and value chain of municipal solid waste based biogas plants to private sector stakeholders. Representing municipalities, the UAAU will promote biogas technology among municipalities whilst the Uganda Manufacturers Association will promote biogas technology amongst its members.

Activity 1.3.2 – Training of promoters of IWM and source separation and the development of guidelines

86. As part of the sensitisation campaign, the National Waste and Biogas expert will identify IWM and source separation promoters who will be selected from stakeholders present or employed at waste collection and generation points such as markets in the five municipalities. The project will provide two 2-day training days in Kampala for these promoters. The project will also develop guidelines for separation of the organic component of waste streams to be distributed at waste collection and generation points.

Output 1.4 Integration of MSW-based biogas in national policies, programmes and incentive instruments targeting renewable energy development, environmental protection and climate change mitigation

87. This output will ensure that MSW-based biogas technology is mainstreamed into national level sectoral strategies, policies and programmes as a valuable asset for energy generation, the treatment of effluents and organic waste streams from municipalities and agro-processing industry, reducing GHG emissions and mitigation of local nuisance and health hazards caused by waste. The project team will design and submit proposals to relevant the teams from

MLHUD, NEMA, MEMD, NWSC, Ministry of Finance, Planning and Economic Development (MFPED) and the Department of Climate Change (DCC) to enhance the regulatory framework for MSW biogas in coordination with incumbent authorities and ministries. The expert team will then assist these ministries to prepare the amendments required for integration of biogas energy into national policies, strategies and incentive instruments.

88. The expert team will play a key role in promoting inter-institutional coordination and linkages with energy policy, waste management issues, climate change policy and environmental protection. The expert team will act as a task force capable of promoting the waste-to-energy agenda among a variety of high-level stakeholders and creating champions of IWM and MSW-based biogas projects.

Activity 1.4.1 – Incentives introduced into national policy, legal and regulatory environment to promote increased uptake of IWM and biogas technology

89. The project expert team will design and submit proposals to enhance the regulatory framework to promote increased uptake of IWM and biogas technology. The framework required for a conducive policy, legal and regulatory environment to attract private sector investment should contain such incentives as guarantees or risk hedging mechanisms, tax rebates, subsidies, favourable power purchase/pricing terms, forex exchange conversion terms among others. However, the policy framework should also allow for Government's pro-active implementation of desirable projects, which may not have attracted the private sector to date. The private sector can then be brought on board for management and operations of the project. Depending on the circumstances of the project, the private sector could be a profit oriented company, a cooperative, a community, or an NGO. Specific incentives could include, for example specific tax regimes that favour renewable energy such as five-year tax-free importation of machinery and equipment (from licensed manufacturers, who have a patent), preferential tax treatment, tax exemption and accelerated depreciation.

90. With the assistance of the expert team, GIZ will also engage with the MFPED in regards to financial incentives (tax breaks, removed tariffs etc.) in support of biogas technologies.

Activity 1.4.2 – Review draft National Solid Waste Management Plan and provide updates and recommendations for inclusion of biogas systems where necessary

91. MLHUD are currently drafting a national solid waste management plan (not covering liquid wastes and at present not considering waste-to-energy potential). The expert team will review and assist with the drafting of sections of the National Solid Waste Management Plan related to waste-to-energy. Specifically, they will provide recommendations for the inclusion of specific resolutions in the legislative framework under competence of MLHUD and NEMA in relation to mandatory use of biodigester technology for specific organic waste streams as part of MSW installations funded by the MLHUD programme (if financially and technically feasible).

Activity 1.4.3 – Recommendations made for IWM enforcement strategy in line with the draft National Solid Waste Management Plan and environmental protection legislative framework

92. The national and international waste management experts will provide recommendations to MLHUD and NEMA for a draft enforcement framework for solid waste management including provisions to encourage waste-to-energy.

Activity 1.4.4 – Policy advocacy for private sector and recommendations made for renewable energy and electricity regulation

93. A number of market constraints were identified related to the regulatory framework for renewable energy and IPPs. In order to overcome such market constraints, the expert team will provide policy advocacy activities for private sector project developers making recommendations for renewable energy and electricity regulation related to biogas to relevant ministries.

94. The expert team will also support a number of organisations who currently provide policy advocacy activities to the private sector, IPPs and municipalities. Policy advocacy activities in support of the project include:

95. Policy advocacy is one of the key pillars of GIZ's Promotion of Renewable Energy and Energy Efficiency Programme (PREEEP) programme. GIZ will support the project by providing policy advocacy for high-tech biogas investors and independent power producers with issues such as feed-in tariffs, red tape issues around grid connection,

environmental impact assessments amongst other issues with government stakeholders, in particular MEMD, NEMA and the Electricity Regulatory Authority (ERA). GIZ will also support the project to engage with the MFPED in regards to financial incentives (tax breaks, removed tariffs etc.) in support of biogas technologies under activity 1.4.1 In addition, capacity development support will also be provided by GIZ to MEMD for improved policies, budget planning, monitoring and evaluation for biogas sector development.

96. PSFU can provide policy advocacy activities on behalf of the private sector on issues related to business development in the project, especially, investment opportunities and operations and maintenance of the integrated waste management systems established under the project.

97. Uganda Manufacturers Association (UMA) will encourage its members to discuss the issues that affect their operations, contributing ideas and proposals in order to shape the policy environment. UMA will also support the evolution of public/private partnerships.

98. UAAU will support municipalities through lobbying and policy advocacy activities in pursuit of private public partnerships to support MSW biogas projects.

99. With the assistance of GIZ, PSFU, UMA and UAAU, the expert team will design and submit a number of proposals to enhance the regulatory framework for MSW biogas in coordination with MEMD, NEMA, MFPED and the Electricity Regulatory Authority (ERA) and other incumbent authorities and ministries.

Output 1.5 Multi-stakeholder platform on waste management and biogas established, whereby stakeholders will take on joint responsibility

100. In order to facilitate sector coordination, the project will support the establishment of a multiple stakeholder coordination platform, whereby stakeholders will take on joint responsibility with clear roles and responsibilities for each actor.

Activity 1.5.1 – Assist MEMD, NEMA, UAAU, PSFU to establish multi-stakeholder platform on waste management and biogas

101. The Project will assist MEMD, NEMA, UAAU and the PSFU to establish a multi-stakeholder platform through: i) existing Municipal Development Forums established by the Urban Authorities Association of Uganda (UAAU); and, through the Private Sector Foundation Uganda (PSFU) and the Uganda Manufacturers Association (UMA). Guidelines on the functioning and information on the performance of the multi-stakeholder platform will be developed and documented by the expert team – notably by the National Institutional Development Expert.

102. Municipalities will be represented by the UAAU. Supported by the UNDP/GEF project, the UAAU will assist municipalities to engage with communities through the Uganda National Urban Forum (UNUF) and Municipal Development Forums – creating a critical platform for government and community to come together to voice issues about waste and come up with solutions together.[24] The UAAU will also establish a Mayors Memorandum for integrated waste management including the use of organic waste for biogas projects. The UAAU will also provide policy advocacy for municipalities ensuring an adequate flow of information between municipalities and central government in order to integrate inputs from municipalities into Output 1.5 and the national policy, legal and regulatory environment. The multi-stakeholder platform will also be used as a platform for the promotion of MSW biogas technology among municipalities, project developers, industry and the general public under Output 1.3.

103. Supported by the UNDP/GEF project, the private sector will be represented by the PSFU and the UMA. The PSFU will provide policy advocacy activities on behalf of the private sector on issues related to business development in the project, especially, investment opportunities and operations and maintenance of the integrated waste management systems established under the project.

[24] For more information, see: http://sdinet.org/2015/07/charting-a-path-together-ugandas-municipal-development-forums/

Component 2: Demonstration and investment in integrated wastewater treatment and biogas plants

104. Financing: USD $1,180,000 requested from the GEF (of which USD $280,000 for TA and US $900,000 for investment) and USD $12,050,000 co-financing.

105. Component 2 involves the implementation of three MSW-based biogas energy systems to:

- Demonstrate the productive use of organic components of municipal and agro processing waste streams, wastewater and sewerage sludge
- Demonstrate their technical maturity and the sustainability of the chosen business models
- Generate operational experiences for further optimization and as input for policy development.

106. While the PIF proposed the establishment of demonstration plants in three municipalities, a prefeasibility assessment, including financial modelling of the three proposed sites as well as other potential municipal MSW biogas sites revealed that municipal pilot projects with or without the proposed PPP models were not financially or technically recommended at the sites identified in the PIF. This was due to: a lack of investment capital; low capacity to implement projects (for example the municipal composting site project); and likely difficulties in setting up a system to obtain sufficient feedstock. For more information, see Annex N.

107. The three sites that were eventually selected (described in Output 2.5) as pilot projects were selected based upon the findings of a prefeasibility assessment, including technical assessment and financial modelling as well as a set of objective criteria (for more information see Annex N and Annex O). Ultimately, the sites will demonstrate the technical maturity of selected biogas technology and the sustainability of the 3 potential chosen business models. During the inception period other sources of concentrated bio-waste from agro-processing facilities will be explored for PPP pilots.

108. Under Component 2, the expert team will add value to the project grants providing a number of technical assistance activities as described below. It is envisioned that a company will be contracted to provide these services.

109. The Uganda National Biogas Alliance (UNBA) will be engaged in various activities under Component 2 including contributing to assessment, prefeasibility studies and selection of activities (sites, actors, PPP partners) and business model development.

110. The project will be integrated into the UNDP Uganda's Sustainable, Inclusive Economic Development Programme and Climate Change Response Programme.

111. The project will take a gender-sensitive approach during the design, procurement, construction and operation of the demonstration plants. In particular, the project will take a gender-sensitive approach in respect to the impact of the project on neighbouring people and formal or informal workers in the waste sector (in particular female waste picker workers). The gender dimensions of various sections of the waste sector, especially logistical chains for collection of organic waste and certain sources such as markets which are female dominated are explored in the Gender Analysis found in Annex MM. Other aspects that will be given particular attention are the end-uses of the energy generated by biogas projects including electricity, heat, and biomethane. For this reason, the project will make available a national Gender Specialist for the review of project activities on gender aspects and to propose corrective measures as and when appropriate.

112. By the time of project closure, it is expected that: (i) the installed pilot MSW-based biogas energy systems will be in operation and technically reliable; (ii) a pipeline of MSW-based biogas projects has been identified, with technical support provided to at least 5 additional municipalities with investment capital mobilized; and (iii) lessons learned from pilots have been documented and disseminated.

Output 2.1 Business models designed for biogas digester systems for a range of plant sizes

113. The development of viable business models will enable technical and financial sustainability, thereby creating new opportunities for investment. In developing the business models, opportunities for public-private partnerships (PPPs) will be explored as PPPs have emerged as a modality to improve municipal solid waste service performance at lower costs than the municipality investing and implementing the activity themselves. One potential model that

will be considered will be one in which the public sector retains the ownership of the plant, but the operations, management and maintenance will be outsourced to private companies. Particular attention will be paid to O&M of the integrated wastewater treatment and biogas plants (including obtaining feedstock), cost recovery and diversifying revenue streams through the sale of electricity, heat and bio-fertilizer.

114. Business models will integrate existing waste collectors (both those operating under official licence of local authorities and those in the informal sector). For example, logistical changes and the way in which organic waste will be sorted and transported will impact the operations of waste transport companies whose modes of operation and necessary amendments must be integrated into the business models. Likewise, opportunities for inclusion in business models of informal waste collectors as paid waste collectors and sorters will be given due consideration under each business model in order to provide livelihood opportunities and reduce negative impacts upon these vulnerable populations (for further details of how the project will manage risks related to informal waste collectors see: Annex G.

115. Figure 3 below shows the flow chart depicting the value chain of the proposed approach. For a full description of the business models for each pilot plant please refer to Annex N.

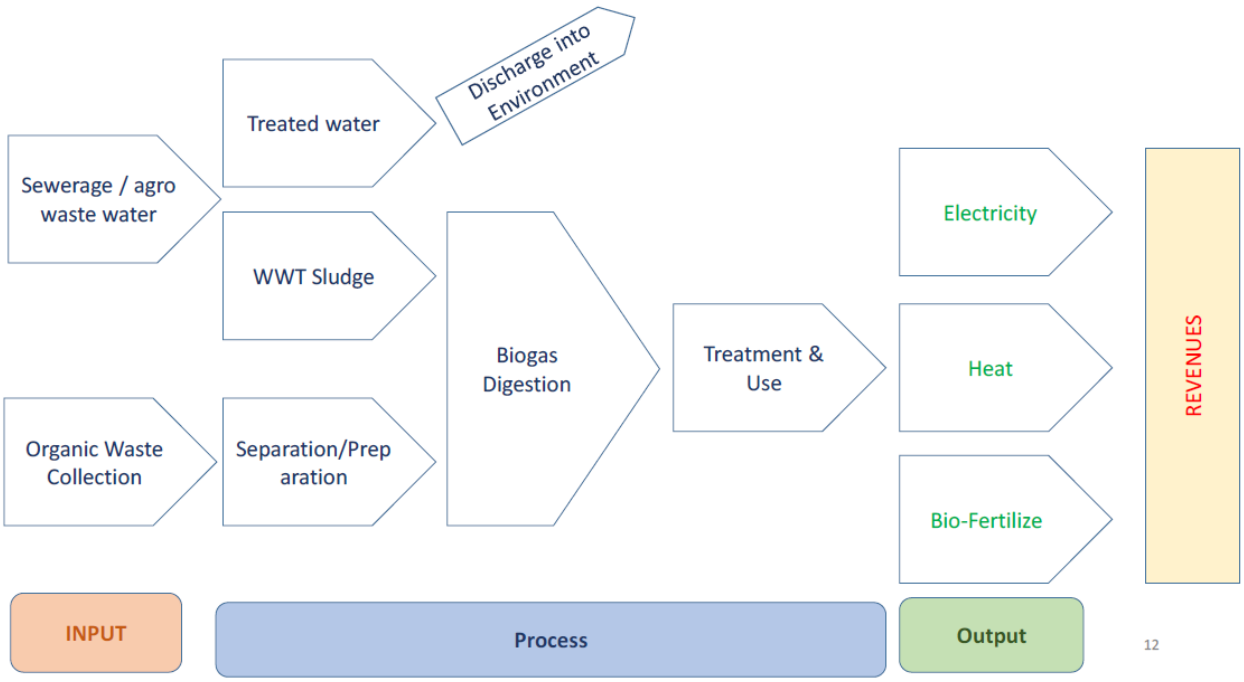

Figure 3: Flow chart of integrated wastewater treatment and biogas plant

Activity 2.1.1 – Development and promotion of MSW biogas business models

116. The expert team will promote the UNDP/MEMD project to private sector by assisting with the development of three potential different biogas business models for implementation of biogas-to-electricity plants. This will involve elaboration of the way in which each business model can work – including responsibilities of actors, likely investment and ongoing costs, potential ongoing benefits (financial, environmental, social), and safeguards which should be put into place to address risks.

117. Based on Output 2.2, these business models will be developed for each of the three pilot projects, resulting in business plans and information memorandums which can be adjusted for other future investments.

Output 2.2 Feasibility studies, permitting procedures and final engineering plans executed and formalization of responsibilities of project partners

118. Output 2.2 will involve assisting project developers with the process of making the investments “shovel-ready”. The expert team will assist the three project developers in producing the following outputs and/or provide feedback to existing plans for the three sites:

(i) bankable feasibility studies with firm data for project development for the three sites;

(ii) completed permitting procedures, including compliance with environmental and safety standards; and

(iii) final engineering plans.

This Output will be mirrored through support provided to project developers in Output 3.4.

Activity 2.2.1 – Feasibility studies conducted/reviewed for three sites

119. In partnership with the project sponsors, the expert team will prepare three bankable feasibility studies for the three pilot sites. Where these feasibility studies already exist, the expert team will provide a review of the study to identify any issues which may need addressing. The feasibility studies will also include an Environmental and Social Impact Assessment conducted by the Social and Environmental Expert.

Activity 2.2.2 – Permitting procedures conducted

120. The expert team – notably the National Waste and Biogas Expert – will assist project developers with permitting procedures, power purchase agreements and grid connection of biogas systems.

Activity 2.2.3 – Development of final engineering plans conducted

121. A contracted biogas plant engineer will prepare the final engineering plans for the three sites. It is expected that most of the engineering plans will be developed as part of the development of the feasibility studies, but that a final review of these plans will take place as a result of this activity.

Activity 2.2.4 – Clarification of roles, evaluation of cash flow projections and optimization of financial structure

122. As part of the pilot project finalization, the expert team will provide assistance to the demonstration pilot partners throughout the preconstruction phase for the process of legal formalization of the biogas business, clarification of roles and liabilities (especially for PPP implementation), evaluation of cash flow projections, and optimization of the financial structure of the biogas enterprise.

Output 2.3 Technical support and training for pilot projects

123. During the PPG phase a lack of exposure to high-tech and large scale biodigester technologies was identified. Those digesters in Uganda considered high-tech or large scale face a raft of technical difficulties. The PPG phase also identified the need for technical capacity among municipality staff assigned to biogas development.

124. The project expert team will offer training to pilot project staff for operation, monitoring and optimisation as well as ensuring social and environmental safeguards of the installed pilot systems. Ad-hoc/when needed technical assistance will also be provided by the expert team throughout the project period. The PIU will work in close coordination with the UNDP's *Sustainable business models for biogas production from organic municipal solid waste project* in Argentina given the similarities in activities under both projects.

125. Approximately USD$ 60,000 under this Output will be used to cover the costs of services, maintenance and technical support not covered under the procurement contracts as well as unforeseen investments if needed.

Activity 2.3.1 – Training of technical staff and preparation of manuals and procedures

126. Working closely with the Argentinian project team, who are implementing similar activities, the GEF funds will be used to provide training to suppliers, biogas experts, maintenance staff, and municipal technical staff for the 3 pilot project operators. This training will be included as part of the contract for construction of the biogas plants (under Output 2.5). Manuals and procedures for operation will be developed as part of this activity. The programme of training activities will include:

(i) Training of technical staff on process monitoring and operation;

(ii) Optimization of biogas production;

(iii) Monitoring of feedstock composition for biodigesters;

(iv) Control and optimization of process parameters for biodigesters;

(v) Storage and safety of biogas and biomethane installations;

(vi) Planning and execution of maintenance and repair activities; and

(vii) Social and environmental safeguards training.

127. These manuals and procedures will be prepared with the intention that they will be used for the additional sites under component three and aligned with the proposed biogas strategy under Output 3.3, and will continue to be used by technical assistance partners such as GIZ following project closure.

Activity 2.3.2 – Monitoring and optimisation of operational procedures and technical performance of pilot plants

128. Technical assistance will be provided to assist biogas operators to monitor and optimise operational procedures. Operational data and experience will be used to further improve the performance and reliability of biogas systems and propose corrective action when needed. Technical assistance will also be provided to supervise and monitor compliance with social and environmental safeguards.

Output 2.4 Investment financing for the 3 plants facilitated and secured

129. The PIF proposed that financial and technical assistance will be necessary to facilitate and secure investment financing for the three pilot sites. The pilot sites have subsequently changed and so has the need for investment finance and technical assistance. All pilot sites require varying levels of technical assistance and finance needs. described below:

(i) Kakira Sugar Ltd is currently operating a bagasse based biomass electricity production unit (5.2 MW) and is planning to install an additional 0.4 MW of power based on a biogas digester using waste materials in a separate plant. This investment is likely to go forward with equity co-finance from Kikira Sugar Ltd, however technical assistance is needed in the planning and optimal operation of the plant to demonstrate the viability of agro-processing industry waste combined with organic wastes from other sources.

(ii) The NWSC Navikubo WWTP site is at the civil/earth works construction phase with a designed and permitted 1MW waste water based biogas electricity production unit proposed and finance already secured. However, due to the quantity and low calorific value of the waste-water feedstock, it is expected the unit will only operate at 30% capacity. Investment grants will be provided to procure and supervise construction of auxiliary systems required to process, sort and combine different waste streams.

(iii) The proposed Kampala landfill site is at concept stage, the project will provide investment grants to procure and supervise construction of biogas equipment and auxiliary systems.

Activity 2.4.1 – Support to pilot sites to secure finance

130. The majority of finance necessary for the pilot sites will be covered by project developer equity (leveraged with loans) and GEF investment grants for the procurement of biogas equipment and auxiliary systems. However, where additional finance is required, as is the case for the new build biogas plant at the new landfill site in Kampala, the project will assist project developers to access finance. This may include facilitating the sharing of information with local financial institutions (FIs) or IFIs. The project will also provide assistance to access other sources of grant funding or guarantees such as those offered by Sida such as the Challenge Fund for Renewable energy, Loan Guarantees and Portfolio Guarantees, and Innovations Against Poverty grants.

Output 2.5 Procurement and construction or modification of biogas demonstration plants

131. Output 2.5 encompasses the specification, procurement and construction of biogas equipment and auxiliary systems for three pilot sites. GEF grant funding will be used as co-investment to improve the financial return on investment and reduce the risk profile of the pilots. Procurement of the systems for public private partnership installations will be through a competitive tender in alignment with UNDP and GEF guidelines and procedures. The contract modality for biogas systems construction will be decided prior to each tender; preference will be given to modalities that minimize the technical risks for the Project, such as turn-key delivery.

132. The project will facilitate cooperation with technology providers on wastewater treatment and biogas. Contractors shall include a training programme for operators in their offers, as well as extensive after-sales services and provisions for technical failure to be delivered under Output 2.5. Under this component GIZ will provide support to European companies to invest and form partnerships with local Independent Power Producers (IPPs).

133. Activities for the three selected demonstration sites consist of the following (for comprehensive details on selected sites please refer to Annex N):

Activity 2.5.1 – Procurement and construction of biogas plant at New Kampala Landfill

134. The project will procure and supervise construction of biogas equipment and auxiliary systems for sorting and transportation of feedstock to a new landfill to be constructed in Kampala. Equipment includes: pre-treatment plant, anaerobic digester, gasholder, Combined Heat and Power Unit, digestate storage and grid connection equipment. The feedstock for the digester will supplied initially from Kampala's food market wastes. Construction of the biogas plant will be phased in order to ensure that sufficient feedstock of required quality can sourced and supplied consistently. The first phase will target 0.5 MW with the aim of scaling up to up to 2 MW. KCCA and IFC currently propose that the new landfill will be operated under a PPP model between KCCA and a private operator (yet to be identified). Therefore, the exact PPP model of the landfill site and likewise the biogas plant operation is yet to be decided, however the project has budgeted for estimated financial and technical assistance.

Activity 2.5.2 – Procurement and construction of biogas auxiliary systems at Nakivubo wastewater treatment plant

135. The project will procure and supervise construction of auxiliary systems and modification of the anaerobic sludge digestion system at the National Water and Sewerage Corporation Nakivubo wastewater treatment plant for co-digestion of Kampala abattoir waste. With the UNDP/GEF project assistance, it is estimated that the plant's current operational efficiency of 25%-30% can be increased to around 80%, reflecting a total output of 2 MW or roughly 14,000 MWh per year from the improved plant.

Activity 2.5.3 – Procurement and construction of biogas auxiliary systems at Kakira sugar factory

136. The project will procure and supervise construction of auxiliary systems and modification of the anaerobic digestion system for agro-processing wastes for co-digestion of sewerage sludge at the Kakira sugar factory. It is estimated that the final output for the Kakira system will reach 0.4 MW. The project will also provide limited on-going technical assistance through project staff.

Component 3: Scale up the use of biogas technologies in other municipalities

137. Financing: USD 497,965 requested from the GEF for TA and USD 2,000,000 co-financing.

138. Component 3 focuses on scaling up to a higher level of national investments. This will include: approximately USD 497,965 in GEF resources and USD 250,000 in co-finance for TA in developing a pipeline of potential MSW-based biogas projects; identifying and targeting the conditions for additional investment through a biogas strategy and implementation plan; and USD 1,750,000 in co-finance establishing a grant/technical assistance fund and approach to attract investment into MSW-based biogas sector. GEF resources will be used to procure contractual services for TA activities related to waste flow surveys, bankable feasibility studies, permitting procedures, and the final engineering plans.

139. Mirroring Component 2, a specialised firm will be hired for TA activities and the National Institutional Development Expert/Project Manager will add further value to the project by providing a number of TA activities on an ad-hoc/as-needed basis. Likewise, the Uganda National Biogas Alliance (UNBA) will be engaged in various activities under Component 2.

140. The Biogas and Finance Consultant will provide technical assistance during the establishment of a finance mechanism and technical assistance to financial institutions to assess biogas projects' suitability for finance. Assistance will also be provided to project developers to access existing streams of finance or financial products such as grants and guarantees. Consequently, access to finance will be removed as a barrier to develop the market for MSW-based biogas.

Output 3.1 Development of a pipeline of MSW-based biogas projects

141. A pipeline of potential MSW-based biogas projects will be developed. Based on the business models developed under Output 2.1, and the experience gained in designing, constructing, operating and maintaining the demonstration biogas plants, the project will elaborate conceptual proposals for at least 5 municipalities. It is expected that this will take place in years 4 and 5 of the project period.

Activity 3.1.1 – Elaboration of conceptual proposals

142. The project experts and where necessary, short term consultancies drawing on UNBA expertise will engage potential private sector project partners and municipalities to elaborate conceptual proposals for biogas energy projects identified in Output 1.

143. At the detailed consultative stage after site selection, the consultant will identify and develop a strategy for skills building and training needs related to women and vulnerable social groups participation in the project (through skills building, training in resource separation, health and safety issues). An Environment and Social Impact Assessment specific to each implementation site will study this potential risk at before Project implementation and provide the pertinent measures to minimise it. In line with the gender mainstreaming strategy of the Project, the elaboration of proposals will also include support to municipalities to ensure gender representation, engagement and responsiveness in terms of content and design of the Project as it is assumed that sources of substantial organic waste are likely to come from selected urban area markets, where women are the major dealers in agro-crop products, while men dominate in the agro-livestock subsector. Additionally, a tailored Gender Assessment specific to each implementation site will be required before project implementation. Subsequently, an autonomous Gender Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. This will be prepared by the Social and Environmental Expert.

Activity 3.1.2 – Assistance to facilitate access to existing financial products and facilities

144. Working with the Uganda Energy Credit Capitalisation Company, the project will develop a programme of activities to facilitate access for project developers to existing financial products offered by IFIs and other development partners. The project experts will also develop the financial models required to support funding applications for the 5 additional municipalities.

145. Access will be facilitated to existing financial products including:

- AfDB's Borrowing Private Sector Window (for more information see Annex R).
- Sida's Challenge Fund for Renewable Energy, Loan Guarantees and Portfolio Guarantees and Innovations against Poverty grants. Assistance will also be provided to project developers to access existing technical assistance facilities such as those offered by GIZ which cover the cost of project preparation activities.
- UECCC offers a range of finance products and facilities including: Liquidity Refinance Option; Cash Reserving; Partial Risk Guarantee (PRG); Bridge Financing Facility; Subordinated Debt Finance; Interest Rate Buy Down (for more information see Annex Q).

146. The project will also provide assistance to government agencies, FIs (including local banks such as Finance Trust Bank) or IFIs (Such as the World Bank and the East Africa Development Bank) should they choose to establish facilities, financial products or funds that may be drawn upon by MSW-based biogas project developers. The GEF project is not expected to provide financing for such mechanisms but will support their establishment and design as necessary.

Output 3.2 Mid and long-term strategy for the replication of biogas projects developed and implemented

147. This output focuses on identifying and targeting the conditions for additional investment in biogas energy generation in the medium and long term, both by government and private investors. A mid to long-term strategy for replication will be developed. The development of the strategy will be carried out in close consultation with MEMD, NEMA, MLHUD, ERA and UNBA.

Activity 3.2.1 – Biogas strategy and implementation plan drafted

148. Alongside MEMD (with support from NEMA, MLHUD, ERA and UNBA), the Waste and Biogas Expert will support the development of a Biogas Strategy for Uganda. The strategy will not be limited to biogas for electricity, but also biogas for thermal use, at household, institutional and industrial level. The expert team will mainly provide inputs for large-scale biogas. Support will also be provided by the expert team to develop an implementation plan as part of the Biogas Strategy for Uganda.

149. Later, based on the outcomes of the pilot projects developed under Component 2 and lessons learned/best practice studies conducted under Component 4, the expert team may develop and submit further policy recommendations in line with the biogas strategy. Based on evidence from Project outcomes, this may include suggestions for higher feed-in tariffs (FiT), lower thresholds for grid connection for energy delivered by MSW-based biogas projects, etc. In turn, a higher FiT and lower thresholds for grid connection would contribute to financial robustness, which would open up the market for other investors.

Activity 3.2.2 – Learning days at biogas sites

150. As part of the biogas strategy implementation, it is envisaged that the project will develop and deliver a learning programme involving open days for private sector project developers interested in biogas projects, technical staff from municipalities, university students, UNBA, and other interested stakeholders to visit the pilot sites to learn about the processes and business models at work. This Output will be developed in parallel with the technical assistance and training programmes developed and delivered under Output 2.3.

Output 3.3 Grant/technical assistance fund and approach to attract investment into MSW-based biogas sector developed

151. During project preparation it was revealed that a range of financial products and facilities are available from various IFIs and multilateral development agencies for IPPs including those producing electricity from MSW-based biogas systems. Furthermore, IFIs showed particular interest in funding large-scale/high-tech biogas projects if investment grants and technical assistance (for example, feasibility and engineering studies) were provided. As such, the project identified that in order to attract investment into the MSW-based biogas sector, what was needed was assistance to facilitate access to existing financial products as well as a grant and technical assistance fund.

Activity 3.3.1 – Grant and technical assistance fund for MSW-based biogas projects

152. In the 4th year of implementation, the project will create a grant and technical assistance fund that can be drawn upon by IFIs and/or project developers. An independent body/advisory board consisting of MEMD, UECCC and UNDP will consider grant applications. Thresholds will be established for the Grant and TA funding, for example projects have to be over 0.3 MW (level to be decided during fund design). Criteria for grant funding levels will be decided during project implementation but may be awarded based on the expected performance of the CHP unit assessed by either MWh produced per year and/or Tonnes of CO_2 emissions avoided (levels also to be decided during fund design). Grant payments will be dispersed once a milestone, such as construction permitting, is achieved. The grant funding component of the fund will consist of USD $1.75 million in co-financing. GEF support will be limited to providing technical advice on designing and setting up the fund and to procuring contractual services for TA-related activities.

153. The technical assistance component of the fund will consist of approximately USD 497,965 from GEF resources to carry out Activities 3.1.1, 3.1.2, 3.2.1, and 3.2.2. – linked with other TA co-financing and will be made available for projects meeting the minimum threshold. This activity will mirror the activities, integrate lessons learned and utilise the technical capacity that was developed through the TA activities provided under Output 2.2, including i) waste flow surveys; ii) bankable feasibility studies with firm data for project development; iii) permitting procedures, including compliance with environmental and safety standards; and iv) the final engineering plans. These activities will be subcontracted to individual consultants and specialized firms under supervision of the National Institutional Development Expert/Project Manager. The National Institutional Development Expert/Project Manager will add further value to the project by providing a number of technical assistance activities on an ad-hoc/as-needed basis. Activities include: assist in the drafting of Terms of Reference for contractors; review consultancy reports; data

analysis; adaptation of methodologies and business models to specific conditions; and, technical backstopping for the projects. The Uganda National Biogas Alliance (UNBA) will be engaged in various activities under Component 3 including contributing to assessment, (pre)feasibility study and selection activities (sites, actors, PPP partners) and business model development.

Component 4: Knowledge Management and Monitoring and Evaluation

154. Financing: USD $138,730 requested from the GEF and USD 60,000 co-financing.

155. Under this Output the UNDP will deliver a number of Knowledge Management and Monitoring and Evaluation products. Output 4 activities form the knowledge management strategy for the project including the wider communication and dissemination of project lessons and experiences to support the replication and scaling-up of project results. The UNDP Country Office will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.

Output 4.1 Project website

Activity 4.1.1 – Development of Project website

156. A project website will be developed where information such as lessons learned studies, best practices, IWM plans, technology options, business model descriptions, feasibility information as well as comprehensive information on accessing finance and technical assistance through the project will be made available.

Output 4.2 Guidelines on waste management practices updated, lessons learned and best practices documented and disseminated

157. The experience gained by the project will generate a considerable amount of useful information. In order to capture and disseminate this information, guidelines on waste management practices will be formulated, lessons learned and best practices will be documented and disseminated broadly.

Activity 4.2.1 – Conduct lessons learned studies

158. Throughout Project implementation, lessons learned will be collected (by Project staff, UNDP, contractors and other stakeholders) for all activities, particularly from the pilot projects. In the final year of the project, lessons learned will be synthesised and conclusions drawn for best practices.

Activity 4.2.2 – Dissemination of lessons learned studies

159. The lessons learned studies developed under Activity 4.2.1 will be disseminated to potential project developers through the UNBA, PSFU, UIA, and UMA, to municipalities through the UAAU and to government stakeholders through Project Board meetings. All non-sensitive knowledge products produced by the project will be made available through the project website where interested stakeholders can download them. Project knowledge products will also be made available via post for those without access to Internet, particularly in remote regions.

Output 4.3 Biogas technology for energy generation and lessons learned from pilot projects integrated into the national renewable energy and MEMD programmes, standardized baselines for calculating emission reductions established, and NAMA registered on the UNFCCC NAMA Registry.

160. In order to truly achieve scale, it will be important for biogas technology to be firmly embedded in the national renewable energy and MEMD programmes. The project will work closely with the relevant authorities to ensure that MSW biogas technology and lessons learned from pilot projects are incorporated into national planning processes.

161. The project will also develop standardised baselines for calculating emissions reductions from Biogas and the project will be registered on the UNFCCC NAMA Registry.

Activity 4.3.1 – Design and submit proposals to update and enhance regulatory framework for Biogas technology for energy and integrate lessons learned from pilot projects into the national renewable energy and MEMD programmes

162. Building on the work conducted under Component 1.4 and the lessons learned knowledge products produced under activity 4.2.1, the project Waste and Biogas Expert and Biogas and Finance Consultant will design and submit proposals to the relevant teams from MLHUD, NEMA, MEMD, NWSC, Ministry of Finance, Planning and Economic Development (MFPED) and the Department of Climate Change (DCC) to update and enhance the regulatory framework to promote increased uptake of IWM and biogas technology.

Activity 4.3.2 – Development of standardised baselines for calculating Emissions reductions from Biogas

163. Working alongside the Regional Collaboration Centre Kampala – UNFCCC, the project Waste and Biogas Expert will develop standardised baselines for calculating emissions reductions from Biogas for electricity and heat production. During project inception.

Activity 4.3.3 – Registration of project on UNFCCC NAMA Registry

164. During project inception, the project will be registered on the UNFCCC NAMA Registry as "NAMA on Integrated Waste Management and Biogas in Uganda."

Output 4.4 Annual Project Implementation Reviews

Activity 4.4.1 – Conduct annual Project Implementation Reviews

165. The UNDP Country Office will initiate and organize key GEF M&E activities including the annual GEF Project Implementation Review (PIR). The PIR provides an opportunity for the Country Office and Project Manager to report on the cumulative progress towards achieving the objective and the annual implementation progress. The Project Manager will monitor risks quarterly and report on the status of risks to the UNDP Country Office who will record progress in the UNDP ATLAS risk log to be reported in the annual PIR. Management responses to critical risks, environmental and social grievances and the project results as outlined in the project results framework will be monitored annually in time for evidence-based reporting and reported to the GEF in the annual PIR.

Output 4.5 Mid Term Review

Activity 4.5.1 – Conduct Mid Term Review

166. The UNDP Country Office will initiate and organize the key GEF M&E independent mid-term review after the second PIR has been submitted to the GEF, and the MTR report will be submitted to the GEF in the same year as the 3rd PIR. The GEF Focal Area Tracking Tool will be updated by the Project Manager/Team and shared with the mid-term review consultants.

Output 4.6 Project Terminal Evaluation

Activity 4.6.1 – Conduct Terminal Evaluation

167. The UNDP Country Office will initiate and organize the key GEF M&E independent terminal evaluation (TE). The TE will take place upon completion of all major project outputs and activities. The terminal evaluation process will begin three months before operational closure of the project allowing the evaluation mission to proceed while the project team is still in place, yet ensuring the project is close enough to completion for the evaluation team to reach conclusions on key aspects such as project sustainability.

ii. Partnerships:

168. The Project will work with a number of local and international partners in order to achieve project impacts. The UNDP has already recognized synergies, established contact and initiated coordination with a number of programmes and projects regionally and nationally. To avoid duplication and realize opportunities for synergy, the Project will conduct a full review of complementary projects during the project inception phase and establish connections and synergies. The multi-stakeholder platform that will be set up under the project will help to

facilitate this coordination. The project will closely coordinate its activities, exchange information and lessons, and work toward a common objective with the following related initiatives.

169. **NEMA: *Municipal solid waste composting project*:** The project will seek lessons learned and coordinate with the NEMA's municipal solid waste composting project initiated in 2005. The municipal solid waste composting project aims to improve the management of municipal solid waste by turning the biodegradable portion of the waste into compost. Lessons learned and coordination with the NEMA project, which links together the Ministry, local government, private sector, academia and civil society organizations around the issue of municipal solid waste has informed the design of the UNDP-GEF Project.

170. Up until now, the NEMA programme has not considered biogas energy plants in the selected municipalities. So there is an opportunity for the GEF project to link to and expand upon the activities under the NEMA project.

171. **MEMD-GIZ: *Promotion of Renewable Energy and Energy Efficiency Programme:*** The UNDP-GEF Project is well aligned with MEMD's Promotion of Renewable Energy and Energy Efficiency Programme (PREEEP). PREEEP is an initiative commissioned by the German Federal Ministry for Economic Cooperation and Development (BMZ) to support MEMD. The project will coordinate with PREEEP to avoid duplication of efforts, specifically in the field of capacity building and promotion, as the UNDP/GEF project will draw upon PREEEP/GIZ resources. The UNDP-GEF project will also seek synergies in the field of policy development to accelerate the implementation of renewable energy technologies.

172. **MEMD-World Bank: *300 m^3 biogas digester at Kayei, in Apac District:*** MEMD has constructed a 300 m^3 biogas digester at Kayei, in Apac District, with support from the World Bank. The biogas plant will generate 10 kW of power. MEMD is also planning to construct one large-scale biogas digester as soon as sufficient waste streams are identified. Under the NEMA programme outlined earlier, 12 towns have composting plants that are operational. Organic waste is collected and utilized to produce compost. These waste streams can be used to generate biogas for power as well as organic fertilizer.

173. **Makerere University: *wastewater treatment system combined with biogas technology that is operational at the Kampala abattoir:*** Makerere University has designed and developed a wastewater treatment system combined with biogas technology that is operational at the Kampala abattoir. The university has also developed proposals with the support of Sida towards the upscaling of WWT and biogas plants at additional abattoirs in Uganda. The GEF project will draw on national technological capacities existing in research institutions and universities. For example, Makerere University can analyze the composition of waste streams on COD/BOD, Ph, carbon-to-nitrogen ratio and can monitor the performance of WWT and biogas systems. The university can also play an important role in knowledge development.

174. **NWSC/KfW/World Bank: *WWT plants in Kampala:*** NWSC currently operates one WWT plant in Kampala and is in the process of commissioning three more. One WWT plant (45,000m^3/d) will incorporate biogas technology and is financed by KfW and the African Development Bank. The biogas plant will primarily use the sludge from the WWT plant as feedstock and will in addition have the capacity to take in waste streams from external sources. The Kampala Capital City Authority (KCCA) is in the process of rolling out a collection/transport and disposal/treatment project. Furthermore, a landfill will be capped and the methane will be captured for power generation. The UNDP-GEF Project will coordinate with the NWSC/KfW/World Bank Project to seek synergies and lessons learned.

175. **GIZ: *Waste sector projects:*** GIZ is active in the waste sector and implements several projects on waste management. In particular, GIZ provides support towards the Reform of the Urban Water and Sanitation Sector (RUWASS) and is a member of the Wastewater Dialogue network in Uganda. UNDP could link up to this network. GIZ's main focus areas are in Kampala and districts in the North of Uganda. There may be an opportunity to combine efforts towards the development and management of a database on waste management and mapping of waste streams in Uganda.

176. **World Bank-GEF: *Energy for Rural Transformation Project III*:** The World Bank/GEF Energy for Rural Transformation project Phase I began in 2001. Relevant to the UNDP-GEF project, Phase II (closed 5/2016) focused on increased use of renewable energy technologies. The UNDP will seek to leverage lessons learned from this project with particular regards to on-grid renewable energy sources and strategy for scaling up during subsequent Phase III of the World Bank Project.

177. A new Phase III (5/2015 – 1/2019) seeks to scale-up Phase II interventions and provide necessary technical assistance to the GOU. The UNDP-GEF project will seek to coordinate with Phase III activities related to the set-up of the electricity distribution sub-sector, on-grid investments, business development support and capacity development.

178. **AfDB-LDCF-GEF*: Building Resilience to Climate Change in the Water and Sanitation Sector:*** Relevant to the UNDP/GEF Project, the African Development Bank/LDCF/GEF Project aims to increase access to climate-resilient sanitation and improved livestock farming through improved water availability. The UNDP/GEF Project will therefore seek to leverage lessons learned and coordinate with relevant activities where synergies may exist related to waste management as well as improved farming practices.

179. **UNIDO/GEF - *Establishment of a sound integrated management of persistent organic pollutants (POPs) and POPs wastes in Uganda*** (project under development): The UNIDO/GEF project aims to enhance environmentally sound management (ESM) of POPs and POPs wastes in an integrated manner through introduction of best available technology and best environmental practice measures to protect human health and the environment. Where relevant, the UNDP/GEF Project will seek synergies with the following activities of the UNIDO/GEF project related to the waste sector: i) targeted awareness raising strategies; and ii) training programmes.

180. The above-mentioned projects and programmes complement the activities of the Project. To avoid duplication and promote synergy, the UNDP will seek to coordinate with these initiatives (refer to Project Management details in Section **Error! Reference source not found.** for details on how the project will work with other projects).

iii. Stakeholder engagement:

181. During project design, relevant stakeholders were requested to provide baseline data on the current and projected situation in the waste sector. All relevant stakeholders were invited to participate in an inception workshop to discuss needs, barriers and opportunities for effective municipal solid waste and wastewater management and the potential for biogas plants. Partners were also invited to attend a Project validation workshop to validate the project design. The key stakeholders and their roles are described below. The project is not expected to have any impact on indigenous people.

Stakeholder	***Role***
Ministry of Energy and Mineral Development	MEMD will serve as the lead implementing partner at the national level for this initiative. The MEMD is guided by the Renewable Energy Policy (2007), including the promotion and development of biogas technology in the country. MEMD will lead the project teams under Component 2 (Demonstration and Investment), including activities related to the possibility of connecting the biogas plants to grid infrastructure and in negotiation of the feed-in tariff. MEMD will also lead Component 3 – Scale up.
National Environment Management Authority (NEMA)	As a regulatory authority, NEMA is responsible for waste management policy development. As the current policy is being reviewed, NEMA will be instrumental in the finalization of the integrated Solid Waste Management policy and in supporting the creation of an enabling environment for wastewater treatment and utilization of biogas technology.
National Water and Sewerage Corporation (NWSC)	NWSC is responsible for the supply of water and treatment of wastewater in urban Uganda. It is a key player in the sector with a vast knowledge base, and has a mandate to do wastewater treatment in urban centres outside Kampala. NWSC will be involved in the planning and design of the integrated wastewater and biogas plants and will provide the necessary data on wastewater. NWSC will manage and operate the demonstration project located at the NWSC Navikubo plant constructed under the project.
Directorate of Water Resources Management (DWRM)	The DWRM is responsible for monitoring and regulating water resources and issuing wastewater discharge permits. Its mandate includes the coordination of stakeholders in the wastewater sector. DWRM will play an important role in improved compliance with the regulatory framework and functioning of the WWT plants.

Ministry of Water and Environment (MWE)	MWE, which is tasked with the sound management and sustainable utilization of Uganda's natural resources, will have an advisory role in developing institutional frameworks for integrated waste management and establishing policy regulations governing renewable energy from biogas technology from sewage sludge and MSW feedstock. It can also provide advice on the reuse and recycling of products in order to safeguard the environment.
Ministry of Local Government (MOLG)	MOLG is the main institution responsible for spearheading decentralization in Uganda. The Ministry will help coordinate project activities with the municipal local governments, ensuring that legal requirements are addressed and quality services are delivered within the development plans in a coordinated and cost effective manner.
Ministry of Agriculture, Animal Industry and Fisheries (MAAIF)	MAAIF's involvement in the project will be limited to an advisory role linked to the quality and quantity of bio-slurry and by-products from biogas production that is useful for agricultural production.
Kampala City Council Authority (KCCA) and District	KCCA is responsible for waste management within the Kampala City boundaries. The project will coordinate with KCCA and other local governments in the development of waste management guidelines and regulatory frameworks, awareness creation, and private sector partnerships based on its experience in existing waste management projects. KCCA and the private sector investor in KCCA's new dump site will be dually responsible for the operation of the demonstration biogas plant under the project.
Municipal Local Governments	Municipal Governments throughout Uganda will be the recipients of a variety of project outputs such as capacity building, information dissemination. In particular, under Component 1, Jinja, Mbale, Mbarara, Gulu, Masaka will be the recipients of technical assistance to prepare IWM plans that integrate MSW-based biogas for energy and technical assistance to introduce tipping/ off-taker fees. In year 3 and 4 of implementation these municipalities will be assisted to prepare a pipeline of biogas projects and access finance and formulate PPPs for project development.
Uganda National Biogas Alliance (UNBA)	UNBA currently has four associations (Eastern Ugandan Biogas Association (EUBA), Western Ugandan Biogas Association (WUBA), Interregional Biogas Association (IRBA) and the Ugandan Biogas Association (UBA) (and currently in the process of establishing a regional association in the North of Uganda) representing over 160 members. UNBA represents a comprehensive network with a committed leadership structure within the umbrella and the regional associations. Members include enterprises, engineers and dealers from the domestic as well as the institutional and commercial sector. Many members are experts, that have professional experience in the African biogas sector for up to 30 years, working as consultants and advisors.
Uganda Energy Credit Capitalization Company (UECCC)	UECCC's mandate is to facilitate investments in Uganda's renewable energy sector by pooling resources from the government, investors and development partners. It provides credit support for private sector led renewable energy infrastructure development. Among the services that it provides, UECCC can provide capacity building for IPPs and financial institutions.
Uganda Investment Authority	The Uganda Investment Authority is a semi-autonomous government agency which drives national economic growth and development in partnership with the private sector. As an investment promotion agency, UIA mainly: markets investment opportunities; promotes packaged investment projects; ensures local and foreign investors have access to information, especially about the business environment so as to make more informed business decisions; and offers business support, advisory and advocacy services. Their involvement will entail promoting waste-to-energy technology to investors, with demonstrated potential in the pilot municipalities.
Local Financial Institutions	Local banks, such as Finance Trust Bank (FTB), have ventured into the energy sector by collaborating with Uganda Energy Credit Capitalization Company (UECCC) to provide solar energy loans. The project will provide technical assistance to banks to assess loan applications for MSW-based biogas systems.
Private Sector Foundation Uganda (PSFU)	The vision of the foundation, which is made up of 175 business associations, is to be the lead national partner in private sector development. It will be involved in developing and carrying out effective policy advocacy activities on behalf of the private sector on issues related to business

	development in the project, especially, investment opportunities and operations and maintenance of the integrated waste management systems established under the project.
Ministry of Finance, Planning and Economic Development	The Ministry of Finance, Planning and Economic Development's mission is to formulate sound economic policies, maximise revenue mobilization, and ensure efficient allocation and accountability for public resources. The Ministry will be engaged through Component 1 in particular during the design and submission of proposals for financial incentives such as tax breaks for biogas equipment.
Ministry of Gender, Labour and Social Development	The mandate of the Ministry of Gender, Labour and Social Development is to empower communities to harness their potential through skills development, labour productivity and cultural growth for sustainable and gender responsive development. The Ministry will be engaged in Component 1 on issues concerning labour, gender and social development in regards to waste management. In particular, input from the Ministry will be requested regarding issues of informal waste pickers.
Waste Pickers Alliance Uganda	The alliance seeks to address the poor working conditions, poor earnings and lack of legal protection of waste pickers. It aims to increase waste pickers' earnings for a decent livelihood, by removing the middlemen, and to train them on savings and cooperative organizing, with a view to eventually integrating them into the formal economy. The waste Pickers Alliance Uganda will be engaged throughout the project implementation to ensure positive social impacts for waste pickers and in order to avoid negative impacts from the projects activities. For further information, see Social and environmental safeguards:.

i. Stakeholder engagement plan:

182. As per Output 1.5, a multi-stakeholder platform on waste management and biogas will be established, whereby stakeholders will take on joint responsibility. Joint responsibility and equal representation will be ensured vertically (i.e. all the groups affected are well represented) and horizontally (i.e. weight of voice within platform), appropriate channels of communication will be provided for each represented group (i.e. in particular for the informal sector that may be illiterate), and will be provided with an active role throughout all phases of the project (i.e. from the design to M&E). For that a consultation and communication plan will be prepared and implemented at the project preparation phase and updated when necessary throughout the implementation phase to clearly disseminate project information and gather feedback in time regarding the needs and priorities of all stakeholders.

183. Consultation sessions will include special outreach efforts and be tailored to the need of vulnerable groups, particularly women, so that the process is socially inclusive and a range of stakeholder views and perspectives are adequately represented. Consultation methods will be designed in consideration of the different socio-cultural norms that inhibit the participation and input into decision-making from vulnerable groups and persons. Consultation activities and public meetings will be well-documented, identifying attendees (men/women), topics discussed, feedback and issues raised by stakeholder groups, and outcomes or actions resulting from the consultation. Management measures must be completed, disclosed, and discussed with stakeholders prior to implementation of any activities that may cause adverse social and environmental impacts.

184. All sessions and communication modes will be offered in English and – where necessary – local languages and follow the customs and norms of local communities. Under UNDP procedures, this will require that a Stakeholder Engagement and Public Disclosure and a Stakeholder Response Mechanism and Compliance Review, a Grievance Redress Mechanism, and SECU Standard Operating Procedures are in place for each site in the project which will address the specific risks. For example through a public log in the project areas that will be available to local communities and individuals to gather and resolve their concerns.

185. *At the national level*, the project management team will build on the stakeholder consultation process that included the inception workshop, validation workshop and other bi-lateral meetings. Following a Project kick-off meeting with key stakeholders, a broader meeting with a broader range of stakeholders will be held under the leadership of

the MEMD to raise awareness of the Project and to establish communication and networking approaches to be used throughout the Project duration.

186. *At the local/ investment site level,* stakeholders will be engaged through the UNDP's standard stakeholder engagement processes, which has so far included consultation through an Environmental Impact Assessment, and Environmental and Social Action Plan (ESAP). The National Environment Act, Cap 153, section 19(3) requires Environmental Impact Assessment to be undertaken by the developer where the lead agency, in consultation with the National Environment Management Authority (NEMA), is of the view that the project may have an impact on the environment; is likely to have a significant impact on the environment, or will have a significant impact on the environment. UNDP, the project management team and MEMD will continue to work closely with key project stakeholders such as project sponsors, co-financing institutions and the technical/ operations management teams of bio digesters.

187. The Project will work closely with relevant authorities and the Waste Pickers groups and other local civil society organisations (CSOs) (for example, market management committees) to identify ways of improving working conditions and earnings, with a particular focus on women in order to set specific indicators and targets related to gender equality. The ultimate aim will be to improve the participation of waste pickers in the integrated management of waste in the municipalities and promote waste recovery and reuse in the country.

188. Of particular importance, some of the waste pickers, with particular focus on disenfranchised women and youth, will be trained to promote resource separation at key generation sites (or waste collection sites) and also participate in recovering resources. Access to plastic and metal waste will not be restricted by the Project. In fact, the resource separation required to supply organic feedstock for the biogas plants is likely to enhance access to plastics and other non (Project) required wastes.

189. Any changes to the electricity grid and connection inside and outside the plant due to the Project will need to follow all regulations to prevent social impacts. To ensure this, a Social Impact Assessment specific to each implementation site will study this potential risk and provide the pertinent measures to minimise it.

ii. Mainstreaming gender:

190. This section describes the project activities that will be followed in order to ensure that women's as well as men's concerns and experiences are an integral part of the design, implementation, monitoring and evaluation of the project. This project has been given a gender marker score of: 'GEN2: gender equality as significant objective.' There are a range of key gender issues that have been identified in the waste sector in general including: many women are employed in the informal waste sector in and around urban areas; there are few women in decision-making positions in the waste sector; women's voices about proper and integrated waste management often go unheard, yet they are very often the people dealing (generating and informally recovering) with household and institutional solid waste; and lack of control over income and limited skills in solid waste recovery and reuse results in women's inability to invest and participate in waste management solutions or even access the benefits from resources recovered from waste after recycling[25]. This project is premised on the assumption that sources of substantial organic waste are likely to come from selected urban area markets, where women are the major dealers in agro-crop products, while men dominate in the agro-livestock subsector. The other sources of organic solid and liquid waste are the households where women control the disposal process and practices. Therefore, three issues have been emphasized in this gender mainstreaming strategy; gender representation, engagement and responsiveness in terms of content and design of the project. These considerations are also echoed in a number of local legislation[26] and international safeguard policies.

[25] UNDP and Global Gender Climate Alliance (GGCA), 2012, 'Gender and Climate Change Capacity Development Series, Africa, Training Module 1: Overview of Linkages between Gender and Climate Change'

[26] The 1995 National Constitution (Article 21 and Article 32(1) and Article 33(6)[26] The National Development Plan (NDP) I (2010-2015) and II (2015-2020) and National Gender Policy[26] 1997; and National Plan of Action for Women are all legal and policy

191. An ESIA and by implication an ESMP is relevant for the construction, operation and maintenance of the biogas plants. The detailed ESIA will be carried out once a specific site has been identified or selected for the project. However, there are pertinent gender issues that need to highlighted that should be considered throughout the project cycle as part of ESMP generics. These gender mainstreaming activities will also cut across the project cycle key phases.

    1. Solid (organic) and liquid waste generation and sourcing or collection in an integrated way
    2. Solid (organic) and liquid waste resource (energy) recovery through biogas plant
    3. Franchise of resources recovered (energy) through transmission and distribution

192. In particular, to ensure that proposed strategies are EMPOWERING for women, men and other vulnerable social groups the following activities will be undertaken or implemented:

    1. Stakeholder engagement plan will include the identification of and consultation with women's and men's groups involved in solid and liquid waste generation and sourcing within the identified sites throughout the project phases.
    2. Identify constraints to women's and vulnerable social groups' participation (such as lack of skills, poor mobilization) and develop strategies to minimize them and enhance their participation. At the detailed consultative stage after site selection, the consultant will identify and develop a strategy for skills building and training needs related to women and vulnerable social groups' participation in the project (through skills building, training in resource separation, health and safety issues).
    3. Positive discrimination (quotas) for women's participation during specific phases of the project such as at the generation and sourcing of organic solid wastes (as promoters or guides of resource separation) will be implemented as part of the project.
    4. Local community leadership structures will be integrated into project implementation design and the design provides for the inclusion of women (1/3) in such committees including the ESMP related activities.
    5. Special assistance programs or interventions will be arranged for at least three women's and other vulnerable social groups such as the youth and how such groups can be co-opted during the franchise and distribution of resources recovered (Prepaid Energy Token Cards).
    6. Waste sector jobs during the construction of the biogas plant will be reserved for local youth and women's groups.
    7. Some members of these women's and youth groups will also be trained in basic technology and skills for constructing and maintaining domestic biogas plants.
    8. Adequate budget provisions for women, men and vulnerable social groups' participation in the project implementation at relevant levels have been included in this project proposal (see the budget in Section X).
    9. During project evaluation, a Gender Impact Assessment (GIA) using gender sensitive indicators will be considered as part of the project evaluation.

iii. South-South and Triangular Cooperation (SSTrC):

193. UNDP has a strong role to play as knowledge broker, capacity development supporter and partnership facilitator when developing countries work together to find solutions to common development challenges. The UNDP-GEF Project will support South-South and Triangular Cooperation (SSTrC) through a variety of cooperation modalities. The project will develop bi-lateral knowledge exchanges and explore technology transfer with other UNDP-GEF biogas projects operating in Argentina, Indonesia, Egypt, Somalia and Brazil. The project will also explore areas of cooperation with other Sub-Saharan African countries for replication of project successes and sharing of lessons learned.

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instruments aimed at narrowing the gender (inequality) gap and promoting equity in access to livelihood opportunities and control of resources or development project(s) outcomes.

V. FEASIBILITY

i. Cost efficiency and effectiveness:

194. The project is considered very cost effective. The cost per tonne of direct GHG reduction to the GEF based solely on renewable energy and then also including methane emissions reductions is shown in the table below. A similar marginal cost of reduction can be expected from the UNDP grant utilising TRAC resources.

Table 4: Cost per tonne of GHG reduction

GEF project grant	$2,170,030
Lifetime tonnes of CO_2 reduced - only electricity production	223,300
Cost per tonne of GHG reduction to the GEF - only electricity production	$9.72
Lifetime tonnes of CO_2eq reduced - electricity production and methane reduction	1,766,291
Cost per tonne of CO_2eq reduction to the GEF - electricity production and methane reduction	$1.23

195. The project's approach involves a mix of business models which can be replicated both within Uganda and elsewhere. The combination of grant mechanisms, technical assistance, and guarantee schemes financed by other organizations is expected to have a significant market impact and help to address the serious waste management issues in Uganda – helping create a better market for waste management and renewable power production.

196. Furthermore, it is noteworthy that the Feed-in-Tariff for biogas-based electricity (US $0.115 per kWh) is substantially less than the current retail price of electricity in Uganda. The lowest domestic price available in 2016 is approximately US $0.15 per kWh.[27]

ii. Risk Management:

197. As per standard UNDP requirements, the Project Manager will monitor risks quarterly and report on the status of risks to the UNDP Country Office. The UNDP Country Office will record progress in the UNDP ATLAS risk log. Risks will be reported as critical when the impact and probability are high (i.e. when impact is rated as 5, and when impact is rated as 4 and probability is rated at 3 or higher). Management responses to critical risks will also be reported to the GEF in the annual PIR.

[27] See the Ugandan Electricity Regulatory Authority's published domestic tariffs: http://era.or.ug/index.php/statistics-tariffs/tariffs/distribution-tariffs/2014-10-14-10-24-55

Table 5: Project Risks

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
Lack of investor appetite: A number of factors may hinder investor interest in MSW-based biogas energy projects including: • Perceived risks of a commercial approach including PPPs for waste management and biogas. • High operational and financial risks. • Lack of guaranteed revenues on non-electricity products. • Limited successful examples**.**	Financial	Moderate	The project will explain the benefits and value chain of MSW-based biogas plants, different business models and PPPs. The project will engage key financial sector players, notably the Uganda Investment Authority, Private Sector Foundation Uganda, the Uganda Energy Credit Capitalization Company, commercial banks and IFIs. The project will work closely with potential PPP stakeholders, building their knowledge of technology and business models and providing technical assistance to assess feasibility and finance options under the Activities of Components 2 and 3. Furthermore, the Ugandan Government is committed to increasing private sector participation in the waste sector. Under component three, the project will assist private project developers to access finance under financial mechanisms such as grants and guarantees – increasing the financial attractiveness and decreasing risks from project finance. The Grant and Technical Assistance Fund developed under Output 3.3 will leverage private sector investment and lending from IFIs and local FIs. The project also facilitates access to available guarantee schemes from Sida and UECCC that would also help to facilitate financial closure. By developing knowledge, capacity and proposing business models for MSW-based biogas plants alongside technical assistance and grants, the project will remove access to finance barriers.	UNDP CO	No change
Feedstock risk: In Uganda, the municipal sector, and to a lesser extent the agro-processing sector, has been slow to adopt new technologies to address waste management. Furthermore, in the absence of examples of MSW-based biogas, investment costs are high and often seen as risky. Therefore, the waste sector in Uganda requires incentives or enforcement to attract investors in waste management and	Operational	Moderate	Risks will be mitigated by technical assistance activities supporting the development and strengthening the capacities and regulatory framework of the waste management sector in Uganda. Under Component 1, the Project will support MLHUD to develop the National Waste Management Strategy and IWM enforcement strategies by submitting proposals and providing updates and recommendations for inclusion of waste-to-energy considerations. Experts will also assist councils update local municipal ordinances in line with the National Waste Management Strategy and IWM enforcement strategies. Risks are further mitigated through Output 1.5, whereby multiple stakeholders take on responsibility for addressing waste through the establishment of a multi-stakeholder platform on waste management and biogas. A lack of financial incentives will be mitigated through Output 1.4 that will introduce incentives into the national policy, legal and regulatory environment to promote increased uptake of IWM and biogas technology. These measures will aim to reduce the financial risks for investors and ensure bankable projects.	UNDP CO	No change

biogas technologies – which will allow for separation of waste sources.					
Environment/ climate risk: Environmental factors, including the effects of climate change such as drought and other factors) could lead to a loss of feedstock and delay or abandonment of MSW-based biogas projects.	Operational	Low	This is an external risk to the project that will be mitigated in the context of a variety of other activities such as; Uganda enacting the National Drought Policy; the Strategy for Enhancing Communities Resilience to Drought; strengthening the institutional framework, resource mobilization and allocation as well as measures to ensure balance between emergency response and long-term development. Loss of feedstock due to drought and other factors will be considered as part of the feasibility studies for the biogas digesters, which will use conservative assumptions regarding the minimum amount of waste effluent feedstock that will be needed to operate on a commercial basis and the risk of an interruption in supply because of drought-related factors.	UNDP CO	No change
Environment/ operational risk: Negative environmental impacts of the biogas pilots could lead to a delay or abandonment of MSW-based biogas projects.	Operational	Low	Local environmental factors will be assessed during the feasibility and commissioning phase of MSW-based biogas sites. Principal risks include contamination of aquifers, nuisance, odours, health risks and animal diseases. A due diligence project development process, monitoring of operations, and active intervention if needed are foreseen to ensure operation will be within established parameters and in compliance with the applicable regulations. The impact of biogas energy systems mainly involves safety aspects related to the collection and piping of the combustible gas. Where biodigesters are planned, these bring along transport of organic material, and some additional space for handling. These effects are negligible at the scale of a large, integrated MSW treatment facility. The GEF project will prepare the environmental, safety and social studies and paragraphs applicable to the biogas energy projects as required for the permitting process.	UNDP CO and NEMA	No Change
Environmental risk: The Project may potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts.	Environmental	Moderate	During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks. During Project implementation this level of risk is likely to be moderate if specific training is provided to personnel and a systematic M&E plan is implemented to include the use of devices where appropriate and indicators to identify pollutants due to routine practices. Similarly, non-routine circumstances will need to be addressed within an Emergency Plan to coordinate the rapid response in the plant to prevent the impact due to these pollutants. Additionally, to ensure all potential pollutants are identified and assessed an Environmental Impact Assessment specific to each implementation site will study this potential risk at both Project preparation and implementation and provide the pertinent measures to minimise it.	UNDP CO and NEMA	No change

			Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project. The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.		
Social risk: The Project may not give local communities or individuals the opportunity to raise human rights concerns regarding the Project during the stakeholder engagement process.	Social	Moderate	A stakeholder platform will be established to be representative vertically (i.e. are all the groups affected well represented) and horizontally (i.e. weight of voice within platform), appropriate channels of communication will be provided for each represented group (i.e. in particular for the informal sector that may be illiterate), and will be provided with an active role throughout all phases of the Project (i.e. from the design to M&E). For that a consultation and communication plan will be prepared and implemented at the investment preparation phase as well as the implementation phase to clearly disseminate information and gather feedback in time regarding the needs and priorities of all stakeholders. All sessions and communication modes will be offered also in local languages and follow the customs and norms of local communities. For that the implementation tools elaborated in 2013 at the REDD+ program in Uganda will be used. The mechanism includes components: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process. This will be required for each site in the Project which will address the specific risks. For example, through a public log in the Project areas that will be available to local communities and individuals to gather and resolve their concerns.	UNDP CO	No change
Social risk: The Project would potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits.	Social	Moderate	The Project preparation team included a dedicated gender expert, with gender-related expertise, local knowledge, and experience. A Gender Assessment by the local gender expert will be carried out specific to each implementation site as part of a comprehensive ESIA / ESMP during Project preparation with women's groups involved in waste management and their participation will be targeted and enhanced in the Project design. The following activities will be undertaken or implemented to ensure that proposed strategies are non-discriminatory and empowering for women, men and other vulnerable social groups: o Identify constraints to women's and vulnerable social groups' participation and develop strategies to minimize the constraints and enhance their participation; o Develop a strategy for skills building and training needs related to women and vulnerable social groups participation in the Project; o Positive discrimination and/or reservations for women's	UNDP CO	No change

			participation at specific phases of the Project (as promoters or guides of resource separation); o Project management structures will include provision for women (1/3) in such committees; and Gender specific outputs and indicators will be incorporated. Subsequently, an autonomous Gender Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with the environmental and social safeguards identified along the Project.		
Technical/ operational risk: Energy production from MSW-based biogas has been proven in other country situations to be technically and economically feasible solution. However, high-tech biogas technology is unfamiliar in Uganda, there is a lack of successful examples, and there is limited capacity to manage high-end biogas systems. Technical failures, either due to equipment failure or poor installation, poor operational management and maintenance lead to loss of trust in the performance of biogas technology.	Operational	High	The project intends to utilise proven, feasible and affordable biogas technologies and duplicate solutions successfully introduced in countries with developed biogas sectors (with adaptation to local conditions). To mitigate risks of limited technical capacity, sufficient capacity will be created to ensure sound operation of biogas digesters. Technical support and training programmes for technical staff for pilot sites and preparation of manuals and procedures under Output 2.3 will develop sufficient capacity for adequate operation of biogas digesters. Issues that may affect operation including feedstock composition and contamination (plastics), traces of inhibitors and toxic substances (such as heavy metals), and temperature control. Mitigation measures under 2.3 including monitoring and optimisation of operational procedures and technical performance of pilot plants as well as ensuring adequate process controls regarding plant operation and feedstock sorting processes will be introduced as part of project preparation and where necessary corrective actions will be taken. This is particularly the case where digestate will be used as a by-product such as soil conditioner Monitoring and optimisation of operational procedures will provide lessons for replication of biogas technology for MSW in Uganda. Due to the high level of risk of technical failure, the project employs additional risk mitigation measures. Measures include: i) the technical backstopping activities provided by the Waste and Biogas expert; and ii) technology providers/contractors shall include a training programme for operators in their offers, as well as extensive after-sales services and provisions for technical failure to be delivered under Output 2.5.	UNDP CO	No change
Construction risk: Construction and operation of biogas plants pose a range of safety issues, potential risks and hazards for humans, animals and the environment	Organizational	High	Appropriate precautions and safety measures will be taken to avoid related risks and hazardous situations, and ensure a safe operation of the proposed biogas plants. Training of biogas plant construction and operating personnel will be aligned with the Government's occupational health and safety regulations and international best practices in the biogas sector. Training provided to operators by contractors under Output 2.5 will include a specific module on health and safety in the workplace.	UNDP CO	No change

			The National Environment Act (Cap 153), Section 20 EIA Regulations S.I. No. 13/1998 requires construction projects such as biogas plants to undergo an individual Environmental Impact Assessment before their implementation. The National social and environmental expert will prepare the environmental, safety and social studies and paragraphs applicable to the biogas energy projects as required for the permitting process.		
Management risk: The Implementing Partner (MEMD) would lack the managerial and technical capacity to implement the Project.	Organizational	Low	The MEMD have ample experience executing programmes financed by multilateral agencies (World Bank) and are familiar with reporting procedures, audits and evaluations as required by multilateral agencies. The Ministry also has specific experience with UNDP and the GEF.		
Political risk: In the face of competing priorities, the political will to comprehensively address waste management may not be sustained.	Political	Low	The broad engagement of stakeholders through the NAMA identification process has ensured the ownership and commitment of lead government agencies. The stakeholder-driven process has naturally selected the most engaged and committed stakeholders to develop the NAMA.	UNDP CO	No change

iii. Social and environmental safeguards:

198. The Social and Environmental Screening established at the PIF stage led to the assessment of 3 risks. Nevertheless, the PPG phase has considered the study of alternative potential sites different to those established previously. Site re/evaluation has been an intrinsic part of the design phase therefore the revision of the Social and Environmental Screening was deemed necessary. This has led to a more comprehensive set of 22 risks based on an inclusive approach to consider these alternative sites as well as other hypothetical sites that may be considered at a later stage.

199. Environmental and social grievances will be reported to the GEF in the annual PIR.

200. At the PIF stage the Social and Environmental risks were identified through the Social and Environmental Risk Screening Checklist. The project was classified as "High risk" as per Social and Environmental Screening Procedure (SESP) guidance, which lists Municipal solid waste processing and disposal facilities as a high risk activity.

201. During project preparation the SESP analysis was thoroughly revised to explore each Social and Environmental risk in detail. Each risk identified is defined and rated according to its level of 'impact' and 'probability' rated on a scale of 1 (low) to 5 (high) for each risk. Depending on the combination of both scores, risks are considered either: Low, Moderate or High significance. Furthermore, assessment and management measures are formulated to address risks with Moderate and High Significance. For a full description of social and environmental safeguards employed by the project please see Annex F: UNDP Social and Environmental and Social Screening Template (SESP) and Annex G: Environmental and Social Management .

202. The present project design includes the identification of the potential locations for the pilot initiatives through the work with stakeholders. It is expected that the details of certain components of the project will not be known at the time of project approval and therefore the E&S safeguards cannot be fully assessed. Under this scenario and according to the latest UNDP SES guidelines the SESP is still applied, disclosed and discussed with stakeholders prior to implementation to identify potential risks even if they cannot yet be fully assessed. Furthermore, an initial management plan is prepared as part of the ProDoc for PAC review that incorporates activities and budget. In this case an Environmental and Social Management Framework (ESMF) will be developed in place of an ESMP.

203. The ESMF will set out the following items:

- Principles, rules, guidelines and procedures to assess the social and environmental risks and impacts.
- Measures and plans to reduce, mitigate and/or offset adverse risks and impacts.
- Provisions for estimating and budgeting the costs of such measures.
- Information on responsibilities for addressing project risks and impacts.

204. Afterward, at the implementation phase a site specific SESA and ESIA will be developed as required by the E&S Standards and Guidance and Ugandan environmental law.

205. Furthermore, at the implementation stage an ESMP will be developed also based on the SESA and ESIA previously compiled. The idea of the plan is to ensure that there is a detailed strategy tailored at the final sites selected for addressing any negative consequences that may occur due to the adaptation measures or capacity building measures taken as part of the project. This ESMP will contain SMART indicators as well as a budget for specific activities and/or investments that should

be undertaken as part of the project implementation and will be submitted for approval through the validation workshop, the UNDP and NEMA, and all comments will be addressed.

iv. Sustainability and Scaling Up:

206. The project has been designed in a way to ensure that project results are sustained well beyond the life of the project. Capacity development of town councils are an important element to enable municipalities to plan and manage waste much more effectively. In developing business models, special attention will be paid to operations and maintenance and revenue streams. Partnerships will be forged with well-established technology providers to ensure that quality systems are procured. Furthermore, the multi-stakeholder platform that is set up will endure beyond the project duration and will emphasize the importance of a shared responsibility on waste management. The incentives that are put in place will help to stimulate market development of waste-to-energy technology. Finally, the proposed demonstration plants will give confidence to both residents and investors on the viability and suitability of biogas plants as a means of managing municipal organic waste and waste from the agro-processing industry.

207. There is a vast growth potential for the waste-to-biogas management sector in Uganda, given the underlying drivers discussed earlier and the fact that it is such an important priority and concern. MSW-based biogas installations for energy generation have a large replication potential in Uganda and other countries in the region. There is significant potential to scale up given that open dumpsites are still a common practice in many municipalities and current compliance levels among major urban polluters are very low. There is also strong interest and support from urban authorities to address this issue. If a successful model is demonstrated, the waste management solution would be taken up by many other districts and municipalities in the country. The proposed GEF project aims to address the key barriers to unleash this potential.

208. As this GEF project represents one of the government's top priority NAMAs, efforts will be made to attract international financial assistance for scale-up. Initial estimates of the 10-year scope for market expansion indicate that an additional 23 MW could be put into place using biogas-to-electricity technology. Assuming half of this could actually be developed, this is consistent with the initial cost estimates in the NAMA for technology support and a credit facility totalling $53.7 million, of which $20 million will be sought from bilateral and multilateral donors. A subsequent, follow on GCF-funded program could be another important means to scale up the project results – potentially even using less donor support. Efforts will be made to ensure that this GEF project will generate the data and detailed analysis that would be required to put together a GCF proposal at a later stage.

v. Economic and/or financial analysis:

209. Pre-feasibility analysis was carried out to analyse the economic and financial costs/benefits for investments in waste-to-biogas-to-electricity investments. This is described in detail for municipal waste programmes in Annex N. The results of the economic and financial analyses on biogas reveal the following:

- The biogas plants are economically viable but not financially viable without a grant and/or a substantial tipping fee. The IRRs are positive even without taking into account positive externalities such as reduced pollution.
- Whilst sources of potential municipal solid waste and wastewater for power production were identified, in order to realize the technical potential, private sector investment (private-public

partnerships) likely in a combination with leveraged finance from financial institutions would be necessary.

- The non-leveraged Internal Rate of Return (IRR) on an investment of 0.5 MW was estimated to be in the range of 10 – 11% without an off-taker fee for waste (a tipping fee) and 12-13% with a tipping fee of US $5.00 per tonne of organic waste.
- Leveraged IRRs with a 20% grant provided by the UNDP-GEF project could reach 17 – 20% (depending upon financing terms). The leveraged IRR without a grant and a 40%/60% equity-to-debt ratio would be approximately 14%.
- Based upon experience in other markets, it is estimated that a discount rate of at least 20% should be applied – meaning that an investment without a grant is unlikely to be sufficiently attractive to trigger investments in a public private partnership.

VI. PROJECT RESULTS FRAMEWORK

This project will contribute to the following Sustainable Development Goal (s): (5) Gender equality; (6) clean water and sanitation; (7) affordable and clean energy; (9) industry innovation and infrastructure; (11) sustainable cities and communities; (12) responsible consumption and production; (13) climate action.					
This project will contribute to the following country outcome included in the UNDAF/Country Programme Document: CP Outcome: 3.1. By end 2020, natural resources management and energy access are gender responsive, effective and efficient, reducing emissions, negating the impact of climate-induced disasters and environmental degradation on livelihoods and production systems, and strengthening community resilience.					
This project will be linked to the following output of the UNDP Strategic Plan: Output 1.4: Scaled up action on climate change adaptation and mitigation cross sectors which is funded and implemented.					
	Objective and Outcome Indicators	**Baseline**	**Mid-term Target**	**End of Project Target**	**Assumptions**
Project Objective: Improved waste management practices in towns and municipalities through the introduction of integrated wastewater treatment plants and biogas digesters	*Indicator 1:* Achieved direct GHG emission reductions by pilot biogas energy plants and replication (ton CO_2eq/yr)	0 tonnes CO2eq/yr;	12,200 tonnes CO2eq/yr	88,300 tonnes CO2eq/yr	Sustained commitment of national authorities and provincial and municipal stakeholders. Project activities can be implemented as planned. Adequate technical and operational performance of installed biogas systems.
	Indicator 2: Number of people benefitting from improved organic waste management	0	7,500 (male = 3,750, female = 3,750)	1,980,000 (male = 990,000, female = 990,000)	
	Indicator 3: Financing mobilized for investment in MSW-based biogas energy systems (US$)	0	US$ 6.5 million	US$ 11.5m	
	Indicator 4: Annual volume of electric energy produced by biogas pilots (MWh/yr)	0 MWh/yr	2,800 MWh/yr	20,300 MWh/yr	
Component 1: Establishing enabling market conditions, institutional strengthening and capacity building for improved waste management and promotion of MSW-based biogas systems **Outcome 1:** Enhanced capacity of municipalities to develop waste management plans and manage municipal solid waste and wastewater in a more sustainable manner	Number of policy and regulatory proposals developed and adopted (#)	0	3	Support to 5 municipalities to introduce MSW disposal/off-taker fees and enforcement frameworks	Sustained commitment of national authorities and provincial and municipal stakeholders. Specific policy framework and MSW planning support to integrate biogas energy systems into national and municipal level programme and incentive mechanisms. Adequate technical and operational performance of installed biogas systems.
	Number of municipalities (#) reporting increased capacity to undertake IWM, as a result of the projects capacity development activities	0	13	19	
	Multi-stakeholder platform established *(in line with UNDP Country Programme* Output indicator: 3.1.3.1: No. of functional platforms established to engage citizens at all levels for sustainable environment and natural resources, disaggregated by category)	0	1	1	
Component 2: Demonstration and investment	Installed electricity generating capacity of MSW-based biogas pilot projects (MW)	0 MW	0.4 MW from Kakira sugar works	2.9 MW from all demonstration sites	Sustained commitment of national authorities and

in integrated wastewater treatment and biogas plants **Outcome 2:** Biogas and WWT plants using MSW feedstock and sewage sludge procured and fully operational	Number of investments undertaken	0	2	3	provincial and municipal stakeholders. Project activities can be implemented as planned. Adequate technical and operational performance of installed biogas systems.
Component 3: Scale up the use of biogas technologies in other municipalities **Outcome 3:** Biogas technology replicated in other potential municipalities with the help of a grant and technical assistance fund	Grant/technical assistance fund and approach to attract investment into MSW-based biogas sector established	-	-	Grant/ technical assistance fund established	
	Number of MSW-based biogas project concepts prepared (#)	0	0	5 concepts prepared	
	Grants disbursed from the fund (either technical assistance or investment)	0	0	US $900,000	
Component 4: Knowledge Management and Monitoring and Evaluation **Outcome 4:** Lessons learnt and success of the demonstration projects supports replication and scaling-up of project results	Number of Knowledge Management products developed and disseminated (#)	0	Project website established (1) Guidelines on waste management practices established and disseminated (1)	Project website updated (1) Guidelines on waste management practices updated and disseminated (1) Lessons learned and best practices documented and disseminated (1)	
	Standardised baselines for calculating emissions reductions established	-	-	Standardised baselines for emissions reductions from biogas	
	NAMA registered on the UNFCCC Registry			UNDP/GEF Project is a registered UNFCCC NAMA for Uganda	

VII. MONITORING AND EVALUATION (M&E) PLAN

210. The project results as outlined in the project results framework will be monitored annually and evaluated periodically during project implementation to ensure the project effectively achieves these results. Supported by Component/Outcome Four: Knowledge Management and M&E, the project monitoring and evaluation plan will also facilitate learning and ensure knowledge is shared and widely disseminated to support the scaling up and replication of project results.

211. Project-level monitoring and evaluation will be undertaken in compliance with UNDP requirements as outlined in the UNDP POPP and UNDP Evaluation Policy. While these UNDP requirements are not outlined in this project document, the UNDP Country Office will work with the relevant project stakeholders to ensure UNDP M&E requirements are met in a timely fashion and to high quality standards. Additional mandatory GEF-specific M&E requirements (as outlined below) will be undertaken in accordance with the GEF M&E policy and other relevant GEF policies.

212. In addition to these mandatory UNDP and GEF M&E requirements, other M&E activities deemed necessary to support project-level adaptive management will be agreed during the Project Inception Workshop and will be detailed in the Inception Report. This will include the exact role of project target groups and other stakeholders in project M&E activities including the GEF Operational Focal Point and national/regional institutes assigned to undertake project monitoring. The GEF Operational Focal Point will strive to ensure consistency in the approach taken to the GEF-specific M&E requirements (notably the GEF Tracking Tools) across all GEF-financed projects in the country. This could be achieved for example by using one national institute to complete the GEF Tracking Tools for all GEF-financed projects in the country, including projects supported by other GEF Agencies.

M&E Oversight and monitoring responsibilities:

213. Project Manager: The Project Manager is responsible for day-to-day project management and regular monitoring of project results and risks, including social and environmental risks. The Project Manager will ensure that all project staff maintain a high level of transparency, responsibility and accountability in M&E and reporting of project results. The Project Manager will inform the Project Board, the UNDP Country Office and the UNDP-GEF RTA of any delays or difficulties as they arise during implementation so that appropriate support and corrective measures can be adopted.

214. The Project Manager will develop annual work plans based on the multi-year work plan included in Annex A, including annual output targets to support the efficient implementation of the project. The Project Manager will ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality. This includes, but is not limited to, ensuring the results framework indicators are monitored annually in time for evidence-based reporting in the GEF PIR, and that the monitoring of risks and the various plans/strategies developed to support project implementation (e.g. gender strategy, KM strategy etc..) occur on a regular basis.

215. Project Board: The Project Board will take corrective action as needed to ensure the project achieves the desired results. The Project Board will hold project reviews to assess the performance of the project and appraise the Annual Work Plan for the following year. In the project's final year, the Project Board will hold an end-of-project review to capture lessons learned and discuss opportunities for scaling up and to highlight project results and lessons learned with relevant audiences. This final review meeting will also discuss the findings outlined in the project terminal evaluation report and the management response.

216. Project Implementing Partner: The Implementing Partner is responsible for providing any and all required information and data necessary for timely, comprehensive and evidence-based project reporting, including results and financial data, as necessary and appropriate. The Implementing Partner will strive to ensure project-level M&E is undertaken by national institutes, and is aligned with national systems so that the data used by and generated by the project supports national systems.

217. UNDP Country Office: The UNDP Country Office will support the Project Manager as needed, including through annual supervision missions. The annual supervision missions will take place according to the schedule outlined in

the annual work plan. Supervision mission reports will be circulated to the project team and Project Board within one month of the mission. The UNDP Country Office will initiate and organize key GEF M&E activities including the annual GEF PIR, the independent mid-term review and the independent terminal evaluation. The UNDP Country Office will also ensure that the standard UNDP and GEF M&E requirements are fulfilled to the highest quality.

218. The UNDP Country Office is responsible for complying with all UNDP project-level M&E requirements as outlined in the UNDP POPP. This includes ensuring the UNDP Quality Assurance Assessment during implementation is undertaken annually; that annual targets at the output level are developed, and monitored and reported using UNDP corporate systems; the regular updating of the ATLAS risk log; and, the updating of the UNDP gender marker on an annual basis based on gender mainstreaming progress reported in the GEF PIR and the UNDP ROAR. Any quality concerns flagged during these M&E activities (e.g. annual GEF PIR quality assessment ratings) must be addressed by the UNDP Country Office and the Project Manager.

219. The UNDP Country Office will retain all M&E records for this project for up to seven years after project financial closure in order to support ex-post evaluations undertaken by the UNDP Independent Evaluation Office (IEO) and/or the GEF Independent Evaluation Office (IEO).

220. UNDP-GEF Unit: Additional M&E and implementation quality assurance and troubleshooting support will be provided by the UNDP-GEF Regional Waste and Biogas Expert and the UNDP-GEF Directorate as needed.

221. **Audit**: The project will be audited according to UNDP Financial Regulations and Rules and applicable audit policies.[28]

Additional GEF monitoring and reporting requirements:

222. Inception Workshop and Report: A project inception workshop will be held within two months after the project document has been signed by all relevant parties to, amongst others:

a) Re-orient project stakeholders to the project strategy and discuss any changes in the overall context that influence project implementation;
b) Discuss the roles and responsibilities of the project team, including reporting and communication lines and conflict resolution mechanisms;
c) Review the results framework and finalize the indicators, means of verification and monitoring plan;
d) Discuss reporting, monitoring and evaluation roles and responsibilities and finalize the M&E budget; identify national/regional institutes to be involved in project-level M&E; discuss the role of the GEF OFP in M&E;
e) Update and review responsibilities for monitoring the various project plans and strategies, including the risk log; Environmental and Social Management Plan and other safeguard requirements; the gender strategy; the knowledge management strategy, and other relevant strategies;
f) Review financial reporting procedures and mandatory requirements, and agree on the arrangements for the annual audit; and
g) Plan and schedule Project Board meetings and finalize the first year annual work plan.

223. The Project Manager will prepare the inception report no later than one month after the inception workshop. The inception report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board.

224. GEF Project Implementation Report (PIR): The Project Manager, the UNDP Country Office, and the UNDP-GEF Regional Technical Advisor will provide objective input to the annual GEF PIR covering the reporting period July (previous year) to June (current year) for each year of project implementation. The Project Manager will ensure that the indicators included in the project results framework are monitored annually in advance of the PIR submission deadline so that progress can be reported in the PIR. Any environmental and social risks and related management plans will be monitored regularly, and progress will be reported in the PIR.

[28] See guidance here: https://info.undp.org/global/popp/frm/pages/financial-management-and-execution-modalities.aspx

225. The PIR submitted to the GEF will be shared with the Project Board. The UNDP Country Office will coordinate the input of the GEF Operational Focal Point and other stakeholders to the PIR as appropriate. The quality rating of the previous year's PIR will be used to inform the preparation of the subsequent PIR.

226. Lessons learned and knowledge generation: Results from the project will be disseminated within and beyond the project intervention area through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to the project. The project will identify, analyse and share lessons learned that might be beneficial to the design and implementation of similar projects and disseminate these lessons widely. There will be continuous information exchange between this project and other projects of similar focus in the same country, region and globally.

227. GEF Focal Area Tracking Tools: The following GEF Tracking Tool(s) will be used to monitor global environmental benefit results:

228. The baseline/CEO Endorsement GEF Focal Area Tracking Tool(s) – submitted in Annex D to this project document – will be updated by the Project Manager/Team and shared with *the* mid-term review consultants and terminal evaluation consultants (not the evaluation consultants hired to undertake the *MTR* or the TE) before the required review/evaluation missions take place. The updated GEF Tracking Tool(s) will be submitted to the GEF along with the completed Mid-term Review report and Terminal Evaluation report.

229. Independent Mid-term Review (MTR): An independent mid-term review process will begin after the second PIR has been submitted to the GEF, and the MTR report will be submitted to the GEF in the same year as the 3rd PIR. The MTR findings and responses outlined in the management response will be incorporated as recommendations for enhanced implementation during the final half of the project's duration. The terms of reference, the review process and the MTR report will follow the standard templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the UNDP Evaluation Resource Center (ERC). As noted in this guidance, the evaluation will be 'independent, impartial and rigorous'. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final MTR report will be available in English and will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and approved by the Project Board.

230. Terminal Evaluation (TE): An independent terminal evaluation (TE) will take place upon completion of all major project outputs and activities. The terminal evaluation process will begin three months before operational closure of the project allowing the evaluation mission to proceed while the project team is still in place, yet ensuring the project is close enough to completion for the evaluation team to reach conclusions on key aspects such as project sustainability. The Project Manager will remain on contract until the TE report and management response have been finalized. The terms of reference, the evaluation process and the final TE report will follow the standard templates and guidance prepared by the UNDP IEO for GEF-financed projects available on the UNDP Evaluation Resource Center. As noted in this guidance, the evaluation will be 'independent, impartial and rigorous'. The consultants that will be hired to undertake the assignment will be independent from organizations that were involved in designing, executing or advising on the project to be evaluated. The GEF Operational Focal Point and other stakeholders will be involved and consulted during the terminal evaluation process. Additional quality assurance support is available from the UNDP-GEF Directorate. The final TE report will be cleared by the UNDP Country Office and the UNDP-GEF Regional Technical Adviser, and will be approved by the Project Board. The TE report will be publically available in English on the UNDP ERC.

231. The UNDP Country Office will include the planned project terminal evaluation in the UNDP Country Office evaluation plan, and will upload the final terminal evaluation report in English and the corresponding management response to the UNDP Evaluation Resource Centre (ERC). Once uploaded to the ERC, the UNDP IEO will undertake a

quality assessment and validate the findings and ratings in the TE report, and rate the quality of the TE report. The UNDP IEO assessment report will be sent to the GEF IEO along with the project terminal evaluation report.

232. Final Report: The project's terminal PIR along with the terminal evaluation (TE) report and corresponding management response will serve as the final project report package. The final project report package shall be discussed with the Project Board during an end-of-project review meeting to discuss lesson learned and opportunities for scaling up.

Table 6: GEF M&E Requirements and M&E Budget:

GEF M&E requirements	Primary responsibility	Indicative costs to be charged to the Project Budget[1] (US$)		Time frame
		GEF grant	Co-financing	
Inception Workshop	UNDP Country Office	5,000	5,000	Within two months of project document signature
Inception Report	Project Manager	None	None	Within two weeks of inception workshop
Standard UNDP monitoring and reporting requirements as outlined in the UNDP POPP	UNDP Country Office	None	None	Quarterly, annually
Monitoring of indicators in project results framework	Project Manager	8,000	5,000	USD 4,000 per year - carried out annually
GEF Project Implementation Report (PIR)	Project Manager and UNDP Country Office and UNDP-GEF team	None	None	Annually
NIM Audit as per UNDP audit policies	UNDP Country Office	15,000	5,000	Annually or other frequency as per UNDP Audit policies, USD 3,000 per year
Lessons learned and knowledge generation	Project Manager	None	5,000	Annually
Monitoring of environmental and social risks, and corresponding management plans as relevant	Project Manager	10,000	5,000	On-going
	UNDP CO			
Addressing environmental and social grievances	Project Manager	4,000	None	On-going
	UNDP Country Office			
	BPPS as needed			
Project Board meetings	Project Board	None	5,000	At minimum annually
	UNDP Country Office			
	Project Manager			
Supervision missions	UNDP Country Office	None[2]	4,000	Annually
Oversight missions	UNDP-GEF team	None[3]	5,000	Troubleshooting as needed
Knowledge management as outlined in Outcome 4	Project Manager	21,730	None	On-going - to be covered as part of project fees
GEF Secretariat learning missions/site visits	UNDP Country Office and Project Manager and UNDP-GEF team	None	None	To be determined.

Mid-term GEF Tracking Tool	Project Manager	None	5,000	Before mid-term review mission takes place.
Independent Mid-term Review (MTR) and management response	UNDP Country Office and Project team and UNDP-GEF team	25,000	5,000	Between 2nd and 3rd PIR.
Terminal GEF Tracking Tool	Project Manager	10,000	5,000	Before terminal evaluation mission takes place
Independent Terminal Evaluation (TE) included in UNDP evaluation plan, and management response	UNDP Country Office and Project team and UNDP-GEF team	40,000	6,000	At least three months before operational closure
Translation of MTR and TE reports into English	UNDP Country Office	None	None	No translation necessary
TOTAL indicative COST				
Excluding project team staff time, and UNDP staff and travel expenses		*138,730*	*60,000*	

VIII. GOVERNANCE AND MANAGEMENT ARRANGEMENTS

233. Roles and responsibilities of the project's governance mechanism: The project will be implemented following UNDP's national implementation modality, according to the Standard Basic Assistance Agreement between UNDP and the Government of Uganda, and the Country Programme.

234. The **Implementing Partner** for this project is the Ministry for Energy and Mineral Development (MEMD). The Implementing Partner is responsible and accountable for managing this project, including the monitoring and evaluation of project interventions, achieving project outcomes, and for the effective use of UNDP resources. The project organisation structure is as follows:

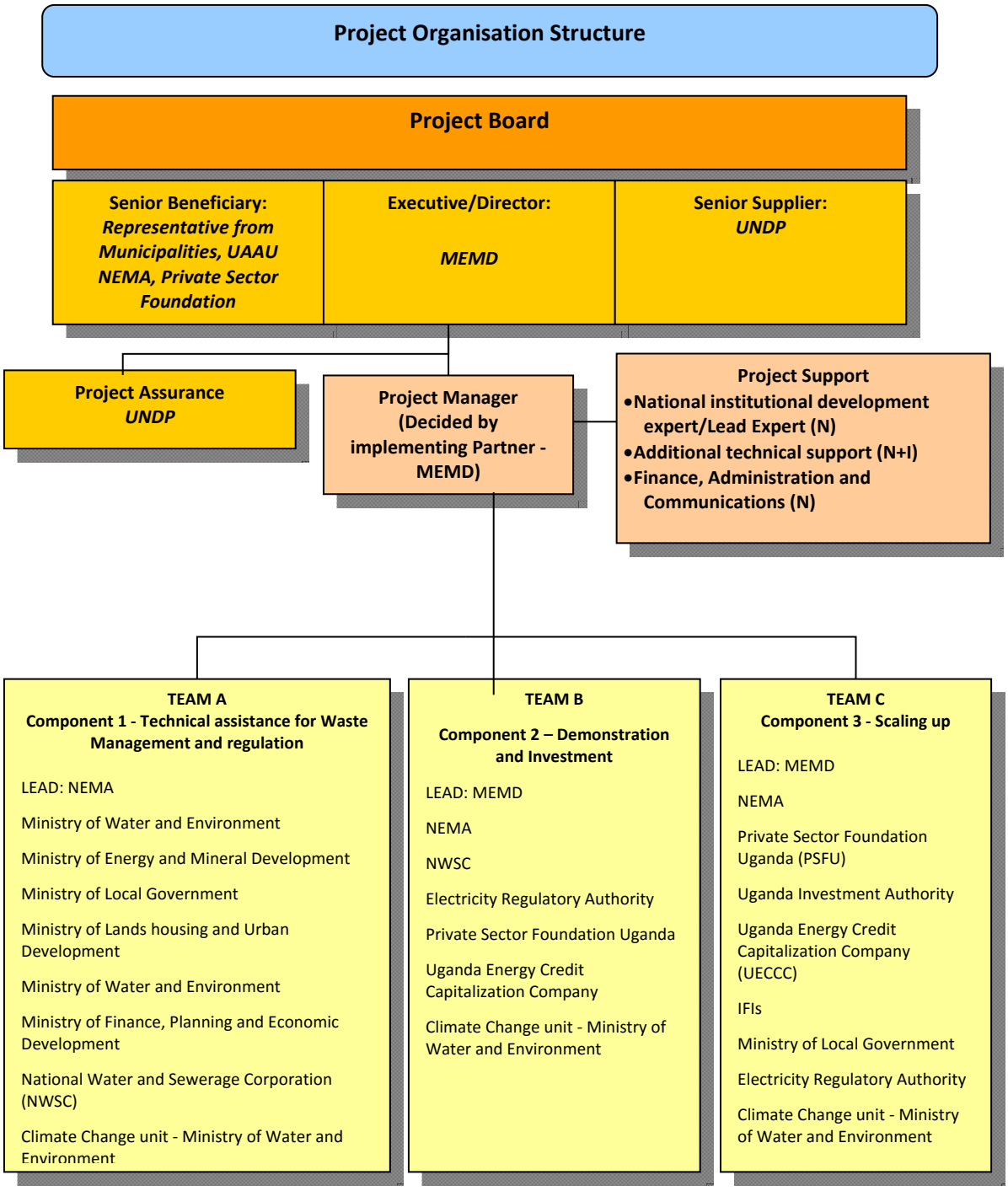

Figure 4: Project Organisation Structure

235. The **Project Board** (also called Project Steering Committee) is responsible for making by consensus, management decisions when guidance is required by the Project Manager, including recommendation for UNDP/Implementing Partner approval of project plans and revisions. In order to ensure UNDP's ultimate accountability, Project Board decisions should be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case a consensus cannot be reached within the Board, final decision shall rest with the UNDP Programme Manager.

236. The **National institutional development expert/lead expert** will act as the lead expert for liaising with stakeholders, developing work plans, and carrying out everyday management of the project – estimated to be committed over ½ time to the project over the course of its implementation period

237. The **Implementation partner lead representative:** will be nominated by MEMD and will run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager function will end when the final project terminal evaluation report, and other documentation required by the GEF and UNDP, has been completed and submitted to UNDP (including operational closure of the project).

238. The **project assurance** role will be provided by the Energy and Environment Unit at the UNDP Country Office, Uganda. Additional quality assurance will be provided by the UNDP Regional Technical Advisor, Regional Service Centre for Africa, Ethiopia as needed.

Governance role for project target groups:

UNDP Direct Project Services as requested by Government (if any): Please refer to Annex K on the Letter of Agreement on Direct Project Costs.

239. Agreement on intellectual property rights and use of logo on the project's deliverables and disclosure of information**:** In order to accord proper acknowledgement to the GEF for providing grant funding, the GEF logo will appear together with the UNDP logo on all promotional materials, other written materials like publications developed by the project, and project hardware. Any citation on publications regarding projects funded by the GEF will also accord proper acknowledgement to the GEF. Information will be disclosed in accordance with relevant policies notably the UNDP Disclosure Policy[29] and the GEF policy on public involvement[30].

240. Project management*:* The project will be operationalised through the use of a Project Implementation Unit. Key PIU management roles include:

- **National institutional development expert/lead expert:** who will act as the lead expert for liaising with stakeholders, developing work plans, and carrying out everyday management of the project – estimated to be committed over ½ time to the project over the course of its implementation period
- **Finance and administration assistant:** who will carry out all administrative and financial activities

241. The project will coordinate with other projects (for additional details please see partnership details in section IV).

[29] See http://www.undp.org/content/undp/en/home/operations/transparency/information_disclosurepolicy/
[30] See https://www.thegef.org/gef/policies_guidelines

IX. FINANCIAL PLANNING AND MANAGEMENT

242. The total cost of the project is USD $17,308,030. This is financed through a GEF grant of USD $2,170,030, and USD $900,000 in cash co-financing from TRAC resources to be administered by UNDP and USD $14,238,000 in parallel co-financing. UNDP, as the GEF Implementing Agency, is responsible for the execution of the GEF resources and the cash co-financing transferred to UNDP bank account only.

243. Parallel co-financing: The actual realization of project co-financing will be monitored during the mid-term review and terminal evaluation process and will be reported to the GEF. The planned parallel co-financing will be used as follows:

Co-financing source	Co-financing type	Co-financing amount (US $)	Planned Activities/Outputs	Risks	Risk Mitigation Measures
UNDP	Cash	900,000	- Grant for Component 3. Scale up the use of biogas technologies in other municipalities	Risk of reallocation of TRAC resources	Project successes to be shared with UNDP regional and global offices
NEMA	In-kind	381,000	- In-kind contribution for Component 1: Establishing enabling market conditions, institutional strengthening and capacity building for improved waste management and promotion of MSW-based biogas systems - In-kind contribution for Project Management	Shift in government priorities to other technologies	On-going dialogue and partnership with authorities.
MEMD	In-kind	557,000	- In-kind contribution for Component 3: Scale up the use of biogas technologies in other municipalities - In-kind contribution for Project Management	Shift in government priorities to other technologies	On-going dialogue and partnership with authorities.
NWSC	Equity	7,800,000	- Investment in biogas facility under Component 2: Demonstration and investment in integrated wastewater treatment and biogas plants	- Failure to obtain finance - Shift in investment priorities - Technical risks of plant operation	Technical assistance provided for project development and to facilitate financing. Grant provided to improve profitability.
KCCA	Equity	2,250,000	- Investment in biogas facility under Component 2: Demonstration and investment in integrated wastewater treatment and biogas plants	- Failure to identify PPP partner - Shift in investment	Technical assistance provided for project development and to facilitate financing. Grant provided to

Co-financing source	Co-financing type	Co-financing amount (US $)	Planned Activities/Outputs	Risks	Risk Mitigation Measures
				priorities - Technical risks of plant operation	improve profitability.
Kakira Sugar Ltd	Equity	2,000,000	- Investment in biogas facility under Component 2: Demonstration and investment in integrated wastewater treatment and biogas plants	- Shift in investment priorities - Technical risks of plant operation	Technical assistance provided for project development and implementation
Uganda Energy Credit Capitalization Company	Guarantees	350,000	- Investment in guarantee mechanism under Component 3: Scale up the use of biogas technologies in other municipalities	- Shift in organisational priorities - Lack of market investment in general	Ongoing dialogue and partnership.
UN Capital Development Fund	Grant	900,000	Technical assistance, awareness raising, and grants for biogas and biomass energy	- Shift in organisational priorities	Ongoing dialogue and partnership.

244. Budget Revision and Tolerance: As per UNDP requirements outlined in the UNDP POPP, the project board will agree on a budget tolerance level for each plan under the overall annual work plan allowing the project manager to expend up to the tolerance level beyond the approved project budget amount for the year without requiring a revision from the Project Board. Should the following deviations occur, the Project Manager and UNDP Country Office will seek the approval of the UNDP-GEF team as these are considered major amendments by the GEF:

    a) Budget re-allocations among components in the project with amounts involving 10% of the total project grant or more;
    b) Introduction of new budget items/or components that exceed 5% of original GEF allocation.

245. Any over expenditure incurred beyond the available GEF grant amount will be absorbed by non-GEF resources (e.g. UNDP TRAC or cash co-financing).

246. Refund to Donor: Should a refund of unspent funds to the GEF be necessary, this will be managed directly by the UNDP-GEF Unit in New York.

247. Project Closure: Project closure will be conducted as per UNDP requirements outlined in the UNDP POPP. On an exceptional basis only, a no-cost extension beyond the initial duration of the project will be sought from in-country UNDP colleagues and then the UNDP-GEF Executive Coordinator.

248. Operational completion: The project will be operationally completed when the last UNDP-financed inputs have been provided and the related activities have been completed. This includes the final clearance of the Terminal Evaluation Report (that will be available in English) and the corresponding management response, and the end-of-project review Project Board meeting. The Implementing Partner through a Project Board decision will notify the UNDP Country Office when operational closure has been completed. At this time, the relevant parties will have already agreed and confirmed in writing on the arrangements for the disposal of any equipment that is still the property of UNDP.

249. Financial completion: The project will be financially closed when the following conditions have been met:

a) The project is operationally completed or has been cancelled;
b) The Implementing Partner has reported all financial transactions to UNDP;
c) UNDP has closed the accounts for the project;
d) UNDP and the Implementing Partner have certified a final Combined Delivery Report (which serves as final budget revision).

250. The project will be financially completed within 12 months of operational closure or after the date of cancellation. Between operational and financial closure, the implementing partner will identify and settle all financial obligations and prepare a final expenditure report. The UNDP Country Office will send the final signed closure documents including confirmation of final cumulative expenditure and unspent balance to the UNDP-GEF Unit for confirmation before the project will be financially closed in Atlas by the UNDP Country Office.

X. TOTAL BUDGET AND WORK PLAN

Total Budget and Work Plan			
Atlas Proposal or Award ID:	00100437	Atlas Primary Output Project ID:	00103399
Atlas Proposal or Award Title:	NAMA on Integrated Waste Management and Biogas in Uganda		
Atlas Business Unit	UGA 10		
Atlas Primary Output Project Title	NAMA on Integrated Waste Management and Biogas in Uganda		
UNDP-GEF PIMS No.	5574		
Implementing Partner	MEMD		

Budget

GEF Outcome/Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	See Budget Note:
Outcome 1: Enhanced capacity of municipalities to develop waste management plans and manage municipal solid waste and wastewater in a more sustainable manner	MEMD	62000	GEF	71200	International Consultants	6,000	6,000	40,000	0	0	52,000	1
				71300	Local Consultants	10,500	17,500	70,000	0	0	98,000	2
				71600	Travel	3,950	40,800	13,050	0	0	57,800	3
				74200	Audio Visual & Print prod Costs	0	0	10,000	0	0	10,000	4
				75700	Training, Workshop and conferences	1,000	9,000	20,000	0	0	30,000	5
				74500	Miscellaneous expenses	0	1,100	1,100	0	0	2,200	6
					Sub-total GEF	**21,450**	**74,400**	**154,150**	**0**	**0**	**250,000**	
					Total Outcome 1	**21,450**	**74,400**	**154,150**	**0**	**0**	**250,000**	
Outcome 2: Biogas and WWT plants using MSW feedstock and sewage sludge procured and fully operational	MEMD	62000	GEF	71200	International Consultants	40,000	54,400	16,800	6,400	6,400	124,000	7
				71300	Local Consultants	29,500	72,700	9,400	3,200	3,200	118,000	8
				71600	Travel	10,800	18,280	3,760	1,280	1,280	35,400	9
				72200	Equipment and Furniture	0	900,000	0	0	0	900,000	10
				74500	Miscellaneous expenses	0	520	1,040	520	520	2,600	11
					Sub-total GEF	**80,300**	**1,045,900**	**31,000**	**11,400**	**11,400**	**1,180,000**	

					Total Outcome 2	**80,300**	**1,045,900**	**31,000**	**11,400**	**11,400**	**1,180,000**	
Outcome 3: Biogas technology replicated in other potential municipalities with the help of a grant and technical assistance fund,	**MEMD**	**62000**	**GEF**	71200	International Consultants	0	9,600	24,000	20,800	9,600	64,000	12
				71300	Local Consultants	0	20,100	31,350	35,150	11,400	98,000	13
				71600	Travel	0	3,870	7,260	13,320	2,750	27,200	14
				72100	Contractual services-Companies	0	0	0	150,000	150,000	300,000	15
				75700	Training, Workshop and conferences	0	900	1,200	3,900	0	6,000	16
				74500	Miscellaneous expenses	0	0	60	1,357	1,349	2,765	17
					Sub-total GEF	**0**	**34,470**	**63,870**	**224,527**	**175,099**	**497,965**	
			UNDP	72200	Equipment and Furniture	**0**	**0**	**0**	**450,000**	**450,000**	**900,000**	18
					Total Outcome 3	**0**	**34,470**	**63,870**	**674,527**	**625,099**	**1,397,965**	
Outcome 4: Lessons learnt and success of the demonstration projects supports replication and scaling-up of project results	**UNDP**	**62000**	**GEF**	71200	International Consultants	0	0	17,500	0	31,500	49,000	19
				71300	Local Consultants	11,800	1,800	14,800	6,800	18,800	54,000	20
				74100	Professional services	3,000	3,000	3,000	3,000	3,000	15,000	21
				71600	Travel	620	620	4,820	1,270	7,570	14,900	22
				75700	Training, Workshop and conferences	5,000	0	0	0	0	5,000	23
				74500	Miscellaneous expenses	166	166	166	166	166	830	24
					Sub-total GEF	**20,586**	**5,586**	**40,286**	**11,236**	**61,036**	**138,730**	
					Total Outcome 4	**20,586**	**5,586**	**40,286**	**11,236**	**61,036**	**138,730**	
Project management unit	**UNDP**	**62000**	**GEF**	71300	Local Consultants	11,520	11,520	11,520	11,520	11,520	57,600	25
				71600	Travel	400	400	400	400	400	2,000	26
				72200	Equipment and Furniture	3,000	3,000	3,000	3,000	3,000	15,000	27

				72400	Communications and audio-visual equipment	3,000	3,000	3,000	3,000	3,000	15,000	28
				74596	Direct project costs	2,747	2,747	2,747	2,747	2,747	13,735	29
					Sub-total GEF	**20,667**	**20,667**	**20,667**	**20,667**	**20,667**	**103,335**	
					Total Management	**20,667**	**20,667**	**20,667**	**20,667**	**20,667**	**103,335**	
				Total GEF		**143,003**	**1,181,023**	**309,973.00**	**267,830**	**268,201**	**2,170,030**	
				Total UNDP					**450,000**	**450,000**	**900,000**	
				PROJECT TOTAL		**143,003**	**1,181,023**	**309,973**	**717,830**	**718,201**	**3,070,030**	

Summary of funds

	Amount Year 1	Amount Year 2	Amount Year 3	Amount Year 4	Amount Year 5	**Total**	Notes
GEF	143,003	1,181,023	309,973	267,830	268,202	**2,170,030**	Cash
UNDP	0	0	0	450,000	450,000	**900,000**	Cash
NEMA	76,200	76,200	76,200	76,200	76,200	**381,000**	Cash and in-kind, but not through UNDP's account
MEMD	111,400	111,400	111,400	111,400	111,400	**557,000**	
Private investors	0	6,025,000	6,025,000	0	0	**12,050,000**	
Other international donors (UNCDF)	0	0	300,000	300,000	300,000	**900,000**	
Other national stakeholders	0	87,500	87,500	87,500	87,500	**350,000**	
TOTAL	330,603	7,393,623	6,822,573	1,205,430	1,205,802	**17,308,030**	

1: Estimated 4 weeks International biogas and finance expert, 9 weeks International waste management expert

2: Estimated 62 weeks National waste and biogas expert, 24 weeks National institutional development expert/project manager, 8 weeks National communications expert

3: Plane tickets for international travel, DSAs, and in-country travel (including for events)

4: Brochures as part of the sensitisation campaign

5: Various workshops within municipalities, trainings within Kampala, Study visit outside of Uganda, and awareness raising events

6: Miscellaneous expenses could include stationary, additional event costs, etc.

7: Estimated 10 weeks International biogas and finance expert, 21 weeks International waste management expert

8: Estimated 72 weeks National waste and biogas expert, 2 weeks National institutional development expert/project manager, 44 weeks National social and environmental expert

9: Plane tickets for international travel, DSAs, and in-country travel

10: Equipment for pilot projects, including US $550,000 worth of equipment for biogas plant at the new Kampala landfill, US $350,000 worth of equipment for the biogas plant at the Nakivubo wastewater treatment plant.

11: Miscellaneous expenses could include additional travel costs, etc.

12: Estimated 8 weeks International biogas and finance expert, 8 weeks International waste management expert

13: Estimated 38 weeks National waste and biogas expert, 24 weeks National institutional development expert/project manager, 8 weeks National communications expert

14: Plane tickets for international travel, DSAs, and in-country travel

15: Contractual services will be procured for scaling up project implementation to additional sites.

16: Learning days at biogas sites

17: Miscellaneous expenses could include additional travel costs, event costs, etc.

18: Procurement of biogas equipment and auxiliary systems at additional sites.

19: Mid-term review and terminal evaluation

20: Estimated 50 weeks of National institutional development expert/project manager, 8 weeks of web-designer

21: The project budget includes an annual audit cost of US $3,000 as per M&E requirements.

22: Plane tickets for international travel, DSAs, and in-country travel

23: Project inception workshop and advisory meetings

24: Miscellaneous expenses could include additional travel costs, event costs, etc.

25: Estimated 16 weeks of the National institutional development expert/project manager, full time of a Finance and administration assistant

26: Plane tickets for international travel, DSAs, and in-country travel

27: Office equipment, computers, etc.

28: Phone expenses, internet

29: Direct Project Costs will include costs for processing payments to consultants, for expenses, etc.

* Note that all Miscellaneous expenses add up to less than 0.5% of the GEF grant

XI. LEGAL CONTEXT

Consistent with the Article III of the Standard Basic Assistance Agreement (SBAA), the responsibility for the safety and security of the Implementing Partner and its personnel and property, and of UNDP's property in the Implementing Partner's custody, rests with the Implementing Partner. To this end, the Implementing Partner shall:

a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;

b) assume all risks and liabilities related to the implementing partner's security, and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of the Implementing Partner's obligations under this Project Document [and the Project Cooperation Agreement between UNDP and the Implementing Partner][31].

The Implementing Partner agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via http://www.un.org/sc/committees/1267/aq_sanctions_list.shtml. This provision must be included in all sub-contracts or sub-agreements entered into under/further to this Project Document".

Any designations on maps or other references employed in this project document do not imply the expression of any opinion whatsoever on the part of UNDP concerning the legal status of any country, territory, city or area or its authorities, or concerning the delimitation of its frontiers or boundaries.

[31] Use bracketed text only when IP is an NGO/IGO

XII. MANDATORY ANNEXES

A. Multi-year work plan
B. Monitoring plan
C. Evaluation plan
D. GEF Tracking Tool (s) at baseline
E. Terms of Reference for Project Board, Project Manager, Chief Waste and Biogas Expert and other positions as appropriate
F. UNDP Social and Environmental and Social Screening Template (SESP)
G. Environmental and Social Management Plan (ESMP) for moderate and high risk projects only
H. UNDP Project Quality Assurance Report
I. UNDP Risk Log
J. Results of the capacity assessment of the project implementing partner and HACT micro assessment
K. Additional agreements - STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

Annex A: Multi-year work plan

Task/ Output	Responsible Party	Year 1				Year 2				Year 3				Year 4				Year 5			
1: Establishing enabling market conditions, institutional strengthening and capacity building for improved waste management and promotion of MSW-based biogas systems																					
Output 1.1 Capacity development of town councils and NGOs on integrated waste management	NEMA																				
Output 1.2 Support towns and municipalities on the design and development of waste management plans and introduction of MSW disposal/off-taker fees	NEMA																				
Output 1.3 Promotion of MSW biogas technology among municipalities, project developers, industry and the general public	NEMA																				
Output 1.4 Integration of MSW-based biogas in national policies, programmes and incentive instruments targeting renewable energy development, environmental protection and climate change mitigation	NEMA																				
Output 1.5 Multi-stakeholder platforms on waste management and biogas established, whereby stakeholders will take on joint responsibility	NEMA																				
2: Demonstration and investment in integrated wastewater treatment and biogas plants																					
Output 2.1 Business models designed for integrated wastewater treatment plants and biogas digesters for a range of plant sizes	UNDP																				
Output 2.2 Feasibility studies, permitting procedures and final engineering plans executed and	UNDP																				

Task/ Output	Responsible Party	Year 1				Year 2				Year 3				Year 4				Year 5			
formalization of responsibilities of project partners																					
Output 2.3 Technical support and training for pilot projects	UNDP																				
Output 2.4 Investment financing for the 3 plants facilitated and secured	UNDP																				
Output 2.5 Procurement and construction or modification of biogas demonstration plants	UNDP																				
3. Scale up the use of biogas technologies in other municipalities																					
Output 3.1 Development of a pipeline of MSW-based biogas projects	UNDP																				
Output 3.2: Mid and long-term strategy for the replication of biogas projects developed and implemented	MEMD																				
Output 3.3 Grant/technical assistance fund and approach to attract investment into MSW-based biogas sector developed	MEMD																				
4: Knowledge Management and Monitoring and Evaluation																					
Output 4.1 Project website	UNDP																				
Output 4.2 Guidelines on waste management practices updated, lessons learned and best practices documented and disseminated	UNDP																				

Task/ Output	Responsible Party	Year 1				Year 2				Year 3				Year 4				Year 5			
Output 4.3 Biogas technology for energy generation and lessons learned from pilot projects integrated into the national renewable energy and MEMD programmes, standardized baselines for calculating emission reductions established, and NAMA registered on the UNFCCC NAMA Registry.	UNDP																				
Output 4.4 Annual Project Implementation Reviews	UNDP																				
Output 4.5 Mid Term Review	UNDP																				
Output 4.6 Project Terminal Evaluation	UNDP																				
Project management																					
Project management	UNDP																				

Annex B: Monitoring Plan

The Project Manager will collect results data according to the following monitoring plan.

Monitoring	Indicators	Description	Data source / Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Project objective 1. Improved waste management practices in towns and municipalities through the introduction of integrated wastewater treatment plants and biogas digesters.	**Indicator 1:** Achieved direct GHG emission reductions by pilot biogas energy plants and replication (ton CO2eq/yr);	Direct emissions reductions achieved	Audits of pilot projects	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	Government remains fully committed to the need to reduce GHG emissions
	Indicator 2: Number of people benefitting from improved organic waste management	Number of people who will benefit from improved organic waste management including 7,500 employees of Kakira Sugar and the projected population of Kampala City of 1,980,000	Mid-term review and terminal evaluation	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report, Government plans, strategies and policy documents	Government remains fully committed to the need to reduce GHG emissions Project activities can be implemented as planned Adequate technical and operational performance of installed biogas systems
	Indicator 3: Financing	Finance has been mobilised for MSW-	Finance agreements	Annually Reported in	UNDP CO	Project terminal report	

Monitoring	Indicators	Description	Data source / Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	mobilized for investment in MSW-based biogas energy systems (US$)	based biogas energy systems		DO tab of the GEF PIR			
	Indicator 4: Annual volume of electric energy produced by biogas pilots (MWh/yr)	Electric energy is produced by biogas pilots	Data from plant owner	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report, PIRs	The investment in biogas technology is no longer deemed bankable; focus on other technologies for waste management
Project Outcome 1 Enhanced capacity of municipalities to develop waste management plans and manage municipal solid waste and wastewater in a more sustainable manner	Number of policy and regulatory proposals developed and adopted (#)	Policy and regulatory proposals developed and adopted	Policy and regulatory proposals	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report, Policy and regulatory proposals	
	Number of municipalities (#) reporting increased capacity to undertake IWM, as a result of the projects capacity development activities	Municipalities report increased capacity to undertake IWM as based on surveys.	Survey	Annually Reported in DO tab of the GEF PIR	UNDP CO	Technical guidance, methodologies and tools and their associated documentation. Training attendance. Project terminal report	Municipalities will actively participate in training
	Multi-stakeholder	Stakeholder	Collection of	Annually	UNDP CO	Project Terminal	Sustained

Monitoring	Indicators	Description	Data source / Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
	platform established	platform established	meeting notes, on-line forums, etc.	Reported in DO tab of the GEF PIR		Report	commitment of national authorities and provincial and municipal stakeholders.
Project Outcome 2 Biogas and WWT plants using MSW feedstock and sewage sludge procured and fully operational	Installed electricity generating capacity of MSW-based biogas pilot projects (MW)	Electricity generating capacity is installed	Power purchase agreements (PPA)	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	The investment in biogas technology is no longer deemed bankable; focus on other technologies for waste management
	Number of investments undertaken	Number of investments undertaken	Partnership documents and license issuances	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	
Project Outcome 3 Biogas technology replicated in other potential municipalities with the help of a grant and technical assistance fund	Grant/technical assistance fund and approach to attract investment into MSW-based biogas sector established	Grant/technical assistance fund established	Finance agreements	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	Adequate demand for, and competitively priced financing products able to provide, long-term financing. Banks' requirements for securities within clients' limits.
	Number of MSW-based biogas project concepts prepared (#)	MSW-based biogas conceptual proposals for biogas energy projects have been	MSW-based biogas Conceptual proposals	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	

Monitoring	Indicators	Description	Data source / Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
		established					
	Grants disbursed from the fund (either technical assistance or investment)	Grant / technical assistance facility utilised and has demand	Reporting from fund managers	Quarterly as part of fund management	UNDP CO	Reports of fund activity	Adequate demand for facility
Project Outcome 4 Lessons learnt and success of the demonstration projects supports replication and scaling-up of project results	Number of Knowledge Management products developed and disseminated (#)	Knowledge Management products have been developed and disseminated	Knowledge Management products including lessons learned studies and project website	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report, project website	Adequate demand for knowledge products
	Standardised baselines for calculating emission reductions established	Standardised baselines for calculating emission reductions established	UNFCCC	Annually Reported in DO tab of the GEF PIR	UNDP CO	Project terminal report	Government remains fully committed to the need to reduce GHG emissions
	NAMA registered on the UNFCCC Registry	NAMA registered on the UNFCCC Registry	UNFCCC Registry	Annually Reported in DO tab of the GEF PIR	UNDP CO	PIR, Mid-term Review, Project Terminal report	
Mid-term GEF Tracking Tool	N/A	N/A	Standard GEF Tracking Tool available at www.thegef.org Baseline GEF Tracking Tool included in Annex.	After 2nd PIR submitted to GEF		Completed GEF Tracking Tool, Project terminal report	

Monitoring	Indicators	Description	Data source / Collection Methods	Frequency	Responsible for data collection	Means of verification	Assumptions and Risks
Terminal GEF Tracking Tool	N/A	N/A	Standard GEF Tracking Tool available at www.thegef.org Baseline GEF Tracking Tool included in Annex.	After final PIR submitted to GEF		Completed GEF Tracking Tool, Project terminal report	
Mid-term Review	N/A	N/A	To be outlined in MTR inception report	Submitted to GEF same year as 3rd PIR	Independent evaluator	Completed MTR, Project terminal report	
Environmental and Social risks and management plans, as relevant.	N/A	N/A	Updated SESP and management plans	Annually	Project Manager UNDP CO	Updated SESP, Project terminal report	

Annex C: Evaluation Plan

Evaluation Title	Planned start date Month/year	Planned end date Month/year	Included in the Country Office Evaluation Plan	Budget for consultants	Other budget (i.e. travel, site visits etc…)	Budget for translation
Mid Term Review	Sep-19	Dec-19		$ 30,500	$ 4,500	N/A
Terminal Evaluation	Jun-21	Sep-21	Yes/No	$ 43,500	$ 6,500	N/A
			Total evaluation budget		$ 85,000	

Annex D: GEF Tracking Tool (s) at baseline

See Excel spreadsheet

Annex E: Terms of Reference for key roles in the project

E.1: Terms of Reference for the National institutional development expert/lead expert

The National institutional development expert/lead expert will act as the lead expert for liaising with stakeholders, developing work plans, and carrying out everyday management of the project – estimated to be committed over ½ time to the project over the course of its implementation period

Education and experience:

- University / Master Degree in Engineering or other closely related areas.
- At least 10 years of progressively responsible experience is required at the national or international level in the areas of community-based development and project management in the energy and environment field involving a significant element of community engagement and capacity building in the public sector.
- Previous experience in development assistance or related work for a donor organization, governmental institutions, NGO or private sector / consulting firm is a very strong advantage.
- Strong analytical, drafting and communication skills.
- Experience in the usage of computers and office software packages (MS Word, Excel, PowerPoint, etc) and advance knowledge of spreadsheet and database packages, experience in handling of web based management systems.
- Strong leadership skills and proven experience in managing interdisciplinary teams.

Duties and Responsibilities

- Plan the activities of the project and monitor progress against the initial quality criteria;
- Mobilize goods and services to initiative activities, including drafting TORs and work specifications;
- Build, motivate and lead a high performing team consisting of project personnel, expert consultants, etc. Undertake personnel performance appraisals and career development coaching at project level;
- Monitor events as determined in the Project Monitoring Schedule Plan, and update the plan as required;
- Manage requests for the provision of financial resources by UNDP, using advance of funds, direct payments;
- Monitor financial resources and accounting to ensure accuracy and reliability of financial reports;
- Responsible for preparing and submitting financial reports to UNDP on a quarterly basis;
- Manage and monitor the project risks initially identified, submit new risks to the Project Board for consideration and decision on possible actions if required; update the status of these risks by maintaining the Project Risks Log;
- Be responsible for managing issues and requests for change by maintaining an Issues Log;
- Prepare the Project Progress Report (progress against planned activities, update on Risks and Issues, expenditures) and submit the report to the Project Board and Project Assurance;
- Prepare the Annual Review Report, and submit the report to the Project Board;
- Prepare the AWP for the following year, as well as Quarterly Plans if required;
- Ensure wide dissemination and visibility of project achievements. Establish and manage mechanisms for exchange of information, experience and lessons learned at the local and national levels
- Maintain close coordination with project partners, ensure synergies, avoid overlaps in project implementation, collaborate with other donors working in the same area, and provide information relevant to the project.
- Support the Project Coordinator, consultants and sub-contractors to ensure the timely delivery of expected outputs in accordance with international quality standards, and promote synergies among the various sub-contracted activities;
- Support the Project Coordinator to advocate for MSW-based biogas energy technologies in Uganda and the region, and effectively coordinate with key policy entities at the national and provincial levels;
- Assist the Project Administrator by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation

Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
- Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and
- Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts.

E.2: Terms of Reference for the National waste and biogas expert

The National waste and biogas expert will be nationally recruited, based on an open competitive process. She/he will be responsible for conducting feasibility studies, investment plans, and analysing waste and digester data.

Education and experience:
- University / Master Degree in Engineering or other closely related areas.
- At least 5 years of progressively responsible experience is required at the national or international level in the waste management and biogas field
- At least 3 years' experience with community engagement and capacity building in the public sector.
- Previous experience in development assistance or related work for a donor organization, governmental institutions, NGO or private sector / consulting firm is a very strong advantage.
- Strong analytical, drafting and communication skills.
- Experience in the usage of computers and office software packages (MS Word, Excel, PowerPoint, etc) and advance knowledge of spreadsheet and database packages, experience in handling of web based management systems.
- Strong leadership skills and proven experience in managing interdisciplinary teams.

Duties and Responsibilities
- Provide technical assistance and training activities for the biogas technicians in selected municipalities and support the biogas project development process;
- Provide technical and strategic assistance for project activities, including planning, monitoring and site operations;
- Assist the preparation of Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;
- Ensure quality control of interventions/outcomes/deliverables;
- Support the National institutional development expert/lead expert, consultants and sub-contractors to ensure the timely delivery of expected outputs in accordance with international quality standards, and promote synergies among the various sub-contracted activities;
- Support the National institutional development expert/lead expert to advocate for MSW-based biogas energy technologies in Uganda, and effectively coordinate with key policy entities at the national and provincial levels;
- Assist the Finance and administration assistant by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
- Provide technical assistance and training activities for the biogas technicians in selected municipalities and support the biogas project development process;
- Conduct feasibility studies and investment plans for pilot plants and analysing waste and digester data;
- Alongside the International Waste Management expert, review the IWM plans for five municipalities for data set completeness on the organic quantity and composition of waste streams. Where necessary, reviewing and compiling existing data (and supplementary data where necessary) on organic quantity and composition of waste streams in preparation for updating of the IWM plans;

- Alongside the International Biogas and finance expert, assist five municipalities elaborate conceptual proposals for MSW-based biogas plants;
- Alongside the International Waste Management expert, support the five municipalities to introduce MSW disposal/off-taker fees;
- Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and
- Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts.

E.3: Terms of Reference for the National social and environmental expert

The National social and environmental expert will be nationally recruited by the UNDP and she/he will be responsible for undertaking social and environmental impact assessments related to various activities of the project.

Education and experience:

- University / Master Degree in social sciences, geography, anthropology or other closely related areas;
- At least 5 years of progressively responsible experience at the national level in environmental and social impact assessment (including necessary national qualifications to conduct ESIA analysis under NEMA legislation).
- At least 3 years' experience with community engagement in the public sector;
- Previous experience in development assistance or related work for a donor organization, governmental institutions, NGO or private sector / consulting firm is a very strong advantage;
- Strong analytical, drafting and communication skills;
- Experience in the usage of computers and office software packages (MS Word, Excel, PowerPoint, etc) and advance knowledge of spreadsheet and database packages, experience in handling of web based management systems;
- Strong research skills

Duties and Responsibilities

- Undertake gender analysis for the project as a whole and the demonstration projects in particular
- Undertake environmental and social impact assessments and develop environmental and social action plans
- Ensure quality control of interventions/outcomes/deliverables;
- Assist the Finance and administration assistant by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
- Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and
- Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts.

E.4: Terms of Reference for the International biogas and finance expert

The International biogas and finance expert will be internationally recruited by UNDP and she/he will be responsible for providing overall technical backstopping to the Project. He/she will provide technical support to the National waste and biogas expert, National institutional development expert/lead expert and the Finance and administration assistant. The International biogas and finance expert assist in developing business models and plans, developing informational memorandums, and in communications with financial institutions and other donors.

Education and experience:

- University / Master Degree in Engineering, finance or other closely related areas;
- At least 10 years of progressively responsible experience is required at the international level in the biogas and finance field;
- At least 3 years' experience with community engagement and capacity building in the public sector;
- Previous experience in development assistance or related work for a donor organization, governmental institutions, NGO or private sector / consulting firm is a very strong advantage;
- Strong analytical, drafting and communication skills;
- Experience in the usage of computers and office software packages (MS Word, Excel, PowerPoint, etc) and advance knowledge of spreadsheet and database packages, experience in handling of web based management systems;
- Strong leadership skills and proven experience in managing interdisciplinary teams.

Duties and Responsibilities

- Provide technical and strategic assistance for project activities, including planning, monitoring and site operations;
- Assist the preparation of Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;
- Ensure quality control of interventions/outcomes/deliverables;
- Support the National institutional development expert/lead expert, consultants and sub-contractors to ensure the timely delivery of expected outputs in accordance with international quality standards, and promote synergies among the various sub-contracted activities;
- Support the National institutional development expert/lead expert to advocate for MSW-based biogas energy technologies in Uganda, and effectively coordinate with key policy entities at the national and provincial levels;
- Assist the Finance and administration assistant by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
- Provide technical assistance and training activities for the biogas technicians in selected municipalities and support the biogas project development process;
- Lead the establishment of a finance mechanism (grant and technical assistance fund) and technical assistance to financial institutions to assess biogas projects' suitability for finance. Assistance will also be provided to project developers to access existing streams of finance or financial products such as grants and guarantees;
- Design and submit proposals to update and enhance the regulatory framework to promote increased uptake of IWM and biogas technology;
- Conduct feasibility studies and investment plans for pilot plants and analysing waste and digester data;
- Alongside the National waste and biogas expert, assist five municipalities elaborate conceptual proposals for MSW-based biogas plants;
- Alongside the International waste management expert and the National waste and biogas expert, support the five municipalities to introduce MSW disposal/off-taker fees;
- Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and
- Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts.

E.5: Terms of Reference for the International waste management expert

The International waste management expert will be internationally recruited by UNDP and she/he will be responsible for providing overall technical backstopping to the Project. He/she will provide technical support to the National waste and

biogas expert, National institutional development expert/lead expert and the Finance and administration assistant. The International waste management expert will provide technical backstopping to selected municipalities to facilitate the design, procurement and construction of the envisaged pilot biogas plants. He/she will report directly to the National institutional development expert/lead expert and to UNDP CO.

Education and experience:

- University / Master Degree in Environmental science/management, Engineering or other closely related areas;
- At least 10 years of progressively responsible experience is required in the waste management field;
- At least 3 years' experience with community engagement and capacity building in the public sector;
- Previous experience in development assistance or related work for a donor organization, governmental institutions, NGO or private sector / consulting firm is a very strong advantage;
- Strong analytical, drafting and communication skills;
- Experience in the usage of computers and office software packages (MS Word, Excel, PowerPoint, etc) and advance knowledge of spreadsheet and database packages, experience in handling of web based management systems;
- Strong leadership skills and proven experience in managing interdisciplinary teams.

Duties and Responsibilities

- Provide technical and strategic assistance for project activities, including planning, monitoring and site operations;
- Assist the preparation of Terms of Reference for consultants and sub-contractors, and assist in the selection and recruitment process;
- Ensure quality control of interventions/outcomes/deliverables;
- Support the National institutional development expert/lead expert, consultants and sub-contractors to ensure the timely delivery of expected outputs in accordance with international quality standards, and promote synergies among the various sub-contracted activities;
- Support the National institutional development expert/lead expert to advocate for MSW-based biogas energy technologies in Uganda, and effectively coordinate with key policy entities at the national and provincial levels;
- Assist the Finance and administration assistant by providing technical inputs during the preparation and revision of the Management Plan, Annual Work Plans, periodic reports such as the Combined Project Implementation Review/Annual Project Report (PIR/APR), inception report, technical reports, quarterly reports for submission to UNDP, the GEF, other donors and Government Departments, as required;
- Provide technical assistance and training activities for the biogas technicians in selected municipalities and support the biogas project development process;
- Alongside the National waste and biogas expert, review the IWM plans for five municipalities for data set completeness on the organic quantity and composition of waste streams. Where necessary, reviewing and compiling existing data (and supplementary data where necessary) on organic quantity and composition of waste streams in preparation for updating of the IWM plans;
- Alongside the National waste and biogas expert, support the five municipalities to introduce MSW disposal/off-taker fees;
- Document lessons from project implementation and make recommendations to the Steering Committee for more effective implementation and coordination of project activities; and
- Provide assistance to set up, review and implement the Project's M&E structures with a view on retrieving verified information on project results and impacts.

E.6: Terms of Reference for the National communications expert

The National Communications Expert will (in cooperation with the rest of the expert team) develop: i) a strategy for the sensitisation campaign; ii) promotional materials including producing brochures, and technical assistance to develop

materials; and, iii) hold numerous public events (likely 2 each in 5 municipalities over the project period – with a total of 10 events) with a wide range of stakeholders invited.

Education and experience:

- Degree in communications, marketing or other related field.
- At least five years of experience in communications, marketing or other substantive area is required.
- At least one years of previous experience in development assistance or related work for the Government, a donor organization, consulting company, or NGO related to the development of materials and holding public events is a very strong advantage.
- A good working knowledge of energy / environmental issues is an advantage
- Experience in the usage of computers and office software packages (MS Word, Excel, etc.) and advance knowledge of spread-sheet and database packages, experience in handling web-based management systems.

Duties and description:

- Work in co-ordination with Communications Officers in the UNDP Country Office and MEMD and NEMA to develop a media strategy and a strategy for the sensitisation campaign, and establish processes for:
    - Regular communication with media contacts;
    - Regular production of press releases;
    - Advising and assisting municipalities in managing local media interest at the community level;
    - Monitoring of media exposure.
- Promotional materials including producing brochures, and technical assistance to develop materials; and, iii)
- Hold numerous public events (likely 2 each in 5 municipalities over the project period – with a total of 10 events) with a wide range of stakeholders invited alongside the Private Sector Foundation Uganda (PSFU) who will be responsible for delivery of the campaign.

E.7: Terms of Reference for the Finance and administration assistant

The Project Administrator will be nationally recruited, based on an open competitive process. She/he will be responsible for the day-to-day administration and overall financial administration of the project and will be delegated on full-time basis to the implementation of the Project. He/she will work under the supervision of the National institutional development expert/lead expert to whom he/she will directly report and as such, he/she will be co-responsible for the overall management of the project to meet government obligations under the Project.

Education and experience:

- Degree in economics, finance, accounting, law, public administration or other related field.
- At least three years of experience in administrative work, accounting/finance, economics, or other substantive area is required.
- At least two years of previous experience in development assistance or related work for the Government, a donor organization, consulting company, or NGO is a very strong advantage.
- Experience in the usage of computers and office software packages (MS Word, Excel, etc.) and advance knowledge of spread-sheet and database packages, experience in handling web-based management systems.

Duties and description:

- Supervise and coordinate the production of project outputs, as per the Project Document;
- Mobilize all project inputs in accordance with UNDP procedures for Nationally Implemented Projects;
- Prepare and follow-up UNDP/GEF financial reports using Atlas (UNDP financial system);
- Supervise and coordinate the work of consultants and sub-contractors;
- Coordinate the recruitment and selection of project personnel;
- Monitor project budgets and financial expenditures;
- Prepare and revise project work and financial plans;
- Prepare and follow-up UNDP/GEF financial reports using Atlas (UNDP financial system);

- Follow-up on timely disbursements by UNDP CO;
- Liaise with UNDP, relevant government agencies, and all project partners, including donor organizations and NGOs for effective coordination/implementation of all project activities;
- Advise all project counterparts on applicable administrative and financial procedures and ensure their proper implementation;
- Prepare payments requests for operational expenses, salaries, insurance, etc. against project budgets and work plans;
- Facilitate administrative backstopping to subcontractors and training activities supported by the Project;
- Support the preparations of project work-plans and operational and financial planning processes;
- Oversee and ensure timely submission of the Inception Report, Combined Project Implementation Review/Annual Project Report (PIR/APR), Technical reports, quarterly financial reports, and other reports as may be required by UNDP, GEF, and Government agencies;
- Disseminate project reports and respond to queries from concerned stakeholders;
- Report Project progress to the Project Steering Committee (PSC) and ensure the fulfilment of PSC directives.
- Contribute to the preparation and implementation of progress reports;
- Ensure the timely and effective implementation of all components of the project;
- Carry out regular field visits of all sites and the activities; and
- Perform other duties as required by the Project Coordinator and/or UNDP.

Annex F: UNDP Social and Environmental and Social Screening Template (SESP)

Project Information

Project Information	
1. **Project Title**	NAMA on Integrated Waste Management and Biogas in Uganda
2. **Project Number**	5574
3. **Location (Global/Region/Country)**	Uganda

Part A. Integrating Overarching Principles to Strengthen Social and Environmental Sustainability

QUESTION 1: How Does the Project Integrate the Overarching Principles in order to Strengthen Social and Environmental Sustainability?
Briefly describe in the space below how the Project mainstreams the human-rights based approach
The Project fully incorporates the human rights based approach, in particular the principles of participation and inclusion, equality and non-discrimination, accountability and rule of law. Participation of civil society, including the informal sector, will be given priority during both Project preparation and implementation through stakeholder engagement mechanisms required in this report. Similarly, the grievance redress processes established will strengthen remarkably the accountability of the most vulnerable groups and individuals affected by the Project both directly and indirectly. For example, to achieve this a multi-stakeholder platform will be set up to enhance coordination in the waste sector and will include representatives from civil society. The underlying premise of the Project is that local government is accountable to its residents for providing adequate waste collection and management services. The monitoring, reporting and verification (MRV) system that will be set up by the Project will include social, environmental and financial indicators to safeguard the improvement of the individuals and local communities, with an emphasis on the most vulnerable groups and individuals identified. Finally, the mechanisms established in this report will help to strengthen the enforcement of existing laws governing the waste sector in order to fulfil public services while promoting the vulnerable groups and their human rights involved to achieve such task.
Briefly describe in the space below how the Project is likely to improve gender equality and women's empowerment
Preparation of specific investment interventions will include along the whole project cycle special attention for vulnerable groups, especially women and girls, who face multiple and intersecting forms of discrimination in the waste sector recovery and reuse processes. Women are often marginalized and excluded from other forms of formal participation in the waste recovery and reuse economy; often, they are reduced to pickers for middle men dealing in marketable plastics and metal wastes. As the implications of gender in the informal waste management sector in Uganda are not fully understood or appreciated, a gender assessment has been conducted during Project preparation to fully gauge the gender implications in the waste resource recovery process, identify possible interventions that can meaningfully improve and enhance women's participation, and develop specific indicators and targets related to gender equality. Preliminary indicators include increase in women's participation in integrated waste management (IWM) activities such as resource separation at collection and generation centres, improvement of income of women employed as resource separation promoters and numbers of women included in the downstream recovered resource (power) process.
Briefly describe in the space below how the Project mainstreams environmental sustainability
The project is primarily focused on environmental sustainability. The global environmental problem that the Project seeks to address is the greenhouse gas emissions, waste water pollution, and general environmental degradation due to improper and inadequate management and treatment of municipal liquid and solid waste in municipalities in Uganda. Most waste streams are poorly managed right from generation to disposal and there are noticeable uncontrolled and open flows directly into the environment without any treatment. Open dumping and burning of solid waste are a common practice in many parts of the country, resulting in the uncontrolled release of pollutants to soil, surface water, ground water, and air - including the emissions of GHGs. Additionally, improper waste management impacts on the health of the local communities in several ways

implying additional risks. This is particular relevant to the poorer communities and the informal waste picker sector due, for example, to their dependence on the waste as a source of income. By introducing integrated waste treatment and biogas plants in the three selected locations (with potential for scaling up to additional sites) the Project will improve solid and liquid waste management through recovery and reuse and will reduce local air pollution, water pollution, and GHG emissions. The Project also strengthens the environmental management capacity of local and central government, supports implementation of the national public health and environmental commitments and commitments to climate change mitigation.

It should be noted that no activities that could cause harm may proceed until assessments are undertaken and management plans are in place for specific sites.

Part B. Identifying and Managing Social and Environmental Risks

QUESTION 2: What are the Potential Social and Environmental Risks?[32]	**QUESTION 3: What is the level of significance of the potential social and environmental risks?[33]**			**QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?**
Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
Principle 1: Human Rights.				
RISK 1: (Checklist risk not identified) Sites for waste treatment and disposal may cause local social impacts, such as interference with traditional, often informal waste collection.	I = 2 P = 2	Low	Social risk Assumptions: n/a	Assessment: • **The main interference identified is in regards to waste pickers. Their activities are commercialized and their relationship is likely to be commercial as their activities are their main source of income.** • **Another indirect risk that may arise is a consequence of the introduction of electricity or heat supply in the vicinity of communities where those services were not available before the Project.** Management: • **During Project preparation the waste collectors and other groups potentially affected along the waste chain in the informal sector have been identified and approached to be considered for involvement in Project design. Consultations during Project preparation and scope visits by the team of**

[32] Note: Describe briefly potential social and environmental risks identified in Attachment 1 – Risk Screening Checklist (based on any "Yes" responses). If no risks have been identified in Attachment 1 then note "No Risks Identified" and skip to Question 4 and Select "Low Risk". Questions 5 and 6 not required for Low Risk Projects.

[33] Note: Respond to Questions 4 and 5 below before proceeding to Question 6

QUESTION 2: What are the Potential Social and Environmental Risks?[32]	QUESTION 3: What is the level of significance of the potential social and environmental risks?[33]			QUESTION 6: What social and environmental assessment and management measures have been conducted and/or are required to address potential risks (for Risks with Moderate and High Significance)?
Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				experts have been conducted to evaluate the risks. • **A Social Impact Assessment specific to each implementation site as part of a comprehensive Environmental & Social Impact Assessment / Environmental & Social Management Plan (ESIA / ESMP) will study this potential risk at before Project implementation and provide the pertinent measures to minimise it. The Project will work closely with relevant authorities and the Waste Pickers groups and other local civil society organisations (CSOs) (for example, market management committees) to identify ways of improving working conditions and earnings, with a particular focus on women in order to set specific indicators and targets related to gender equality. The ultimate aim will be to improve the participation of waste pickers in the integrated management of waste in the municipalities and promote waste recovery and reuse in the country.** • **Of particular importance, some of the waste pickers, with particular focus on disenfranchised women and youth, will be trained to promote resource separation at key generation sites (or waste collection sites) and also participate in recovering resources. Access to plastic and metal waste will not be restricted by the Project. In fact, the resource separation required to supply organic feedstock for the biogas plants is likely to enhance access to plastics and other non (Project) required wastes.** • **Any changes to the electricity grid and connection inside and outside the plant due to the Project will need to follow all regulations to prevent social impacts. To ensure this, a Social Impact Assessment specific to each implementation site will study this potential risk and provide the pertinent measures to minimise it as part of a comprehensive ESIA / ESMP.** • **Subsequently, an autonomous Social Management Plan will establish how, who, when, and where the measures will be**

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				managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project.
RISK 2: This risk combines two potential risks from the Social and Environmental Risk Screening Checklist. (Checklist Principle 1, risk 1) The Project could lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups. (Checklist Principle 1, risk 3): The Project could potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups.	I = 2 P = 2	Low	Social risk Assumptions: n/a	Assessment: • **With regards to municipal-led activities, marginalised groups such as waste pickers may be adversely affected in the waste resource and recovery sector because it is frequently related to the informal economy. The mechanization or formalisation of waste management activities formally undertaken by informal waste pickers may compromise the human rights of waste pickers.** • **In regards to private industrial/ food production/ agricultural-led activities, marginalized groups are often left outside the decision-making processes, which may impact their human rights, further perpetuating their disadvantaged situation.** Management: • **During Project preparation, groups potentially affected along the waste chain in the informal sector, such as waste pickers, were identified and consulted in order to ensure their involvement and consideration in Project design. Consultations and scoping have been conducted to evaluate the inherent risks.** • **A Social Impact Assessment specific to each implementation site will be conducted before Project implementation to describe the social patterns and conditions in the Project area, the local economy and primary sources of income, identified marginalised groups and impacts on human rights due to Project activity including the necessary measures to be implemented to minimise the situation.** • **Subsequently, an autonomous Social Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will**

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				be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project. • **The Social Impact Assessment and Social Management Plan will be undertaken as part of a comprehensive ESIA / ESMP.**
RISK 3: This risk combines two potential risks from the Social and Environmental Risk Screening Checklist. (Checklist Principle 1, risk 2) There is likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups. (Checklist Principle 3, Standard 5, risk 5.2) The Project would possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation).	I = 2 P = 2	Low	Social risk Assumptions: The E&S assessment is conducted under the assumption that the Project will be located on public land in municipalities or already acquired land for the private sector operators.	Assessment: • **Based on the assumption described, physical displacement is unlikely to happen.** • **Some social marginalised groups especially urban poor men and women are currently earning a living from picking and selling plastics and metal wastes. However, these waste sub-streams will not be required by the Project bio-digesters. Some urban farmers collect organic wastes as animal feeds but these are proportionally very few and pick the feeds directly from the companies. Some farmers pick animal liquid waste from abattoirs for crop farming. These streams will not be interfered with as they are generally a small fraction. However, economic displacement may be a slight risk because the organic waste is currently valued for example to produce briquettes – though the amount of organic waste available is expected to be more than sufficient for both activities.** Management: • **During Project preparation, groups potentially affected along the waste chain in the informal sector, such as waste pickers, were identified and consulted in order to ensure their involvement and consideration in Project design. Consultations and scoping have been conducted to evaluate the inherent risks.** • **Farmers will be encouraged to access and use the digestate from the bio-digester, which is a better soil nutrient than liquid animal waste. This is in line with Integrated Waste Management principles. In parallel, initial consultations and scope visits by the team of experts have helped on the**

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				evaluation of this risk. Furthermore, after site selection and before Project implementation stakeholder engagement mechanisms will be used to identify other groups to be consulted. For that the implementation tools elaborated in 2013 at the REDD+ program in Uganda will be used. The mechanism includes components: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process. • **Economic displacement: A Social Impact Assessment specific to each implementation site will be conducted to describe the social patterns and conditions in the Project area, the local economy and primary sources of income to foresee the potential losses and restrictions due to the Project including the necessary measures to be implemented to minimise the situation.** • **Subsequently, an autonomous Social Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project.** • **The Social Impact Assessment and Social Management Plan will be undertaken as part of a comprehensive ESIA / ESMP.**
RISK 4: (Checklist Principle 1, risk 7). The Project may not give local communities or individuals the opportunity to raise human rights concerns regarding the Project during the stakeholder engagement process.	I = 3 P = 2	Moderate	Social risk Assumptions: n/a	Assessment: • **Local communities or individuals affected not typically consulted and included in Project designs.** Management: • **A stakeholder platform will be established to be representative vertically (i.e. are all the groups affected well represented) and horizontally (i.e. weight of voice within platform), appropriate channels of communication will be provided for each represented group (i.e. in particular for the**

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				informal sector that may be illiterate), and will be provided with an active role throughout all phases of the Project (i.e. from the design to M&E). For that a consultation and communication plan will be prepared and implemented at the investment preparation phase as well as the implementation phase to clearly disseminate information and gather feedback in time regarding the needs and priorities of all stakeholders. All sessions and communication modes will be offered also in local languages and follow the customs and norms of local communities. For that the implementation tools elaborated in 2013 at the REDD+ program in Uganda will be used. The mechanism includes components: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process. This will be required for each site in the Project which will address the specific risks. For example through a public log in the Project areas that will be available to local communities and individuals to gather and resolve their concerns.
RISK 5: This risk combines two potential risks from the Social and Environmental Risk Screening Checklist. (Checklist Principle 1, risk 1.5) There is a risk that duty-bearers do not have the capacity to meet their obligations in the Project. (Checklist Principle 3, Standard 3, risk 3.9) The Project engages security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or	I = 4 P = 4	High	Social & Environmental risk Assumptions: n/a	Assessment: • **The biogas technology at the scale considered is first of its kind in the Project region. The technical capacity for implementation of Project activities is low and it is assumed that local security personnel will be locally employed. This may pose a challenge to ensure that security and duty-bearers obligations are met.** Management: • **At the preparation phase scoping visits by the team of experts have been conducted to evaluate the risk.** • **The Project budget provides ongoing technical assistance for investments to be undertaken, specific training and capacity development and awareness raising activities for duty-bearers and security personnel throughout the period of project**

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accountability).				**implementation.** • **The collection of data through the M&E established during the Project cycle will control duty-bearers' performance to ensure it meets the capacity needed.** • **The different implementation tools elaborated in 2013 at the REDD+ program in Uganda will be used for dissemination of information about unfulfilled rights and about rights violations puts pressure on duty bearers to meet their obligations to respect, protect and fulfil their obligations in the Project. The mechanism includes components: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process.**
RISK 6: (Checklist Principle 1, risk 6) There is a risk that rights-holders do not have the capacity to claim their rights.	I = 1 P = 4	Low	Social risk Assumptions: n/a	Assessment: • **The biogas technology at the scale considered is first of its kind in the Project region. As a result, there is a general lack of know-how of the technology, management, stakeholder's rights and financial mechanisms around this new activity.** Management: • **The often polarized debate between the pursuit of sustainable development in local communities versus utility-scale of renewable energy development in the region will need to focus the effort to translate the benefits of the Project into real services to the communities and where possible with the multiplier effect on benefits – in particular related to environmental improvements at and near waste treatment / biogas facility sites where odours will be reduced.** • **This practice will be complemented into real action along the Project through the autonomous Social Management Plan established that will determine how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with**

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				Project goals and especially with the environmental and gender safeguards identified along the Project. The Plan will be developed as part of a comprehensive ESIA / ESMP. • **The Project is expected to involve public/private partnerships. This means that public institutions may be limited in their ability to share information with the public and intervene in specific investment operation. Confidentiality agreements may also prevent the population from being able to ascertain all information. In order to alleviate future potential negative impacts, legal agreements with public institutions will need to be negotiated in a way which allows public input into decision-making.** • **The implementation tools elaborated in 2013 at the REDD+ program in Uganda will ensure institutionalised communication with the community for each site in the Project. Similarly, these tools will also ensure that the agreements with private investors will explicitly enumerate all direct and indirect financial responsibilities for the government and investors in the case that any of the activities implemented within a specific investment do not go as expected (i.e. if the waste availability or power production forecasts is not what was expected, the operational costs increase at a later stage, market demand for fertilizer or electricity falls, or the infrastructure falls into disuse). .** • **To ensure that social and environmental considerations are not overlooked at the high-level a SESA will be required at each potential site to install a process that will link with, reinforce, and/or recommend policy appraisal approaches used to shape development policies and plans related to the Project activities.**
Principle 2: Gender Equality and Women's Empowerment.				
RISK 7: (Checklist Principle 2, risk 1) The Project could have adverse impacts on gender equality and the	I = 2 P = 2	Low	Social risk Assumptions: n/a	Assessment: • **A higher number of disproportionally affected women are likely to be involved in picking waste as source of income at**

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situation of the female sector.				**collection or sorting sites. By nature, plastics and metals are the most wanted target materials of waste pickers, in contrast to the organic material used for biogas production. However, briquette production from organic waste is also an informal practice with significant presence of women. Changes in the management of waste towards a more formalised system may displace these women and favour male leadership as managerial positions are typically covered by men due to pre-existing conditions.** Management: • **Measures to tackle this risk are described under Risk 8. Furthermore, resource separation is likely to improve their access to such wastes as they are likely not to be required by the Project. However, at the project preparation phase changes on waste management have been assessed to identify the potential income loss for the affected groups making a living from current waste management systems. As a measure some of the women pickers are likely to be employed during the Project as resource separation promoters. The Project preparation included a dedicated gender expert, with gender-related expertise, local knowledge, and experience. Additionally, a tailored Gender Assessment specific to each site of implementation will be required before project implementation. This will be prepared by the local gender expert to better understand the implications of gender in the waste management, recovery and reuse sector in each site, identify possible interventions that can narrow the gender gap and enhance women's participation in the process, and develop specific indicators and targets related to gender equality.** • **Subsequently, an autonomous Gender Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will**

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				be designed in accordance with Project goals and especially with the environmental and social safeguards identified along the Project. The Gender Management Plan will be developed as part of a comprehensive ESIA / ESMP.
RISK 8: (Checklist Principle 2, risk 3) There is a risk that women's groups/leaders may raise gender equality concerns regarding the Project during the stakeholder engagement process and this may not be included in the overall Project proposal and in the risk assessment.	I = 2 P = 1	Low	Social risk Assumptions: n/a	Assessment: • **Women are often excluded from the formal decision making processes in the waste resource and recovery sector in the Project area lack of recognition of the informal waste sector.** Management: • **The Project preparation phase included a dedicated gender expert, with gender-related expertise, local knowledge, and experience. A Gender Assessment specific to each implementation site will be conducted by the local gender expert before project implementation. Gender patterns and conditions in the Project area will be described and inequalities identified, similarly, impacts due to the Project activity will be assessed. This is in order to identify the necessary means to ensure inclusion of the concerns that may arise during the Project.** • **Subsequently, before project implementation an autonomous Gender Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and social safeguards identified along the Project.** • **The consultation and communication plan prepared as per Risk 9 will include the concerns raised by women's groups/leaders providing a tracking mechanism for the resolution of each of them.** • **The Gender Management Plan and consultation & communication plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 9: (Checklist Principle 2, risk 2)	I = 1	Moderate	Social risk	Assessment:

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The Project would potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits.	P = 4		Assumptions: n/a	• **Women's participation in Project design and implementation may be marginalised due to pre-existing conditions that marginalise women's participation in management activities in the waste sector (managerial positions are dominated by men), as well as, unequal access to benefits.** Management: • **The Project preparation team included a dedicated gender expert, with gender-related expertise, local knowledge, and experience.** • **A Gender Assessment by the local gender expert will be carried out specific to each implementation site as part of a comprehensive ESIA / ESMP during Project preparation with women's groups involved in waste management and their participation will be targeted and enhanced in the Project design.** • **The following activities will be undertaken or implemented to ensure that proposed strategies are non-discriminatory and empowering for women, men and other vulnerable social groups:** o **Identify constraints to women's and vulnerable social groups' participation and develop strategies to minimize the constraints and enhance their participation;** o **Develop a strategy for skills building and training needs related to women and vulnerable social groups participation in the Project;** o **Positive discrimination and/or reservations for women's participation at specific phases of the Project (as promoters or guides of resource separation);** o **Project management structures will include provision for women (1/3) in such committees; and Gender specific outputs and indicators will be incorporated.** • **Subsequently, an autonomous Gender Management Plan will establish how, who, when, and where the measures will be**

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				managed including the cost of implementation. The plan will be designed in accordance with the environmental and social safeguards identified along the Project.
Principle 3: Environmental Sustainability.				
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management.				
RISK 10: This risk combines two potential risks from the Social and Environmental Risk Screening Checklist. (Checklist Principle 3, Standard 1, risk 1.1) The Project may potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services. For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes. (Checklist Principle 3, Standard 1, risk 1.2) Some Project activities proposed may be within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities.	I = 2 P = 2	Low	Environmental risk Assumptions: This E&S assessment is conducted under the consideration that no indigenous people are found in the Project boundaries. This includes project sites and catchment areas around the project sites.	Assessment: • **There may be critical habitats and/or environmental sensitive areas near Project areas.** • **There may be temporarily modified, natural and/or critical habitats affected by adverse impacts due to the following activities:** o **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. No significant impacts on habitats are expected within this phase.** o **Operational phase: Later, during implementation, nearby habitats are not expected to be impacted.** Management: • **During Project preparation similar site activities have been visited by the team of experts to evaluate the risks. An Environmental Impact Assessment will be conducted for each specific implementation site. Environmental measures will be required for each site in the Project which will address this specific risk including the necessary measures to be implemented to minimise the situation. For example through buffer areas around Project sites that will likely prevent any adverse impacts.** • **An autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.**

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				• **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 11: (Checklist Principle 3, Standard 1, risk 1.3) The Project may involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods. (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	I = 1 P = 3	Low	Environmental risk Assumptions: n/a	Assessment: • **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. It is expected that land and resources will be used within this phase and be small in comparison to other industrial facilities and/or landfill sites affiliated with the specific implementation site. A significant amount of water may be needed to fill the digester for technical hydraulic tests before operating the plant – though this is a temporary impact.** • **Operational phase: During the operational phase no further land is expected to be used. However, resources needed at this phase typically involve animal manure. This fertiliser is typically used by farmers and may be sold for extra income. This impact will be assessed as a social impact instead.** Management: • **During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks.** • **An Environmental Impact Assessment will be conducted for each specific implementation site. Environmental measures will be required for each site in the Project that will address the expected changes to the use of land and resources. For example through the use of recycled water instead of fresh water.** • **An autonomous Environmental Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental**

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				Management Plan will be developed as part of a comprehensive ESIA / ESMP.
RISK 12: (Checklist Principle 3, Standard 1, risk 1.11) The Project may result in secondary or consequential development activities which could lead to adverse social and environmental effects, or it would generate cumulative impacts with other known existing or planned activities in the area. For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.	I = 2 P = 2	Low	Environmental & Social risks Assumptions: n/a	Assessment: • **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. It is expected that this development would all take place on existing developed areas or in areas where development of much larger installations (i.e. large landfills) is planned. It cannot be ensured at this present stage (Project preparation) that this phase may not involve secondary or consequential development activities which could lead to adverse social or environmental effects, but it is unlikely that the specific sites developed will have a marginal impact significantly greater than other existing developments.** Management: • **An Environmental & Social Impact Assessment will be conducted for each specific implementation site. Specific measures will be required for each site in the Project which will address the expected consequential development activities and cumulative impacts.** • **Subsequently, an autonomous Environmental & Social Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the gender safeguards identified along the Project.**
Standard 3: Community Health, Safety and Working Conditions.				
RISK 13: (Checklist Principle 3, Standard 3, risk 3.7) The Project could potentially pose occupational health and safety risks due to biological and chemical hazards.	I = 4 P = 3	High	Social risk Assumptions: n/a	Assessment: • **Construction and decommission phase: The Project will involve the new construction of the infrastructure to implement waste treatment and biogas generation. It is expected that the activities may pose occupational health and**

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				safety risks due to biological and chemical hazards due mainly to working accidents. • **Later, at the operational phase the expected potential occupational health and safety risks due to biological and chemical hazards are related, for example, to contamination with pathogens, particularly if sewage is involved and long exposure to leaking gas occurs.** Management: • **During Project preparation similar activities (waste management and biogas production in Uganda and the East African region) have been studied through consultations and scoping visits by the team of experts to evaluate risks.** • **During Project implementation this level of risk is likely to be moderate if a systematic M&E plan is implemented to include the use of devices where appropriate and indicators to identify health and safety scenarios due to biological and chemical hazards in case of routine activities. While it is acknowledged that methane leakages should be avoided to the extent possible, a cost-benefit approach may be applied to balance expensive detection sensors with specific training of operators to do regular inspections and maintenance. Similarly, non-routine and emergency circumstances will be covered under an Emergency Plan to coordinate the rapid response in the plant.** • **A Social Impact Assessment specific to each implementation site will study the potential risk before Project implementation and provide the pertinent measures to minimise biological and chemical hazards due to routine and non-routine circumstances.** • **An autonomous Social Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				the environmental and gender safeguards identified along the Project. • **Furthermore, as part of the Project design to reduce risks associated with waste collection at generation points, resource separation will be promoted and Integrated Waste Management promoters or guides employed at key generation points like markets. During Project implementation this level of risk is likely to be moderate as well if resource separation best practices are promoted and implemented. Standard best practice will be applied to ensure that waste sector workers are provided with appropriate health and safety working conditions.**
RISK 14: (Checklist Principle 3, Standard 3, risk 3.1) The elements of Project construction, operation, or decommissioning may pose potential safety risks to local communities.	I = 3 P = 4	Moderate	Social risk Assumption: This E&S assessment is conducted under the consideration that all sub-products generated as a result of the Project (after the treatment in the plant) will be properly treated before being transferred outside the scope of the Project.	Assessment: • **Based on the assumption provided there are two potential aspects within the Project to study:** o **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. This may pose temporary safety risks to local communities due to the sudden increase of heavy traffic in the area.** o **Operational Phase: During operation, some increased traffic may also occur related to delivery and removal of digestate. Additionally, safety risks may be related typically to accidents causing odour and soil/water infiltration. Accidental leakage is considered below in the risk "failure of structural elements".** Management: • **Installed systems are subject to national law and a due diligence process. This risk is further mitigated by including training of plant personnel under the Project.** • **A Social Impact Assessment will be conducted for each specific implementation site. Specific measures will be required for each site in the Project which will address the**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				safety needs of local communities during the construction, operation, and decommissioning of the elements of the Project. • **Subsequently, an autonomous Social Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project.** • **The Social Impact Assessment and Social Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 15: This risk combines two potential risks form the Social and Environmental Screening Checklist. (Checklist Principle 3, Standard 3, risk 3.2) The Project may pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation). (Checklist Principle 3, Standard 7, risk 7.3) The proposed Project may potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials. The Project propose may use of chemicals or materials subject to international bans or phase-outs. For example, DDT, PCBs and other chemicals listed in international	I = 3 P = 4	Moderate	Environmental and Social risk Assumption: Hazardous waste is any waste that poses substantial or potential threats to public health or the environment. Therefore, this E&S assessment is conducted under the consideration that the future waste to treat is hazardous due to the big amounts to deal with.	Assessment: • **It is not expected that the Project will use chemicals or materials subject to international bans or phase-outs. However, based on the assumption described there are two potential aspects within the Project to study as there may be activities involving transport, storage, and use and/or disposal of hazardous or dangerous materials in the Project areas:** o **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. It is not expected that this activity may pose health or safety risks to local communities and to the environment due to hazardous chemicals and/or materials. However, at the decommissioning phase similar risks may be expected as for the operational phase.** o **Operation phase: at the operational phase community health and the environment may be impacted typically by hazardous chemicals and/or materials mainly due to pathogenic content in the materials transported, stored, and used due to routine and non-routine activities. For example due to accidents or routine activities as follows:** - **Waste received to be treated: The expected waste to be handled will be organic. It is expected that the**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol.				**waste will come from controlled industrial sectors and/or municipal sources separated at the generation stage. Therefore, it is not expected that the Project will deal with these risky materials, including those subject to international bans or phase-outs. However, some traces of non-desirable materials may be found in the waste to treat depending on the quality of the waste received to be treated.** - **Treatment process of waste: A typical biogas plant does not include the use of additional risky constituents, including those subject to international bans or phase-outs.** - **Waste transformation: The treatment of the waste received will undergo different physical and chemical processes. It is not expected that any of the stages at the transformation of the waste will lead to additional constituents, including those subject to international bans or phase-outs.** Management: • **During Project implementation this level of risk is likely to be low if a systematic M&E plan is implemented to include the use of devices where appropriate and indicators to identify risky materials due to routine practices. Similarly, non-routine circumstances will need to count with an Emergency Plan to coordinate the rapid response in the plant to prevent the impact due to these materials. Additionally, to ensure all potential risky materials due to routine and non-routine circumstances are identified and assessed an Environmental Impact Assessment specific to each implementation site will study this potential risk at both Project preparation and implementation and provide the pertinent measures to minimise it.**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				• **For municipal solid waste, unwanted raw material could potentially include hazardous waste which would otherwise simply be landfilled or deposited straight into the environment. Protocols for dealing with this waste should be developed in conjunction with the waste management companies for dealing with this waste.** • **An Environmental Impact Assessment will be conducted for each specific implementation site. Environmental measures will be required for each site in the Project that will address the expected health and safety measures to be in place to minimize the potential effects of hazardous/dangerous materials.** • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 16: (Checklist Principle 3, Standard 3, risk 3.3) The Project may involve large-scale infrastructure development (e.g. dams, roads, buildings).	I = 3 P = 5	Moderate	Environmental & Social risk Assumptions: n/a	Assessment: • **It is expected that the Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. These are typically digesters and reactors including their pipeline network and road access where needed.** Management: • **An Environmental Impact Assessment will be conducted for each specific implementation site. All large-scale infrastructure development will be evaluated at the preparation phase. Environmental measures will be required for each site in the Project that will address the expected**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				environmental and social measures to be in place to minimize the potential effects of such developments. • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 17: (Checklist Principle 3, Standard 3, risk 3.4) There is a risk that failure of structural elements of the Project pose risks to communities. (e.g. collapse of buildings or infrastructure)	I = 4 P = 1	Moderate	Social risk Assumptions: n/a	Assessment: • **It is not expected that the structural elements of the Project may fail. However, under this unlikely case the risks to local communities may be significant due to gas and liquid leakage.** Management: • **Due diligence will be undertaken as a part of investment preparation activities – including selection of qualified construction firms for the site activities. Furthermore, all construction will comply with legal building requirements under Ugandan law.** • **An Environmental Impact Assessment will be conducted for each specific implementation site. The potential forms of failure of structural elements of the Project and their impacts to communities will be evaluated at the preparation phase. Environmental measures will be required for each site in the Project that will address the expected social measures to be in place to minimize the potential effects of such failures.** • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				along the Project. • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 18: (Checklist Principle 3, Standard 3, risk 3.6) The Project may result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS).	I = 3 P = 3	Moderate	Social risk Assumptions: n/a	Assessment: • There may be potential increased health risks due to the following activities: • **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. It is not expected that this activity would pose health or safety risks to local communities.** • **During the operational phase, safety risks may be related typically to the proliferation of bacteria, flies, and soil/water infiltration. On the other hand, proper operation of the sites will reduce the impact of uncontrolled organic waste on the environment.** • **Additionally, increases in promiscuous behaviour may occur as a result of workers being relocated for construction and/or operation – potentially leading to disease spread.** • **Accidental health risks are considered in risk below "failure of structural elements".** Management: • **During Project preparation, similar Project activity sites have been visited by the team of experts to evaluate the risks.** • **A Social Impact Assessment will be conducted for each specific implementation site before project implementation. Specific measures will be required for each site in the Project that will address the health risks during the operational phase of the Project.** • **Subsequently, an autonomous Social Management Plan will establish how, who, when and where the measures will be**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project. • **During project implementation it will be mandatory for the contractor to use sensitizing approaches to the workers against the potential virus and will operate a service, which will in addition to giving first aid treatment of workers that may get injured at work, also provide appropriate healthcare to workers who will need it.** • **The Social Impact Assessment and Social Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 19: (Checklist Principle 3, Standard 3, risk 3.8) The Project may involve support for employment or livelihoods that may fail to comply with national and international labour standards (i.e. principles and standards of ILO fundamental conventions).	I = 2 P = 2	Low	Social risk Assumptions: n/a	Assessment: • **The waste sector attracts often informal ways of employment and livelihood that fail to comply with national and international labour standards. This is the case of waste pickers for example.** Management: • **During Project preparation, the affected groups along the waste chain have been identified and approached to be considered for involvement in Project design.** • **Additionally, a Social Impact Assessment specific to each implementation site will study this potential risk at both Project preparation and implementation and provide the pertinent measures to minimise this risk. The Project will work closely with relevant authorities and the Waste Pickers groups to identify ways of improving working conditions and earnings, with a particular focus on women with the aim of compliance with national and international labour standards. The ultimate aim will be to improve the participation of waste pickers in the integrated management of waste in the municipalities and promote waste recovery and reuse in the country. Some of the waste pickers especially women and**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				youth will be trained to promote resource separation at key generation sites and also participate in the recovered resource process. Access to plastic and metal waste will not be restricted by the Project. Programmatically, resource separation is likely to enhance access to plastics and other non (Project) required wastes. • **Formal direct and indirect staff to the Project will be identified and their working standards evaluated. To ensure this, a Social Impact Assessment specific to each implementation site will study this potential risk and provide the pertinent measures to minimise it. The Project will need to follow all regulations to prevent social impacts.** • **An autonomous Social Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the environmental and gender safeguards identified along the Project.** • **The Social Impact Assessment and Social Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
Standard 7: Pollution Prevention and Resource Efficiency.				
RISK 20: (Checklist Principle 3, Standard 7, risk 7.1) The Project may potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts.	I = 3 P = 5	Moderate	Environmental risk Assumptions: n/a	Assessment: • **There may be release of pollutants to the environment due to the following activities:** o **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. The release of pollutants to the environment is not expected due to either routine or non-routine circumstances at the construction phase. However, at the decommissioning phase similar risks may be expected as for the operational phase.** o **Later, at the operational phase routine activities are not expected to release pollutants to the environment.**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				However, it cannot be ensured at this present stage (Project preparation) that this activity may not involve the release of pollutants to the environment due to either routine or non-routine circumstances. For example due to accidents on the pipeline systems containing gas or sludge or routine activities as follows: - **Waste received to be treated: The expected waste to be handled will be organic. It is expected that the waste will come from controlled industrial sectors and/or municipal sources separated at the generation stage. Therefore, it is not expected that the Project will release pollutants to the environment. However, some traces of non-desirable substances may be found in the waste to treat depending on the quality of the waste received to be treated.** - **Treatment process of waste: A typical biogas plant does not include the use of additional substances that may be considered environmental pollutants.** - **Waste transformation: The treatment of the waste received will undergo different physical and chemical processes. It is not expected that any of the stages of the transformation of the waste will lead to additional environmental pollutants.** Management: • **During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks.** • **During Project implementation this level of risk is likely to be moderate if specific training is provided to personnel and a systematic M&E plan is implemented to include the use of devices where appropriate and indicators to identify pollutants due to routine practices. Similarly, non-routine circumstances will need to be addressed within an Emergency Plan to coordinate the rapid response in the plant to prevent the impact due to these pollutants.**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				• **Additionally, to ensure all potential pollutants are identified and assessed an Environmental Impact Assessment specific to each implementation site will study this potential risk at both Project preparation and implementation and provide the pertinent measures to minimise it.** • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 21: (Checklist Principle 3, Standard 7, risk 7.2) The proposed Project may potentially result in the generation of waste (both hazardous and non-hazardous).	I = 3 P = 5	Moderate	Environmental risk Assumption: This E&S assessment is conducted under the consideration that not all sub-products generated in result of the Project (after the treatment in the plant) will have marketed channels fully ensured.	Assessment: • **Based on the assumption described there are two potential aspects within the Project to study:** o **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. This may result in the generation of waste (either hazardous or non-hazardous).** o **Later, at the operational phase it is expected that the Project will result in the generation of "new" waste in the form of:** - **Received raw material that cannot be treated (wastewater and/or waste)** - **Unwanted raw material (from sorting the organic waste received in the plant)** - **Excess of wet sludge (potentially to be used as fertiliser)** - **Discharged water (potentially to be used for fertigation) not finding a place in the market** - **Excess of dry sludge (potentially to be used as compost soil)**

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				- **Excess of electricity that cannot be fed into the grid** - **Excess of heat that cannot be utilised.** Management: • **During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks.** • **An Environmental Impact Assessment will be conducted for each specific implementation site. Environmental measures will be required for each site in the Project which will address the expected waste (both hazardous and non-hazardous) generated by the plant.** • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**
RISK 22: (Checklist Principle 3, Standard 7, risk 7.5) The Project may include activities that require significant consumption of raw materials, energy, and/or water.	I = 2 P = 2	Low	Environmental risk Assumptions: n/a	Assessment: • **Construction and decommission phase: The Project will involve the construction of new infrastructure to implement the waste treatment and biogas generation. This may involve activities that require significant consumption of raw materials, energy, and/or water.** • **Later, at the operational phase the Project may need to use water to be mixed with the waste in order to achieve the right moisture level for the treatment. However, this is not expected to be a routine activity as this would be the case only when there is not enough discharged water, wastewater in the plant.** Management:

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Risk Description	*Impact and Probability (1-5)*	*Significance (Low, Moderate, High)*	*Comments*	*Description of assessment and management measures as reflected in the Project design. If ESIA or SESA is required note that the assessment should consider all potential impacts and risks.*
				• **During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks.** • **An Environmental Impact Assessment will be conducted for each specific implementation site. Environmental measures will be required for each site in the Project which will address the expected raw materials used by the Project. For example through the use of recycled water instead of fresh water.** • **Subsequently, an autonomous Environmental Management Plan will establish how, who, when and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project.** • **The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.**

QUESTION 4: What is the overall Project risk categorization?		
Select one (see SESP for guidance)		**Comments**
Low Risk	☐	
Moderate Risk	☐	
High Risk	☒	**As per SESP guidance, which lists Municipal solid waste processing and disposal facilities as a high risk activity.**

QUESTION 5: Based on the identified risks and risk categorization, what requirements of the SES are relevant?		
Check all that apply		**Comments**
Principle 1: Human Rights	☒	Identify ways of improving working conditions and earnings, with a particular focus on local communities, waste pickers, marginalized and poor groups. Where possible, support and recommendations will be provided to relevant ministries and municipalities to assist with

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					the formalization of waste pickers' roles within the waste management sector. A multi-stakeholder platform will be set up including representatives from civil society to ensure that local communities and vulnerable/marginalized and poor groups are fully involved in both Project preparation and implementation. Likewise, ensure mechanisms to account for priorities and concerns raised by these groups along the Project cycle be translated into formal decision-making actions. Specific stakeholder mechanisms with a focus on local communities, waste pickers, marginalized and poor groups will be developed for this (e.g. through a SEPD, SRM, GRM, SECU) at each site. Develop a tailored plan to include rights-holders, duty-bearers and security personnel in all awareness, training and capacity development activities to meet obligations and claim rights as needed.
	Principle 2: Gender Equality and Women's Empowerment			☒	Identify ways of reducing the gender gap (reduce discrimination, access to opportunities and benefits, gender equality) in the Project activity and improving working conditions/earnings of waste pickers, with a particular focus on women. Ensure that women are fully involved in both Project preparation and implementation. Likewise, ensure mechanisms to account for priorities and concerns raised by this sector along the Project cycle to be translated into formal decision-making actions. Specific stakeholder mechanisms with a focus on gender issues will be developed for this (e.g. through a SEPD, SRM, GRM, SECU) at each site.
	Principle 3: Environmental Sustainability				
	Standard 1. Biodiversity Conservation and Natural Resource Management			☒	Specific environmental measures (e.g. through a ESIA, ESA, ESMP) will be required for each site in the Project that will address the specific risks.

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	Standard 2. Climate Change Mitigation and Adaptation			☒	The E&S assessment assumes that the generation and management of biogas will result in GHG emission reductions ensured by means of the UNDP tools (GEF standard methodology developed by the STAP) and appropriate M&E. Therefore, no further requirements are necessary.
	Standard 3. Community Health, Safety and Working Conditions			☒	Specific environmental measures (e.g. through a ESIA, ESA, ESMP) will be required for each site in the Project that will address the specific risks. Develop a tailored plan to include rights-holders, duty-bearers and security personnel in all awareness, training and capacity development activities to meet obligations and claim rights as needed. In parallel, emergency plans will be developed to build community resilience against unexpected Project scenarios so as to protect health, safety and working conditions.
	Standard 4. Cultural Heritage			☐	The E&S assessment assumes that no cultural heritage will be affected by any of the activities along the Project cycle. Therefore, no further requirements are necessary.
	Standard 5. Displacement and Resettlement			☐	The E&S assessment assumes that the Project will be located on public land in municipalities or already acquired land for the private sector operators by any of the activities along the Project cycle. Therefore, no further requirements are necessary.
	Standard 6. Indigenous Peoples			☐	The E&S assessment assumes that no indigenous peoples will be affected by any of the activities along the Project cycle. Therefore, no further requirements are necessary.

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	Standard 7. Pollution Prevention and Resource Efficiency			☒	Specific environmental measures (e.g. through a ESIA, ESA, ESMP) will be required for each site in the Project which will address the specific risks. In particular, the focus will remain on the control of odour, effluent and gaseous emissions during the operational phase. Similarly, the waste handling process will require special attention. In parallel, emergency plans will be developed to build community resilience against unexpected Project scenarios so as to protect the environment and its habitats.

Final Sign Off

Signature	*Date*	*Description*
QA Assessor		UNDP staff member responsible for the Project, typically a UNDP Programme Officer. Final signature confirms they have "checked" to ensure that the SESP is adequately conducted.
QA Approver		UNDP senior manager, typically the UNDP Deputy Country Director (DCD), Country Director (CD), Deputy Resident Representative (DRR), or Resident Representative (RR). The QA Approver cannot also be the QA Assessor. Final signature confirms they have "cleared" the SESP prior to submittal to the PAC.
PAC Chair		UNDP chair of the PAC. In some cases, PAC Chair may also be the QA Approver. Final signature confirms that the SESP was considered as part of the Project appraisal and considered in recommendations of the PAC.

SESP Attachment 1. Social and Environmental Risk Screening Checklist

Checklist Potential Social and Environmental Risks		
Principles 1: Human Rights		**Answer (Yes/No)**
1.	Could the Project lead to adverse impacts on enjoyment of the human rights (civil, political, economic, social or cultural) of the affected population and particularly of marginalized groups?	Yes
2.	Is there a likelihood that the Project would have inequitable or discriminatory adverse impacts on affected populations, particularly people living in poverty or marginalized or excluded individuals or groups? [34]	Yes
3.	Could the Project potentially restrict availability, quality of and access to resources or basic services, in particular to marginalized individuals or groups?	Yes
4.	Is there a likelihood that the Project would exclude any potentially affected stakeholders, in particular marginalized groups, from fully participating in decisions that may affect them?	No
5.	Is there a risk that duty-bearers do not have the capacity to meet their obligations in the Project?	Yes
6.	Is there a risk that rights-holders do not have the capacity to claim their rights?	Yes
7.	Have local communities or individuals, given the opportunity, raised human rights concerns regarding the Project during the stakeholder engagement process?	Yes
8.	Is there a risk that the Project would exacerbate conflicts among and/or the risk of violence to Project-affected communities and individuals?	No
Principle 2: Gender Equality and Women's Empowerment		
1.	Is there a likelihood that the proposed Project would have adverse impacts on gender equality and/or the situation of women and girls?	Yes
2.	Would the Project potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits?	Yes
3.	Have women's groups/leaders raised gender equality concerns regarding the Project during the stakeholder engagement process and has this been included in the overall Project proposal and in the risk assessment?	Yes
4.	Would the Project potentially limit women's ability to use, develop and protect natural resources, taking into account different roles and positions of women and men in accessing environmental goods and services? *For example, activities that could lead to natural resources degradation or depletion in communities who depend on these resources for their livelihoods and well being*	No
Principle 3: Environmental Sustainability: Screening questions regarding environmental risks are encompassed by the specific Standard-related questions below		
Standard 1: Biodiversity Conservation and Sustainable Natural Resource Management		
1.1	Would the Project potentially cause adverse impacts to habitats (e.g. modified, natural, and critical habitats) and/or ecosystems and ecosystem services? *For example, through habitat loss, conversion or degradation, fragmentation, hydrological changes*	Yes
1.2	Are any Project activities proposed within or adjacent to critical habitats and/or environmentally sensitive areas, including legally protected areas (e.g. nature reserve, national park), areas proposed for protection, or recognized as such by authoritative sources and/or indigenous peoples or local communities?	Yes
1.3	Does the Project involve changes to the use of lands and resources that may have adverse impacts on habitats, ecosystems, and/or livelihoods? (Note: if restrictions and/or limitations of access to lands would apply, refer to Standard 5)	Yes
1.4	Would Project activities pose risks to endangered species?	No
1.5	Would the Project pose a risk of introducing invasive alien species?	No

[34] Prohibited grounds of discrimination include race, ethnicity, gender, age, language, disability, sexual orientation, religion, political or other opinion, national or social or geographical origin, property, birth or other status including as an indigenous person or as a member of a minority. References to "women and men" or similar is understood to include women and men, boys and girls, and other groups discriminated against based on their gender identities, such as transgender people and transsexuals.

1.6	Does the Project involve harvesting of natural forests, plantation development, or reforestation?	No
1.7	Does the Project involve the production and/or harvesting of fish populations or other aquatic species?	No
1.8	Does the Project involve significant extraction, diversion or containment of surface or ground water? *For example, construction of dams, reservoirs, river basin developments, groundwater extraction*	No
1.9	Does the Project involve utilization of genetic resources? (e.g. collection and/or harvesting, commercial development)	No
1.10	Would the Project generate potential adverse transboundary or global environmental concerns?	No
1.11	Would the Project result in secondary or consequential development activities which could lead to adverse social and environmental effects, or would it generate cumulative impacts with other known existing or planned activities in the area? *For example, a new road through forested lands will generate direct environmental and social impacts (e.g. felling of trees, earthworks, potential relocation of inhabitants). The new road may also facilitate encroachment on lands by illegal settlers or generate unplanned commercial development along the route, potentially in sensitive areas. These are indirect, secondary, or induced impacts that need to be considered. Also, if similar developments in the same forested area are planned, then cumulative impacts of multiple activities (even if not part of the same Project) need to be considered.*	Yes
Standard 2: Climate Change Mitigation and Adaptation		
2.1	Will the proposed Project result in significant[35] greenhouse gas emissions or may exacerbate climate change?	No
2.2	Would the potential outcomes of the Project be sensitive or vulnerable to potential impacts of climate change?	No
2.3	Is the proposed Project likely to directly or indirectly increase social and environmental vulnerability to climate change now or in the future (also known as maladaptive practices)? *For example, changes to land use planning may encourage further development of floodplains, potentially increasing the population's vulnerability to climate change, specifically flooding*	No
Standard 3: Community Health, Safety and Working Conditions		
3.1	Would elements of Project construction, operation, or decommissioning pose potential safety risks to local communities?	Yes
3.2	Would the Project pose potential risks to community health and safety due to the transport, storage, and use and/or disposal of hazardous or dangerous materials (e.g. explosives, fuel and other chemicals during construction and operation)?	Yes
3.3	Does the Project involve large-scale infrastructure development (e.g. dams, roads, buildings)?	Yes
3.4	Would failure of structural elements of the Project pose risks to communities? (e.g. collapse of buildings or infrastructure)	Yes
3.5	Would the proposed Project be susceptible to or lead to increased vulnerability to earthquakes, subsidence, landslides, erosion, flooding or extreme climatic conditions?	No
3.6	Would the Project result in potential increased health risks (e.g. from water-borne or other vector-borne diseases or communicable infections such as HIV/AIDS)?	Yes
3.7	Does the Project pose potential risks and vulnerabilities related to occupational health and safety due to physical, chemical, biological, and radiological hazards during Project construction, operation, or decommissioning?	Yes
3.8	Does the Project involve support for employment or livelihoods that may fail to comply with national and international labour standards (i.e. principles and standards of ILO fundamental conventions)?	Yes
3.9	Does the Project engage security personnel that may pose a potential risk to health and safety of communities and/or individuals (e.g. due to a lack of adequate training or accountability)?	Yes
Standard 4: Cultural Heritage		
4.1	Will the proposed Project result in interventions that would potentially adversely impact sites, structures, or objects with historical, cultural, artistic, traditional or religious values or intangible forms of culture (e.g. knowledge, innovations, practices)? (Note: Projects intended to protect and conserve Cultural Heritage may	No

[35] In regards to CO_2, 'significant emissions' corresponds generally to more than 25,000 tons per year (from both direct and indirect sources). [The Guidance Note on Climate Change Mitigation and Adaptation provides additional information on GHG emissions.]

	also have inadvertent adverse impacts)	
4.2	Does the Project propose utilizing tangible and/or intangible forms of cultural heritage for commercial or other purposes?	No
Standard 5: Displacement and Resettlement		
5.1	Would the Project potentially involve temporary or permanent and full or partial physical displacement?	No
5.2	Would the Project possibly result in economic displacement (e.g. loss of assets or access to resources due to land acquisition or access restrictions – even in the absence of physical relocation)?	Yes
5.3	Is there a risk that the Project would lead to forced evictions?[36]	No
5.4	Would the proposed Project possibly affect land tenure arrangements and/or community based property rights/customary rights to land, territories and/or resources?	No
Standard 6: Indigenous Peoples		
6.1	Are indigenous peoples present in the Project area (including Project area of influence)?	No
6.2	Is it likely that the Project or portions of the Project will be located on lands and territories claimed by indigenous peoples?	No
6.3	Would the proposed Project potentially affect the human rights, lands, natural resources, territories, and traditional livelihoods of indigenous peoples (regardless of whether indigenous peoples possess the legal titles to such areas, whether the Project is located within or outside of the lands and territories inhabited by the affected peoples, or whether the indigenous peoples are recognized as indigenous peoples by the country in question)? *If the answer to the screening question 6.3 is "yes" the potential risk impacts are considered potentially severe and/or critical and the Project would be categorized as either Moderate or High Risk.*	No
6.4	Has there been an absence of culturally appropriate consultations carried out with the objective of achieving FPIC on matters that may affect the rights and interests, lands, resources, territories and traditional livelihoods of the indigenous peoples concerned?	No
6.5	Does the proposed Project involve the utilization and/or commercial development of natural resources on lands and territories claimed by indigenous peoples?	No
6.6	Is there a potential for forced eviction or the whole or partial physical or economic displacement of indigenous peoples, including through access restrictions to lands, territories, and resources?	No
6.7	Would the Project adversely affect the development priorities of indigenous peoples as defined by them?	No
6.8	Would the Project potentially affect the physical and cultural survival of indigenous peoples?	No
6.9	Would the Project potentially affect the Cultural Heritage of indigenous peoples, including through the commercialization or use of their traditional knowledge and practices?	No
Standard 7: Pollution Prevention and Resource Efficiency		
7.1	Would the Project potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts?	Yes
7.2	Would the proposed Project potentially result in the generation of waste (both hazardous and non-hazardous)?	Yes
7.3	Will the proposed Project potentially involve the manufacture, trade, release, and/or use of hazardous chemicals and/or materials? Does the Project propose use of chemicals or materials subject to international bans or phase-outs? *For example, DDT, PCBs and other chemicals listed in international conventions such as the Stockholm Conventions on Persistent Organic Pollutants or the Montreal Protocol*	Yes
7.4	Will the proposed Project involve the application of pesticides that may have a negative effect on the environment or human health?	No
7.5	Does the Project include activities that require significant consumption of raw materials, energy, and/or water?	Yes

[36] Forced evictions include acts and/or omissions involving the coerced or involuntary displacement of individuals, groups, or communities from homes and/or lands and common property resources that were occupied or depended upon, thus eliminating the ability of an individual, group, or community to reside or work in a particular dwelling, residence, or location without the provision of, and access to, appropriate forms of legal or other protections.

Annex G: Environmental and Social Management Framework (ESMF)

Executive Summary

The objective of this GEF project titled "*Preparation of Project Document for NAMA on Integrated Waste Management and Biogas Production in Uganda*" (hereafter, the "Project") is to provide technical support to the UNDP LECB1 project in Uganda by preparing a Project Document for a NAMA to improve waste management practices in towns and municipalities through the introduction of integrated organic solid waste and wastewater treatment plants and biogas digesters. The Project consists of four main components to be implemented over the course of a five-year period as described in the project document.

The objective of the ESMF is to ensure compliance of relevant policies and to direct the Project personnel and stakeholders during the implementation of the Project in tackling the social and environmental concerns identified. Among those, the ESMF aims to manage the Environmental & Social (E&S) impacts through appropriate mitigation measures that may arise with the implementation of the project providing specific guidance to be followed consistent with the existing E&S studies of working sites but also the policies at the local, national and international level and the UNDP.

The present ESMF is organized into nine sections:

- Section I describes the Project scope and coverage, and objectives of the ESMF in relation to the project preparation phase.
- Section II identifies the potential social and environmental impacts due to the project activities and the methodology used.
- Section III analyses the legal and institutional framework relevant to the safeguards.
- Section IV describes the procedures used for screening, assessment and management of environmental and social risks identified.
- Section V provides an overview of institutional capacity assessment and building, including the assignment of responsibilities along the project cycle.
- Section VI describes the stakeholder engagement and disclosure process.
- Section VII describes the grievance redress mechanism to be utilised during the project.
- Section VIII establishes the monitoring and evaluation arrangements
- Finally, Section IX presents the planned budget for ESMF implementation.

The preliminary assessment of potential environmental and social risks mainly relate to operation and management of the biogas plant although sitting of the plant shows some immediate impacts too. In summary these are:

- **The construction and decommissioning activities of the biogas plant.**
- **The operations of the biogas plant, in particular waste handling and the management of downstream social populations affected.**

Conclusions at the project preparation phase are based on the study undertaken through the following:

- **Site visits and Stakeholder interviews.**
- **Consensus with UNDP on the scale of the assessment to be undertaken during project design.**
- **Review of the previous work conducted at the Project Identification Form (PIF) stage**
- **Review of the existing relevant documentation like the ESIA of some of the selected sites.**

It is expected that the Project will lead to sound positive environmental impacts due to the reduction of GHG emissions but also the prevention of landfill use and the protection of underground and surface runoff water resources from pollution for the neighbouring environs. Moreover, the bio-fertiliser by-product from the bio-digester can be used for improving agricultural production especially among the neighbouring communities purposes.

It is also expected that the Project will lead to positive social impacts. Improved waste management, as well as the biogas facilities are expected to create jobs. They can also serve as a catalyst for waste resource separation and

remove the increasing uncollected waste from the streets. Potential negative impacts have been identified and mitigation measures will be applied. These relate to typical challenges faced by large scale infrastructure investments like health and safety to personnel and local communities and the environment. Also relevant is the potential impact on waste pickers and women depending on the current waste streams management situation.

Table of Contents

Project description:

A summary of project components, outcomes, outputs and activities is provided in the project document (Section IV).

Social and environmental context

The increasing presence of uncollected waste – both liquid and solid waste – in recent years is particularly intense in the main urban areas in Uganda.

The agro-processing industry, including fish processing factories and livestock slaughterhouses, produces substantial quantities of wastewater, much of which is discharged into the environment without any treatment. Although more than 100 facilities have permits allowing them to discharge treated wastewater, compliance with effluent standards is low. Many other facilities are operating without permits. By some estimates, 90% of the collected wastewater of Kampala is discharged without any treatment.

Open dumping and burning of solid waste are a common practice in many parts of the country, resulting in the uncontrolled release of local air pollutants and GHG emissions. Considering the adverse health and environmental impacts, the Government of Uganda considers pollution from wastewater and solid waste as a priority concern.

Purpose and objectives of the ESMF

The purpose of the ESMF is to identify the likely environmental and social impacts, propose suitable mitigation measures and implementation of these measures. This ESMF is required to ensure compliance with the UNDP, Government of Uganda, and those of the participating donors and stakeholders.

Specifically, the ESMF:

- Evaluates the project's potential environmental risks and impacts in its area of influence; examines project alternatives;
- Identifies ways of improving project selection, siting, planning, design, and implementation by preventing, minimizing, mitigating, or compensating for adverse environmental impacts and enhancing positive impacts; and
- Includes the process of mitigating and managing adverse environmental impacts throughout project implementation.

The ESMF takes into account the legislative and institutional context; the natural environment; human health and safety; social aspects (involuntary resettlement, indigenous peoples and working conditions); and trans-boundary and global environmental aspects when relevant. All the major E&S impacts along with mitigation and management measures have been compiled in the form of this ESMF. The ESMF will be applicable for the whole Project implementation period.

Project area

The project's scope allows for the implementation of activities anywhere across the country of Uganda where the integral waste/wastewater management towards biogas generation may be feasible. The findings achieved during the design period lead to following up on the next steps with a deeper assessment on the synergies and challenges on the interaction of the Project against the baseline at each specific location chosen at any phase along the project cycle.

This ESMF is based on the understanding that three potential sites have been scrutinised to serve as pilot biogas implementation and that more sites across the country will be supported by the Project to replicate and scale up the experience within the project cycle. Therefore, an open list of possibilities broadens the scope of analysis at the project preparation site.

Potential social and environmental impacts

Methodology used for identification of potential impacts

This analysis considers the following business models for using waste streams for developing integrated municipal waste/ waste water treatment and biogas facilities:

Under these options the following business models are the basis of the present analysis:

- Business model 1: Municipal waste conversion to biogas converted to electricity/heat
- Business model 2: Municipal wastewater treatment resulting in biogas converted to electricity/heat
- Business model 3: Industrial/ food production/ agricultural waste conversion to biogas converted to electricity/heat

It is important to note that the project will not involve the support of energy crop production for biogas-based power plants.

There is also a fourth possibility around low-technology biogas production at waste-water treatment plants that would still yield significant GHG savings and would be investigated if all other options fail. This case has not been considered as part of the safeguards analysis.

The ESMF has been prepared in accordance with applicable UNDP-GEF safeguard policies and is based on different techniques embracing mainly literature review on similar projects in the region, consultation with the identified stakeholders at the design phase and professional knowledge including the expert consultants involved in the Project Document preparation.

While the initial targeted sites for the biogas plants have been identified and a menu of intentioned arrangements has been developed through the design phase of the project, the final sites and arrangements serving the purpose and the specific activities to be implemented will be committed to during project implementation. Therefore, this document provides the requirements to be followed in the future around the E&S assessments. As a consequence, at a future stage when all variables are known, a series of site specific E&S measures will have to be conducted to identify suitable mitigation measures with the support of the key stakeholders. These are budgeted and included in the present design phase but applicable to the whole project cycle. Note that existing sites with valid E&S studies will have their E&S plans followed and/or re-aligned the requirements of the ESMF.

The potential environmental impacts mainly relate to project siting and site preparation, construction, operation and management of the cogeneration plant. These are:

- The construction and decommissioning activities, waste generation and their management and
- The operations of the biogas plant, waste, and their management.

Below is the detailed list of expected positive and negative impacts expected from the Project. An in depth assessment is contained in Section 5 of this document.

Expected positive impacts

Depending on the option chosen among the waste streams and business models identified the following positive environmental effects will be achieved through the anaerobic treatment applying the best practices and measures established at the preparation phase. In consequence, as the sub-projects considered are associated with one or more activities described above, independent assessments will be needed on this regard at the implementation phase:

- Reduction of emissions of odorous substances compared to the current scenarios in landfills and due to illegal abandonment
- Hygienisation and destruction of pathogenic microorganisms and weed seeds in a controlled manner
- Increase of the local greener fertilizer value leading to less dependency on imported chemicals
- Safeguarding of water resources due to recycling and reuse of process waster
- GHG reductions:
    - Reduction of CO_2 emissions by substitution of biogas in place of fossil fuels to generate electricity
    - Reduction of methane (CH_4), ammonia, and nitrous oxide emissions that would occur in uncontrolled circumstances
- Gender empowerment and gap reduction in the waste sector

- Degraded ecosystems restored by re-direction of waste that were previously abandoned
- Improved local and regional economies through the creation of direct and indirect jobs
- Enhanced fuel/energy security by means of decentralised know-how technologies
- And potentially others.

Expected negative impacts and mitigation measures

The activity is classified as High Risk due to the interventions planned under Component 2.

Although the ultimate goal of this project is to reduce GHG emissions, a combination of the safeguards challenges at different levels may jeopardise the current scenario which may undermine the goals of the project if the appropriate measures are not taken during the project cycle. Therefore, a series of environmental and social measures will have to be conducted to identify suitable mitigation measures with the support of the key stakeholders. These will be budgeted and included in the present design phase but applicable to the whole project cycle. Below is the summary of the potential negative impacts of the project:

- During construction and decommissioning: the most important aspect considers occupational health and safety of personnel and local communities. Big amounts of soil are expected from excavation where the installations will need to be built, as well as some waste from construction and decommissioning materials and off cuts are expected. High standards of health and safety and full compliance with the potential policies of each site as well as regional and national standards will be required as a mitigation measure.
- During operation: This analysis is based under the assumption that not all received waste will be profitable and sub-products resulting from the waste treatment will always have secured ways to be marketed. Under this assumption certain unwanted waste and sub-products will be generated. Therefore, the following will need to be taken into consideration in the specific environmental measures when analysing and assessing the significance of the impacts that may be created at each specific site:
    - Loading and transportation of feedstock to the plant
    - Evacuation/transportation and end use of liquid and solid sub-products and unwanted materials
    - Odour/dust/noise production and control

a. Furthermore, other major risks involve the release of pollutants, occupational health and safety conditions due to biological and chemical hazards as well as typical risks due to the large-scale nature of the infrastructure. This novel technology implies also a risk that security personnel and duty-bearers do not have the capacity to meet their obligations in the Project.

- Cumulative impacts: Component 3 of the project will result on the incremental effect of the impacts identified by the activities when considering the foreseeable future actions within this project and other similar projects outside this one. Effects should be assessed in terms of the capacity of the resources, ecosystems, and/or affected communities to accommodate such impacts. In the Ugandan environmental, social and economic contexts, large and medium infrastructures projects such as biogas plants can have significant cumulative impacts. However from the analysis of the baseline and implementation readiness for biogas implementation, there are clear indications that the cumulative impacts resulting from the increased number of biogas plants shall be negligible in the near future while the negative socio-economic impacts of not conducting any investment on the integrated waste management for biogas production shall be considerable taking into consideration the current region's economies characterized by poor waste management practices and poor infrastructure development.

Legal and institutional framework

This section describes the applicable UNDP-GEF environmental and social safeguard policies and country specific policy, legal and administrative frameworks, rules and regulations applicable to this project. The section also provides an overview of current gaps between existing country systems and UNDP-GEF applied policies, relevant to the safeguard requirements.

UNDP safeguard policies

The UNDP requires E&S safeguards of Projects proposed to ensure that they are sustainable. This assessment is a process dependent on the nature, scale, and location of the proposed project. The key elements of UNDP Social and Environmental Standards are followed according to the latest (March 2016) version of the SESP (Social and Environmental Procedures):

- Overarching Policy and Principles
- Project-level Standards
- Policy Delivery Process and Accountability

International Policies

Uganda has actively participated and ratified the following international policies:

Table 7: E&S relevant international policies

Significant Policies	Relevance to the Project
Convention of Biological Diversity **Status: Ratified**	The Convention is a multilateral treaty. Its objective is to develop national strategies for the conservation and sustainable use of biological diversity. It is often seen as the key document regarding sustainable development embracing three main goals: • Sustainable use of its components • Conservation of biological diversity (or biodiversity) • Fair and equitable sharing of benefits arising from genetic resources
United Nations Framework Convention on Climate Change (UNFCCC) **Status: Ratified**	The Convention is an intergovernmental environmental treaty developed to address the problem of climate change and in particular to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.

Country systems

The socio-economic and environmental national framework is summarised in the table below:

Table 8: E&S relevant national framework

Significant legal framework	Relevance to the Project
Supreme law	
The Constitution of the Republic of Uganda (1995, as amended). **Status: In force**	The Constitution is the supreme law of Uganda. It is a national objective and directive principle of state policy that the State shall protect important natural resources including land, water, wetlands, minerals, oil, fauna and flora on behalf of the people of Uganda. The proposed project aims at addressing the increasing waste problem to convert it into biogas. This helps the protection of important natural resources by replacing the conventional sources of fuel used for this purpose.
Policies	
The National Environmental Action Plan (NEAP, 1995). **Status: In force**	The NEAP provides a framework for addressing gaps in environment management as well as a strategy for integrating environment management into the national socio-economic development. It brings together different activities which have previously had sectoral interests only into one integrated effort. One of the outcomes of the NEAP was the formulation of the National Environment Management Policy (NEMP). The proposed project contributes to the socio-economic development through environmental improvements by integrating biogas technology in the waste management sector. Despite direct environmental benefits it is required to conduct environmental studies which comply with national guidelines and apply to required permits.
The National Environment Management Policy (NEMP, 1994). **Status: In force**	Key objectives of this Policy include the enhancement of the health and quality of life of all people in Uganda and promotion of long-term, sustainable socio-economic development through sound environmental and natural resource management and use; and optimizing resource use and achieving a sustainable level of resource consumption. The proposed project will interrelate with different aspects of the natural environment and it is required to conduct environmental studies which comply with national guidelines and apply for the required permits.
Renewable Energy Policy (REP, 2007). **Status: In force but currently under review**	This Policy lays down Government's commitment to the development and utilization of renewable energy resources and technologies to increase the use of modern renewable energy, from the current 4% (in the year 2007) to 61% of the total energy consumption by the year 2017. The proposed project helps the policy goals increasing the renewable energy share through the inclusion of biogas production within the waste management process
The National Water Policy (1999). **Status: In force**	This Policy addresses current water management issues and adopts the objectives and strategies formulated under the Water Action Plan. It presents the frameworks for the water resources management and development through which priorities can be established and the protection and optimal use of the nation's water resources planned and assured. The proposed project contributes to the improvement of water resources through the inclusion of wastewater treatment into the integrated waste management process for biogas production. Despite direct environmental benefits it is required to conduct environmental studies which comply with national guidelines and apply for the required permits.
Regulations	
The National Environment Regulations (several dates). **Status: In force but currently under review**	The Regulations provide the permits and requirements for the following scopes: Waste Management and discharge (1999) • **Audit (2006)** • **Minimum Standards for Management of Soil Quality (2001)** • **Noise Standards and Control (2003)** • **Conduct and Certification of Environmental Practitioners (2001)** • **Wetlands, River Banks and Lake Shores Management (200)** • **Management of Ozone Depleting Substances and Products (2001)**

Significant legal framework	Relevance to the Project
	The proposed project contributes directly to the national environment and in particular to waste management and discharge. Despite direct environmental benefits it is required to conduct environmental studies which comply with national guidelines and apply for the required permits.
The Water Resources Regulations (1998). **Status: In force**	These Regulations provide further for various aspects of water law for which provisions were made in the Water Statute, 1995. The text consists of 29 regulations which are divided into 5 Parts: Preliminary (I); Water permits (II); Water Policy Committee (III); Drilling and construction permits (IV); Miscellaneous (V). In the case of project activities involving abstracting water from a lake, river or underground using a motorized pump; discharging wastewater into the environment; involved in drilling of water; or construction of dams and other structures on water bodies are required to apply for a water permit. It cannot be ensured at this present stage (Project preparation) that the project may not involve any of such water related activities.
The Environment Impact Assessment Regulations (1998). **Status: In force**	These Regulations shall apply to all projects listed in the Third Schedule to these Regulations and major repairs, extensions, or routine maintenance of existing projects included in the Schedule (reg. 3). In those cases, a developer shall prepare a project brief stating the information included in regulation 5. The proposed project will support existing and planned biogas plants as well as other waste management installations in the national boundary of Uganda. Therefore, it is expected that Third Schedule activities will be developed and shall comply with the regulations in all cases.
Acts	
The National Environment Act (Cap 153). **Status: In force**	It provides for the sustainable management of the environment and establishes NEMA as the principal agency responsible for coordinating, monitoring, regulating and supervising environmental management in the country. NEMA advises Government and spearheads the development of environmental policies, laws, regulations, standards and guidelines; and guides Government on sound environmental management in Uganda. Cap. 153, Section 20 provides for sub-projects to undergo EIA. Following the provision of an environmental authority at the national level, this project has liaised with this authority (NEMA) to serve as a main partner at the national level for this initiative. Furthermore, the project will support the Government to integrate biogas technology for energy generation into national MEMD and NEMA programmes as described in the ProDoc. The objective of Component 1 is to enhance the knowledge, technical and managerial capacities of NEMA, among others. The proposed projects will have impacts on natural resources and it is required to conduct environmental studies, which comply with national guidelines and apply to required permits.
The Water Act. **Status: In force**	This act provides for the use, protection and management of water resources and water supply. The Water Act insists on protection and integrated sustainable development, management and use of the national water resources with the full participation of the stakeholders. In the case of project activities involving abstracting water from a lake, river or underground using a motorized pump; discharging wastewater into the environment; involved in drilling for water; or construction of dams and other structures on water bodies are required to apply for a water permit. It cannot be ensured at this present stage (Project preparation) that the project may not involve any of such water related activities. Therefore, the proposed project shall comply with the act in all cases.
The Land Act. **Status: In force**	This Act makes provision for the procedures and method of compulsory acquisition of land for public purposes whether for temporary or permanent use. The Government or developer is to compensate any person who suffers damage as a result of a project development. It cannot be ensured at this present stage (Project preparation) that the project may not involve any of such land related activities. Therefore, the proposed project shall comply with the act in all cases.
The Investment Code Act . **Status: In force**	Section 19(1)(d) of this Act makes it an implied term and condition of every holder of an investment license to take the necessary steps to ensure that the operation of their business enterprise does not cause any injury to the ecology or the environment. The proposed project aims at engaging the waste sector at the national and local level ensuring market conditions are improved to attract private sector investment to replicate biogas. Therefore, it is expected that such investment shall comply with the regulations in all cases.
Occupational Safety and health Act 2007. **Status: In force**	According to the Act it is obligatory for an employer to ensure health, safety and welfare of persons at workplace including its vicinity. Likewise, it is the responsibility of employer to provide free protective equipment including clothing to the workers involved in hazardous work and to provide instruction, training and supervision as is necessary to ensure health and safety at the workplace. The Act provides for a labour inspection system to verify the above

Significant legal framework	Relevance to the Project
	matters at work. The proposed project contributes to the creation of new jobs within the waste sector. Despite direct benefits it is required to conduct social studies which comply with national guidelines and inspections.
Public Health Act 1964 (Revised in 2000). **Status: In force**	An Act to consolidate the law regarding the preservation of public health. It provides rules relative to, among other things, prevention and suppression of (animal) diseases, sewerage and drainage, prevention and destruction of mosquitoes, storage of foodstuffs, the handling of food by diseased persons and control of potable water. The Act defines ample regulation-making powers of the Minister. The Minister may, by Statutory Instrument, establish sanitary boards. These Boards shall exercise the powers conferred on local authorities by this Act in respect of any specified area. The Minister shall also establish the Advisory Board of Health. It shall be the duty of every local authority to take all lawful, necessary and reasonably practicable measures for preventing pollution of water supply and for purifying any such supply which has become polluted. The proposed project will interrelate with different aspects of public health and it is required to conduct appropriate environmental and social studies which comply with national guidelines and apply for the required permits and supervisions.

As summarised in the table above, the foundation for the environmental legal framework in Uganda is well established. Social safeguards are included within the environmental framework, for example, as a specific scope of consideration for the Environmental Impact Assessment (EIA). Gender analysis, on the contrary, is not cited among the required safeguards. The challenge remains to ensuring that social and gender safeguards are underpinned at the same level as environmental safeguards either through additional requirements to strengthen analysis or through the linkage to other appealing social and gender policies at the national framework. There is, likewise, need to increase measures at both central and local level to improve public consultation requirements and ensure ways of integrating them into the decision-making of the activities. For example, through institutionalised communication with the community and public consensus in a way that input is allowed to relevant decisions and in particular public/private agreements.

A known challenge, and in particular with biogas technology and gender empowerment, includes insufficient law enforcement and public awareness, both in terms of law, management expertise, equipment and/or facilitation. There is a need to emphasise the relevance of training and capacity building among law enforcers and government officials and to include an enforcement plan to overcome this limitation. In this regard the challenge extends to ensuring preventive monitoring by the project owner that will be closely supervised by compliance personnel.

The Government of Uganda has successfully used economic and social incentives/disincentives as an approach to environmental regulation since years ago. It has provided a basis for payment of fees, levies and charges under the permit and license system. It could be emphasised, however, that the use of incentives/disincentives should go hand in hand with positive discrimination for first-of-its-kind activities and those with sound E&S benefits. For example, as it is the case of biogas generation, this technology shows a minor presence in the renewable energy share in Uganda. This could be favoured considering the cost that development activities have on the environment and calculating the contribution of the environment sector to the gross domestic product (GDP), among other factors, to alleviate the cost of compliance. The other challenge relates to bringing up to the established legal requirements in this project the existing plants that were set up before the project coming into force. Bringing those plants to comply with such environmental and social standards may be laborious and will require visits of environmental and social experts, compliance schedules and agreed benchmarks intended to achieve gradual compliance to the extent possible. Finally, the legal framework encourages sustainability through recycling practices but no minimum requirements are stipulated at any levels. Current efforts being developed by the project and other parallel waste management initiatives could be easily supported by considering appropriate thresholds on waste recovery.

Procedures for screening, assessment and management:

Specify the procedures for reviewing and addressing potential social and environmental issues

A study has been undertaken for the Environmental and Social Assessment and Management. This included the following:

- Site visits and stakeholder interviews
- Consensus with UNDP on the scale of the assessment to be undertaken during project design
- Review of the previous work conducted at the PIF stage
- Review of the existing relevant documentation like the ESIA of some of the selected sites

Step 1: Environmental and social screening

At the time of writing this document the most advanced guidance available to comply with UNDP environmental and social requirements were the "DRAFT Guidance Note - UNDP Social and Environmental Standards (SES)" dated on 26th February 2016. Therefore, this ESMF is based on the premises of such guidelines.

According to these guidelines the UNDP classifies the proposed projects depending on the type, location, sensitivity and scale of the project and the nature and magnitude of its potential E&S impacts. In order to ensure consistency in the categorisation process all proposed projects undertake an E&S screening following the most updated (March 2016) UNDP's Social and Environmental Screening Procedure (SESP). The resulting project level risk category –low, medium, high – reflects the depth needed to tackle the project's potential environmental and social risks and adverse impacts.

When screening indicates that a project presents risks associated with specific SES Overarching Principles and/or Project-level Standards (e.g. Human Rights, Indigenous Peoples, Pollution Prevention), it is necessary to review the SES to ensure the relevant requirements related to these standards are addressed in the assessment and management process. This Project counts with a SES Report conducted at the Project Identification Form (PIF) stage. The review of this SES conducted at the PIF stage lead to the following findings on the established SES:

The Social and Environmental Risk Screening Checklist conducted at the PIF stage identified 7 potential risks. According to the SESP all risks identified in the Screening Checklist need to be assessed and managed. However, only 3 have been assessed on their level of significance and management measures as shown above. This excludes part of the categorisation of the overall Project that may affect to further measures and requirements. Therefore, these findings lead to the need to widen the assessment and management of the 4 other risks identified in the Screening Checklist. Thus, the analysis of these 4 additional risks as well as the consideration of all identified issues exposed during Project preparation have resulted in a more comprehensive context to identify the likely risks on future chosen sites. In conclusion the revised Social and Environmental Screening Report leads to a total of 22 identified potential risks (instead of 3 as identified in the PIF) and entails a focus on the following requirements:

- Identify ways of improving working conditions and earnings, with a particular focus on local communities, waste pickers, marginalized and poor groups. Where possible, support and recommendations will be provided to relevant ministries and municipalities to assist the formalization of waste pickers roles within the waste management sector.
- A multi-stakeholder platform will be set up to including representatives from civil society to ensure that local communities and vulnerable/marginalized and poor groups are fully involved in both Project preparation and implementation. Likewise, ensure mechanisms to account for priorities and concerns raised by these groups along the Project cycle to be translated to formal decision-making actions. Specific stakeholders mechanisms with a focus on local communicates, waste pickers, marginalized and poor groups will be developed at each site for this through the (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process.
- Develop a tailored plan to include rights-holders, duty-bearers and security personnel in all awareness, training and capacity development activities to meet obligations and claim rights as needed.

- Identify ways of reducing the gender gap (reduce discrimination, access to opportunities and benefit, gender equality) in the Project activity and improving working conditions/earnings of waste pickers, with a particular focus on women.
- Ensure that women are fully involved in both Project preparation and implementation. Likewise, ensure mechanisms to account for priorities and concerns raised by this sector along the Project cycle to be translated to formal decision-making actions. Specific stakeholders mechanisms with a focus on gender issues will be developed for this at each site.
- Specific environmental measures (e.g. through an ESIA, ESA, ESMP) will be required for each site in the Project that will address the specific risks.
- The E&S assessment assumes the generation and management of biogas will result in GHG emission reductions measured by means of the UNDP tools (GEF standard methodology developed by the STAP) and appropriate M&E. Therefore, no further requirements are necessary.
- Specific environmental measures (e.g. through an ESIA, ESA, ESMP) will be required for each site in the Project that will address the specific risks.
- Develop a tailored plan to include rights-holders, duty-bearers and security personnel in all awareness, training and capacity development activities to meet obligations and claim rights as needed.
- In parallel, emergency plans will be developed to build community resilience against unexpected Project scenarios so as to protect health, safety and working conditions.
- The E&S assessment assumes that no cultural heritage will be affected by any of the activities along the Project cycle. Therefore, no further requirements are necessary.
- The E&S assessment assumes that the Project will be located on public land in municipalities or already acquired land for the private sector operators by any of the activities along the Project cycle. Therefore, no further requirements are necessary.
- The E&S assessment assumes that no indigenous peoples will be affected by any of the activities along the Project cycle. Therefore, no further requirements are necessary.
- Specific environmental measures (e.g. through an ESIA, ESA, ESMP) will be required for each site in the Project which will address the specific risks.
- In particular, the focus will remain on the control of odour, effluent and gaseous emissions at the operational phase. Similarly, the waste handling process will require special attention.
- In parallel, emergency plans will be developed to build community resilience against unexpected Project scenarios so as to protect the environment and its habitats.

Detailed assessment and management of each risk is available in Annex F of the Project Document.

Step 2: Conduct environmental and social assessment studies

According to the UNDP SES guidelines on the SESP, there are 5 possible scenarios the Projects may belong to. Scenario 1 and 2 represent situations on which project components and variables are known to the extent that it is possible to conduct the assessment during the design stage. Scenarios 3, 4, or 5 represent situations for which certain components are not known or are likely to change substantially and therefore cannot be fully assessed so it will be necessary to conduct the assessment during implementation.

The present project design includes the identification of the potential locations for the pilot initiatives through work with stakeholders. It is expected that the details of certain components of the project will not be known or finalised at the time of project approval and therefore the E&S safeguards cannot be fully assessed. Under this scenario and according to the latest UNDP SES guidelines the SESP is still applied, disclosed and discussed with stakeholders prior to implementation to identify potential risks even if they cannot yet be fully assessed. Furthermore, an Environmental and Social Management Framework (ESMF) will be developed for PAC review that will be followed by an Environmental and Social Management Plan (ESMP) before the implementation phase. Furthermore, based on the analysis at the preparation phase we can confirm that the full SESA and ESIA are necessary for specific site investments. Both documents will follow the requirements of UNDP's Social and Environmental Standards, and reflect Uganda's environmental assessment laws and regulations, host country obligations under international law, and core human rights treaties. The SESA and ESIA will meet the UNDP, GEF and Ugandan requirements. Since the feasibility studies for the demonstration investments will be carried out within the implementation of the GEF

project itself, the SESA and ESIA will also be developed during this period. At that time, the SESA and ESIA must be carried out by certified Ugandan experts under the assessment and ultimate approval of project partners.

Step 3: Specific site E&S Safeguards documents appraisal and approval

The indicative outline of an ESIA Report published in Attachment 1 of the DRAFT Guidance Note - UNDP Social and Environmental Standards (SES) published on the 22th November 2015 will be followed. The ESIA developed before the implementation phase will cover the major project requirements:

a) Biodiversity Conservation and Sustainable Natural Resource Management
b) Climate Change Mitigation and Adaptation
c) Community Health, Safety and Working Conditions
d) Pollution Prevention and Resource Efficiency

Similarly, Annex 3 of the DRAFT Guidance Note - UNDP Social and Environmental Standards (SES) published on the 22th November 2015 provides a clear path to conduct a SESA. The SESA will include but not be limited by the elements in such guidance to install a process that will link with and, where feasible, reinforce other policy appraisal approaches used to shape development policies and plans. This will help ensure that social and environmental considerations are not overlooked at the high-level.

The process will involve the preparation of a concise report that summarizes the main findings and results of SESA, including:

a) SESA stakeholder engagement process
b) Key social and environmental priorities and issues associated with chosen PPP
c) Institutional arrangements for coordinating integration of social and environmental issues into the chosen Public Private Partnership
d) Legal, regulatory, policy, institutional and capacity recommendations to address any identified gaps for managing the social and environmental priorities and implementing applicable social and environmental policies
e) Results of assessment of social and environmental risks/impacts associated with the implementation of PPP
f) Identification of measures (e.g. policies, institutional strengthening, governance reform) to address and manage anticipated adverse social and environmental risks and impacts, including a summary Action Matrix (see Table A3.1 below for indicative outline) and
g) Where applicable, the ESMF used as framework for managing social and environmental risks during implementation of PPP related activities and/or policies/regulations.

Furthermore, at the implementation stage an ESMP will be developed also based on the SESA and ESIA previously compiled. The document will include but not be limited to the indicative outline for an ESMP described in Attachment 2 of the DRAFT Guidance Note - UNDP Social and Environmental Standards (SES) published on the 22th November 2015.The idea of the plan is to ensure that there is a detailed strategy tailored at the final sites selected for addressing any negative consequences that may occur due to the adaptation measures or capacity building measures taken as a part of the project. This ESMP will contain SMART indicators as well as a budget for specific activities and/or investments that should be undertaken as a part of the project implementation and will be submitted for approval through public consultation to the project partners, and all comments will be addressed.

It is worth noting that the present ESMF will need to be revised in case of future project changes and/or chosen sites considering conditions falling out the assumptions presented in this document.

Step 4: Information disclosure and stakeholder involvement

Consultation and communication has taken place from the early design phase coinciding with significant decision making activities affecting the entire project cycle and will continue to be a core element to this project, clearly documented and tracked. These are addressed in Sections 7 and 8 of this document. Please see details in such sections.

Management process

All subprojects will be screened using the 'Environmental and Social Screening' (SES) report to identify and assess the associated environmental risks, their assessment and management through mitigation measures. The project team will systematically undertake the following procedures to ensure overall environmental management of proposed sub-projects:

1: Review negative list for sub-project categorisation

The Project will require a new SES report and ESMF to be conducted for any proposal from the negative list. This list will be created to classify those potential sites that do not comply with the following assumptions below:

- One the following business models are the basis of the potential site (for example they use energy crops as a feedstock):
  - Business model 1: Municipal waste conversion to biogas converted to electricity/heat
  - Business model 2: Municipal wastewater treatment resulting in biogas converted to electricity/heat
  - Business model 3: Industrial/ food production/ agricultural waste conversion to biogas converted to electricity/heat
- The site is located on public land in municipalities or already acquired land for the private sector operators.
- No indigenous people are found in the Project boundaries. This includes project sites and catchment areas around the project sites.
- All sub-products generated in result of the Project (after the treatment in the plant) will be properly treated before being transferred outside the scope of the Project.
- Hazardous waste is any waste that poses substantial or potential threats to public health or the environment. Given the big amounts of waste involved in the functioning of the biogas plants, this E&S assessment is conducted under the consideration that the future waste to treat is hazardous.
- At the Project preparation phase it cannot be ensured that marketing channels will be secured for all sub-products generated in result of the Project (after the treatment in the plant).

2: Preparation of sub-project

Those sub-projects that succeed the negative list criteria and its requirements as established above can then proceed to develop the sub-project as per the task sequence described in Section "Institutional responsibilities" in this ESMF.

Institutional arrangements and capacity building

The institutional structures involved in implementation of the ESMF have been defined in the Project Document (Section VIII on Governance and Management Arrangements), including their roles, responsibilities of project staff and associated agencies in implementation of project activities.

Capacity Building

Recruitment of dedicated project staff will improve institutional capacity to implement the ESMF where it is weak. Prior to implementation the project will budget sufficient funds for a suitable qualified individual/team who will support the environmental and social safeguards of project activities. Training on safeguards should include familiarization of potential environmental and social impacts, appropriate mitigation and monitoring actions and compliance requirements.

A detailed assessment for each potential implementation scenario will be conducted to establish the institutional capacity for applying safeguard instruments and complying with UNDP-GEF safeguard policies for the duration of the project. Thus, training modules would be prepared as required and training would be scheduled as necessary. A Capacity Building Plan will be developed for stakeholders identified requiring additional support and formal training on safeguards aspects of the Project and Program.

As part of capacity building, stakeholders will receive information and guidance on how to communicate with the project organisation structure about concerns and grievances if they arise, including guidance on when and how to

use the stakeholder engagement and grievance mechanisms. Details of this instrument are provided below for both cases.

Roles of institutions and capacity assessment

The roles played within the implementation of the project by major stakeholders are described in the ProDoc. Existing gaps and weaknesses in regards to the implementation of this ESMF are analysed in this Section. Information provided is based on findings from the project preparation phase. The proposed project embraces the national boundary of Uganda and all activities shall comply with the legal framework exposed here in all cases.

Table 9: E&S related institutions, their roles and capacity assessment

Government Agencies	Identified capacity gaps
National Environment Management Authority (NEMA) / Ministry of Water and Environment (MWE) / Ministry of Energy and Mineral Development (MEMD)	These authorities have limited biogas experience and means to enforce their national laws. As a mitigation measure the Project includes under Component I activities dedicated to the provision of a Technical Advisor to deliver training and capacity building to law enforcers and government officials of this Authority. Moreover, the lack of sound interdependent social and gender compliance requirements identified (other than the social aspects included at the environmental impact assessment) to bring these as priority safeguards are mitigated through the incorporation of a social expert and a gender expert to provide a thorough analysis following UNDP-GEF standards and guidelines. Additionally, the TA provided as per Component 1 will to prepare the amendments required for integration of biogas energy into national policies and municipal ordinances. If the safeguards are affected by the legal framework currently under review a new assessment of the ESMF and further E&S documents should be conducted. In order to mitigate future challenges, the Project includes activities under Component 1 dedicated to providing Technical Advisory to assist this Ministry, among others, to prepare the amendments required for integration of biogas energy into national policies, strategies and incentive instruments
National Water and Sewerage Corporation (NWSC) / Directorate of Water Resources Management (DWRM)	Limited country and/or regional experience on biogas feasibility and assessment, and in particular to environmental and social related safeguards. In order to mitigate this gap, the Project includes activities under Component 1, 2, and 3 will dedicate Technical Advisory to assist NWSC and DWRM, among others, to prepare the amendments required for integration of biogas energy into national policies, strategies and incentive instruments – as well as to prepare projects.
Ministry of Local Government (MOLG) / Ministry of Gender, Labour and Social Development (MGLSD) / Platform for Labour Action (PLA)	The legal framework analysis has identified the lack of sound public consultation compliance requirements at both central and local level. The Project will mitigate this gap establishing Project measures through the Social and Environmental Screening report (see Annex F) to ensure ways of integrating public opinion into the decision-making of the activities. There are strong competing demands on government spending allocations, and social protection programmes inevitably receive lower priority than spending on 'development' programmes for economic growth. Additionally, a significant proportion of social protection activities in Uganda are financed by the donors. The danger is that effective social protection requires constant refinancing, whereas donors operate on project cycles that are time-bound and subject to changes in fashion or personnel. As for other entities in Uganda more training and more personnel are urgently needed in these areas. The Project will support these stakeholders through an activity dedicated to the development of a sensitisation campaign to the public to raise awareness. Of particular interest is also the incorporation of a social expert with a focus gender during the Project cycle to provide a thorough analysis following UNDP-GEF standards and guidelines. Furthermore, public consultations have been carried out at the Project preparation and additional stakeholder engagement measures have been established as requirements through the Social and Environmental Screening report (see Annex F) to ensure ways of integrating public opinion into the decision-making of the activities at no cost for this entity.
Ministry of Agriculture, Animal Industries and Fisheries (MAAIF)	Limited consideration of Environmental and social safeguards into Ministry services and limited collaboration with Environmental Agency. Component I has considered an activity to eradicate isolation within the government authorities and externally with the waste sector and affected groups. Thus, in order to facilitate coordination, the project will support the establishment of a multiple stakeholder coordination platform. Additionally, advisory roles of the Ministries like this one will be supported through the Project activity established to review and where necessary collect and update data on organic quantity and composition of waste streams for IWM plans (for 14 municipalities) to include waste to energy considerations.
Kampala City Council Authority (KCCA) and District / Municipal Local Governments	The centralised waste management practice observed leads also to poor budgetary resources handed to municipalities in order to get equipped and diminishes the technical and financial capacity to successfully manage waste. In order to enhance the knowledge, technical and managerial capacities of this Ministry, as well as Ugandan municipalities and NEMA the Project Document proposes measures to alleviate financial pressures on integrated waste management with biogas production. This will be achieved through establishing activities in Component 1 to provide municipalities Technical Assistance (TA) to address capacity and regulatory barriers related to waste management, the promotion of biogas technology and waste management plans and the establishment public private partnerships amongst municipalities and agro-processing industry.

Uganda National Biogas Alliance (UNBA)	A recent assessment indicates lack of standards, insufficient/lack of training and know-how-transfer (HCB) for planers, builders, suppliers… and insufficient after sales services by construction companies. These obstacles are planned to be tackled by the Project through dedicated activities on training and exchange visits between municipalities.
Local Financial Institutions / Private Sector Foundation Uganda (PSFU) / Uganda Energy Credit Capitalization Company (UECCC) / Uganda Investment Authority (UIA)	Limited country and/or regional experience on biogas feasibility and assessment, and in particular to environmental and social related safeguards. Despite having used economic and social incentives/disincentives for innovative projects the weight of environmental and social (including gender) positive discrimination is not an institutional common practice and it is neither one of the high priorities on internal requirements of these entities. This is particularly true for the social and gender scopes and environmental challenges other than climate change. The ProDoc proposes measures to alleviate financial pressures on integrated waste management with biogas production.
Waste Pickers Alliance Uganda / Illegal Manual Emptiers / Private Emptiers' Association Uganda (PEAU) / 2000 Trinity Agencies Ltd	The lack of sound interdependent social and gender compliance requirements identified (other than the social aspects included at the environmental impact assessment) to bring these as priority safeguards are mitigated through the incorporation of a social expert and a gender expert to provide a thorough analysis following UNDP-GEF standards and guidelines. Furthermore, public consultations have been carried out at the Project preparation and additional stakeholder engagement measures have been established as requirements through the Social and Environmental Screening report (see Annex F) to ensure ways of integrating public opinion into the decision-making of the activities. In parallel, training of IWM and source separation promoters and development of guidelines will be scheduled under the activities of the Project.

Institutional responsibilities

This section describes the institutional arrangements to implement the ESMF, from the screening of potential sites, preparation of site safeguard instruments, and review and clearance of sites through to the monitoring of implementation:

Table 10: E&S project cycle tasks and responsibilities

Environmental and Social related Tasks	
Scoping Tasks	**Responsible party**
Review of ESMF	Project Assurance
Clearance and disclose ESMF	Project Steering Committee
Eliminate all activities that are not in line with ProDoc safeguards and conditions	Project Manager
Confirm consultations are adequate	Project Assurance
Screening Tasks	**Responsible party**
Screen all proposed subprojects for adverse environmental and social impacts based on scoping exercise with the Social and Environmental Screening report.	Project Support
Screening records filed for review	Project Manager
Review screening process	Project Assurance
Subproject Preparation and Design Tasks	**Responsible party**
Conduct studies to inform subproject design and environmental and social safeguards as required	Third party / Project Support
Design subproject and activities in accordance with local, national and international standards, environmental and social -based approaches where relevant	Project Support
Prepare environmental and social related documentation for each subproject, (i.e. TORs, ESIA, ESA, ESMP, SEPD, SRM, GRM, SECU, progress reports) in accordance with ESMF and local, national and international legislation and agreements	Project Support
Approve technical design and environmental and social studies	Project Manager / Permitting Agency (i.e. NEMA)
Support review process and documentation	Project Manager / Project Steering Committee
Disclose draft documents in country	Project Steering Committee
Undertake consultations with stakeholders and affected peoples as required	Project Manager / Project Steering Committee
Incorporate Permitting Agency feedback and stakeholder feedback into design and environmental and social studies	Project Manager / Project Support
Review and approval of design and environmental and social studies (i.e. TORs, ESIA, ESA, ESMP, SEPD, SRM, GRM, SECU, progress reports) and update existing ESMF if necessary)	Permitting Agency
Prepare environmental and social safeguards cost estimates	Project Manager
Approve environmental and social safeguards budget	Project Steering Committee
Review safeguards instruments and confirm consultation process was adequate	Project Assurance
Clearance of safeguard instruments	Project Steering Committee
Implementation	**Responsible party**
Deliver safeguards training where necessary	Project Support

Environmental and Social related Tasks	
Scoping Tasks	**Responsible party**
Effective implementation of mitigation measures required in environmental and social studies/documentation	Project Manager / Project Support
Update safeguard instruments in consultation with affected people when technical specifications are finalised	Project Manager
Establish grievance focal point and address grievances	Project Manager
Disclose final safeguard instruments	Project Manager
Document the implementation of safeguard measures	Project Manager
Periodic supervision of implementation process, safeguards and progress reports	Project Assurance
Capacity Building	**Responsible party**
Deliver safeguards training where necessary	Project Manager
Technical support and training workshops	Project Support
Conduct capacity assessment for safeguards compliance	Project Manager
Clear TORs for consultants to ensure outputs meet safeguard requirements	Project Assurance
Monitoring	**Responsible party**
Monitor indicators including individuals and groups of special attention as established at the ESMF in participatory monitoring and evaluation exercises	Third party / Project Support
Supervision and monitoring compliance with safeguards (including ongoing maintenance) and Project Document	Project Assurance
Supervision and monitoring compliance with safeguards (including ongoing maintenance) and Project Document	
Safeguards monitoring oversight	Project Steering Committee / Permitting Agency

Stakeholder engagement and disclosure process

The purpose of stakeholder engagement and information disclosure is to gather stakeholder input and feedback into subproject development and design, and the effectiveness of mitigation measures for example through public consultations. The methods employed at the stakeholder engagement process se must be culturally appropriate, delivered in a timely manner and centrally managed to ensure a consistent and ongoing consultation process. Consultation sessions will include special outreach efforts and be tailored to the need of vulnerable groups, particularly women, so that the process is socially inclusive and a range of stakeholder views and perspectives are adequately represented.

This process represents an additional resource for a relatively small number of situations in which project stakeholder(s):

a. Have not been satisfied with the responses they have received through existing channels and procedures;
b. Make a formal request to use the SRM; and
c. Meet the SRM's eligibility criteria (outlined above).

And finally, the assignment of roles, expected flow and relationships of the different elements composing the stakeholder engagement and disclosure process for the Project will be detailed at the respective E&S studies to be conducted for each potential site based on the implementation tools elaborated in 2013 at the REDD+ program in Uganda. The plan identified various participation structures and processes at national and local level with potential to be

utilized to foster stakeholder engagement including components for communication and awareness plan as well as feedback grievance and redress.

The assessment of compliance by Uganda's REDD+ Process encompasses the following elements: a) Multi-delivery partner and adherence to environment and social safeguards; b) Stakeholder engagement; c) Disclosure of information; and, d) Grievance and accountability.

The mechanisms for this include the following aspects: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process.

Grievance redress mechanism

In the unlikely case that stakeholders need to show their concerns on UNDP E&S compliance the Compliance Review process serves to respond to such situations. Similar to the stakeholder engagement and disclosure process, the assignment of roles, expected flow and relationships of the different elements composing the Grievance Redress Mechanism for the project will be detailed at the respective E&S studies to be conducted for each potential site based on the implementation tools elaborated in 2013 at the REDD+ program in Uganda.

Monitoring and evaluation arrangements:

The ESMP will establish the specific tailored indicators for each site. Monitoring should be conducted by an individual, firm, or community organization not directly affiliated with the Project organisation structure. These will fall into the M&E requirements established at the Project Document level (Annex B).

Budget for ESMF implementation

E&S budget assessment is typically conducted and disclosed during the Project design phase prior to appraisal. However, in this case it will need to be financed through the Project budget (hence, during Project implementation) at the time when details of the sub-projects are known.

Measures that need to be budgeted for the E&S safeguards to be effective include both main options identified, on one hand each potential site ready for biogas implementation in the short term and on the other hand those disadvantaged scenarios where the path needs to be flattened to get closer to biogas implementation. The budget plan will tailor costing and resourcing to ensure sufficient funds and contingencies are available throughout the project on each particular option. The list may include but not limited to:

a. Undertaking an institutional safeguards capacity assessment in each project partner
b. Project staffing and administration (i.e. safeguard officer in PMU where necessary)
c. Training sessions and capacity building on safeguard issues
d. Undertaking social and environmental assessments (ESMF/ESMP/SESA/ESIA) including baseline surveys, field visits, consultant fees, development consent fees, application fees, technical input, designing, implementing, monitoring, etc for each subproject
e. Conducting community consultation sessions and dissemination of public information (radio, newspapers etc)
f. Technical design of subproject/s to meet specific standards
g. Environmental permits
h. Costs of stakeholder engagement, information disclosure, managing GRM and dispute resolution

The cost of each item listed above varies from sub-project to sub-project and will be estimated by the Project Manager. The accuracy of these cost estimates is important and should be reviewed by appropriate persons (Project Steering Committee), so as to avoid duplicate costs or unnecessary expenses. A preliminary cost analysis for developing all E&S needed by a local expert is estimated to cost up to $30,000 per site. In addition, fees payable of project briefs and

environmental impact assessment under sub-regulation (1) of regulation 37 (These fees are to NEMA and not to Consultants; and they are paid after NEMA has approved EIA, in order to get the EIA certificate) are as follows:

- Where the total value of the project is more than Shs. 1,000,000,000 but does not exceed Shs. 5,000,000,000/= the amount payable shall be Shs. 2,000,000.
- Where the total value of the project is more than Shs. 5,000,000,000, the amount payable shall be 0.1% of the total value of the project.

The budget for technical assistance for feasibility studies and permitting utilising GEF resources - which would include the ESIA / ESMP from the GEF project is approximately US $170,000 - including US $74,000 for a social / environment expert who would carry out much of this work.

Annex H: UNDP Project Quality Assurance Report

Atlas Project award ID: 00100437	NAMA on Integrated Waste Management and Biogas in Uganda	Output ID/Project ID number: 00103399-	NAMA on Integrated Waste Management and Biogas in Uganda	Appraisal/Design

PROJECT QA ASSESSMENT: DESIGN AND APPRAISAL

OVERALL PROJECT

EXEMPLARY (5) ◉◉◉◉◉	HIGHLY SATISFACTORY (4) ◉◉◉◉○	SATISFACTORY (3) ◉◉◉○○	NEEDS IMPROVEMENT (2) ◉◉○○○	INADEQUATE (1) ◉○○○○
At least four criteria are rated Exemplary, and all criteria are rated High or Exemplary.	All criteria are rated Satisfactory or higher, and at least four criteria are rated High or Exemplary.	At least six criteria are rated Satisfactory or higher, and only one may be rated Needs Improvement. The SES criterion must be rated Satisfactory or above.	At least three criteria are rated Satisfactory or higher, and only four criteria may be rated Needs Improvement.	One or more criteria are rated Inadequate, or five or more criteria are rated Needs Improvement.

DECISION

- **APPROVE – the project is of sufficient quality to continue as planned. Any management actions must be addressed in a timely manner.**
- **APPROVE WITH QUALIFICATIONS – the project has issues that must be addressed before the project document can be approved. Any management actions must be addressed in a timely manner.**
- **DISAPPROVE – the project has significant issues that should prevent the project from being approved as drafted.**

RATING CRITERIA

STRATEGIC

1. Does the project's Theory of Change specify how it will contribute to higher level change? (Select the option from 1-3 that best reflects the project): • **3: The project has a theory of change with explicit assumptions and clear change pathway describing how the project will contribute to outcome level change as specified in the programme/CPD, backed by credible evidence of what works effectively in this context. The project document clearly describes why the project's strategy is the best approach at this point in time.** • **2: The project has a theory of change. It has an explicit change pathway that explains how the project intends to contribute to outcome-level change and why the project strategy is the best approach at this point in time, but is backed by limited evidence.** • **1: The project does not have a theory of change, but the project document may describe in generic terms how the project will contribute to development results, without specifying the key assumptions. It does not make an explicit link to the programme/CPD's theory of change.** *Note: Management Action or strong management justification must be given for a score of 1	3	**Evidence** Draft Project document (Page 21)
2. Is the project aligned with the thematic focus of the UNDP Strategic Plan? (select the option from 1-3 that best reflects the project): • **3: The project responds to one of the three areas of development work[37] as specified in the Strategic Plan; it addresses at least one of the proposed new and emerging areas[38]; an issues-based analysis has been incorporated into the project design; and the project's RRF includes all the relevant SP output indicators. *(all must be true to select this option)***	3	**Evidence** Cover page for draft Project document specifies applicable Key Result Area (Strategic Plan):

[37] 1. Sustainable development pathways; 2. Inclusive and effective democratic governance; 3. Resilience building

[38] sustainable production technologies, access to modern energy services and energy efficiency, natural resources management, extractive industries, urbanization, citizen security, social protection, and risk management for resilience

• **2: The project responds to one of the three areas of development work[1] as specified in the Strategic Plan. The project's RRF includes at least one SP output indicator, if relevant. *(both must be true to select this option)*** • **1: While the project may respond to one of the three areas of development work[1] as specified in the Strategic Plan, it is based on a sectoral approach without addressing the complexity of the development issue. None of the relevant SP indicators are included in the RRF. This answer is also selected if the project does not respond to any of the three areas of development work in the Strategic Plan.**	
RELEVANT	
3. Does the project have strategies to effectively identify, engage and ensure the meaningful participation of targeted groups/geographic areas with a priority focus on the excluded and marginalized? (select the option from 1-3 that best reflects this project): • **3: The target groups/geographic areas are appropriately specified, prioritising the excluded and/or marginalised. Beneficiaries will be identified through a rigorous process based on evidence (if applicable.) The project has an explicit strategy to identify, engage and ensure the meaningful participation of specified target groups/geographic areas throughout the project, including through monitoring and decision-making (such as representation on the project board) *(all must be true to select this option)*** • **2: The target groups/geographic areas are appropriately specified, prioritising the excluded and/or marginalised. The project document states how beneficiaries will be identified, engaged and how meaningful participation will be ensured throughout the project. *(both must be true to select this option)*** • **1: The target groups/geographic areas are not specified, or do not prioritize excluded and/or marginalised populations. The project does not have a written strategy to identify or engage or ensure the meaningful participation of the target groups/geographic areas throughout the project.** *Note: Management Action must be taken for a score of 1	3 *Select (all) targeted groups: (drop-down)* **Evidence** Draft project document
4. Have knowledge, good practices, and past lessons learned of UNDP and others informed the project design? (select the option from 1-3 that best reflects this project): • **3: Knowledge and lessons learned (gained e.g. through peer assist sessions) backed by credible evidence from evaluation, corporate policies/strategies, and monitoring have been explicitly used, with appropriate referencing, to develop the project's theory of change and justify the approach used by the project over alternatives.** • **2: The project design mentions knowledge and lessons learned backed by evidence/sources, which inform the project's theory of change but have not been used/are not sufficient to justify the approach selected over alternatives.** • **1: There is only scant or no mention of knowledge and lessons learned informing the project design. Any references that are made are not backed by evidence.** *Note: Management Action or strong management justification must be given for a score of 1	3 **Evidence** Draft Project document
5. Does the project use gender analysis in the project design and does the project respond to this gender analysis with concrete measures to address gender inequities and empower women? (select the option from 1-3 that best reflects this project): • **3: A participatory gender analysis on the project has been conducted. This analysis reflects on the different needs, roles and access to/control over resources of women and men, and it is fully integrated into the project document. The project establishes concrete priorities to address gender inequalities in its strategy. The results framework includes outputs and activities that specifically respond to this gender analysis, with indicators that measure and monitor results contributing to gender equality. *(all must be true to select this option)*** • **2: A gender analysis on the project has been conducted. This analysis reflects on the different needs, roles and access to/control over resources of women and men. Gender concerns are integrated in the development challenge and strategy sections of the project document. The results framework includes outputs and activities that specifically respond to this gender analysis, with indicators that measure and monitor results contributing to gender equality. *(all must be true to select this option)*** • **1: The project design may or may not mention information and/or data on the differential impact of the project's development situation on gender relations, women**	3 **Evidence** Draft Project document has a section on Gender mainstreaming and Annex on Gender analysis

and men, but the constraints have not been clearly identified and interventions have not been considered. *Note: Management Action or strong management justification must be given for a score of 1	
6. Does UNDP have a clear advantage to engage in the role envisioned by the project vis-à-vis national partners, other development partners, and other actors? (select from options 1-3 that best reflects this project): • **3: An analysis has been conducted on the role of other partners in the area where the project intends to work, and credible evidence supports the proposed engagement of UNDP and partners through the project. It is clear how results achieved by relevant partners will contribute to outcome level change complementing the project's intended results. If relevant, options for south-south and triangular cooperation have been considered, as appropriate. *(all must be true to select this option)*** • **2: Some analysis has been conducted on the role of other partners where the project intends to work, and relatively limited evidence supports the proposed engagement of and division of labour between UNDP and partners through the project. Options for south-south and triangular cooperation may not have not been fully developed during project design, even if relevant opportunities have been identified.** • **1: No clear analysis has been conducted on the role of other partners in the area that the project intends to work, and relatively limited evidence supports the proposed engagement of UNDP and partners through the project. There is risk that the project overlaps and/or does not coordinate with partners' interventions in this area. Options for south-south and triangular cooperation have not been considered, despite its potential relevance.** *Note: Management Action or strong management justification must be given for a score of 1	3 **Evidence** Draft prodoc reflects intention of UNDP to explore partnerships with existing programmes and leverage its convening power to develop strategic partnerships to enhance delivery of expected programme results

SOCIAL & ENVIRONMENTAL STANDARDS

7. Does the project seek to further the realization of human rights using a human rights based approach? (select from options 1-3 that best reflects this project): • **3: Credible evidence that the project aims to further the realization of human rights, upholding the relevant international and national laws and standards in the area of the project. Any potential adverse impacts on enjoyment of human rights were rigorously identified and assessed as relevant, with appropriate mitigation and management measures incorporated into project design and budget. *(all must be true to select this option)*** • **2: Some evidence that the project aims to further the realization of human rights. Potential adverse impacts on enjoyment of human rights were identified and assessed as relevant, and appropriate mitigation and management measures incorporated into the project design and budget.** • **1: No evidence that the project aims to further the realization of human rights. Limited or no evidence that potential adverse impacts on enjoyment of human rights were considered.** *Note: Management action or strong management justification must be given for a score of 1	2 **Evidence** Draft Prodoc integrates Human Rights Based Approach in SESA
8. Did the project consider potential environmental opportunities and adverse impacts, applying a precautionary approach? (select from options 1-3 that best reflects this project): • **3: Credible evidence that opportunities to enhance environmental sustainability and integrate poverty-environment linkages were fully considered as relevant, and integrated in project strategy and design. Credible evidence that potential adverse environmental impacts have been identified and rigorously assessed with appropriate management and mitigation measures incorporated into project design and budget. *(all must be true to select this option)*.** • **2: No evidence that opportunities to strengthen environmental sustainability and poverty-environment linkages were considered. Credible evidence that potential adverse environmental impacts have been identified and assessed, if relevant, and appropriate management and mitigation measures incorporated into project design and budget.** • **1: No evidence that opportunities to strengthen environmental sustainability and poverty-environment linkages were considered. Limited or no evidence that potential adverse environmental impacts were adequately considered.**	3 **Evidence** Draft Project Document

*Note: Management action or strong management justification must be given for a score of 1		
9. Has the Social and Environmental Screening Procedure (SESP) been conducted to identify potential social and environmental impacts and risks? The SESP is not required for projects in which UNDP is Administrative Agent only and/or projects comprised solely of reports, coordination of events, trainings, workshops, meetings, conferences and/or communication materials and information dissemination. [if yes, upload the completed checklist. If SESP is not required, provide the reason for the exemption in the evidence section.]	Yes	No
	SESP done	

MANAGEMENT & MONITORING

10. Does the project have a strong results framework? (select from options 1-3 that best reflects this project): • **3: The project's selection of outputs and activities are at an appropriate level and relate in a clear way to the project's theory of change. Outputs are accompanied by SMART, results-oriented indicators that measure all of the key expected changes identified in the theory of change, each with credible data sources, and populated baselines and targets, including gender sensitive, sex-disaggregated indicators where appropriate. *(all must be true to select this option)*** • **2: The project's selection of outputs and activities are at an appropriate level, but may not cover all aspects of the project's theory of change. Outputs are accompanied by SMART, results-oriented indicators, but baselines, targets and data sources may not yet be fully specified. Some use of gender sensitive, sex-disaggregated indicators, as appropriate. *(all must be true to select this option)*** • **1: The results framework does not meet all of the conditions specified in selection "2" above. This includes: the project's selection of outputs and activities are not at an appropriate level and do not relate in a clear way to the project's theory of change; outputs are not accompanied by SMART, results-oriented indicators that measure the expected change, and have not been populated with baselines and targets; data sources are not specified, and/or no gender sensitive, sex-disaggregation of indicators.** *Note: Management Action or strong management justification must be given for a score of 1	3	2
	1	
	Evidence Draft Project Document has M and E Plan	
11. Is there a comprehensive and costed M&E plan in place with specified data collection sources and methods to support evidence-based management, monitoring and evaluation of the project?	Yes (3)	
12. Is the project's governance mechanism clearly defined in the project document, including planned composition of the project board? (select from options 1-3 that best reflects this project): • **3: The project's governance mechanism is fully defined in the project composition. Individuals have been specified for each position in the governance mechanism (especially all members of the project board.) Project Board members have agreed on their roles and responsibilities as specified in the terms of reference. The ToR of the project board has been attached to the project document. *(all must be true to select this option)*.** • **2: The project's governance mechanism is defined in the project document; specific institutions are noted as holding key governance roles, but individuals may not have been specified yet. The prodoc lists the most important responsibilities of the project board, project director/manager and quality assurance roles. *(all must be true to select this option)*** • **1: The project's governance mechanism is loosely defined in the project document, only mentioning key roles that will need to be filled at a later date. No information on the responsibilities of key positions in the governance mechanism is provided.** *Note: Management Action or strong management justification must be given for a score of 1	3	
	Evidence Draft Project document has Section on Governance Mechanism	
13. Have the project risks been identified with clear plans stated to manage and mitigate each risks?	3	

(select from options 1-3 that best reflects this project): • **3: Project risks related to the achievement of results are fully described in the project risk log, based on comprehensive analysis drawing on the theory of change, Social and Environmental Standards and screening, situation analysis, capacity assessments and other analysis. Clear and complete plan in place to manage and mitigate each risk. *(both must be true to select this option)*** • **2: Project risks related to the achievement of results identified in the initial project risk log with mitigation measures identified for each risk.** • **1: Some risks may be identified in the initial project risk log, but no evidence of analysis and no clear risk mitigation measures identified. This option is also selected if risks are not clearly identified and no initial risk log is included with the project document.** *Note: Management Action must be taken for a score of 1	**Evidence** Draft project document includes a Risk log (Yet to be completed)	
EFFICIENT		
14. Have specific measures for ensuring cost-efficient use of resources been explicitly mentioned as part of the project design? This can include: i) using the theory of change analysis to explore different options of achieving the maximum results with the resources available; ii) using a portfolio management approach to improve cost effectiveness through synergies with other interventions; iii) through joint operations (e.g., monitoring or procurement) with other partners.	Yes (3)	
15. Are explicit plans in place to ensure the project links up with other relevant on-going projects and initiatives, whether led by UNDP, national or other partners, to achieve more efficient results (including, for example, through sharing resources or coordinating delivery?)	Yes (3)	
16. Is the budget justified and supported with valid estimates? • **3: The project's budget is at the activity level with funding sources, and is specified for the duration of the project period in a multi-year budget. Costs are supported with valid estimates using benchmarks from similar projects or activities. Cost implications from inflation and foreign exchange exposure have been estimated and incorporated in the budget.** • **2: The project's budget is at the activity level with funding sources, when possible, and is specified for the duration of the project in a multi-year budget. Costs are supported with valid estimates based on prevailing rates.** • **1: The project's budget is not specified at the activity level, and/or may not be captured in a multi-year budget.** g.	3 **Evidence** Draft Project document	
17. **Is the Country Office fully recovering the costs involved with project implementation?** • **3: The budget fully covers all project costs that are attributable to the project, including programme management and development effectiveness services related to strategic country programme planning, quality assurance, pipeline development, policy advocacy services, finance, procurement, human resources, administration, issuance of contracts, security, travel, assets, general services, information and communications based on full costing in accordance with prevailing UNDP policies (i.e., UPL, LPL.)** • **2: The budget covers significant project costs that are attributable to the project based on prevailing UNDP policies (i.e., UPL, LPL) as relevant.** • **1: The budget does not adequately cover project costs that are attributable to the project, and UNDP is cross-subsidizing the project.** *Note: Management Action must be given for a score of 1. The budget must be revised to fully reflect the costs of implementation before the project commences.	3 1 **Evidence** Project document includes provisions for Cost recovery	2
EFFECTIVE .		
18. Is the chosen implementation modality most appropriate? (select from options 1-3 that best reflects		2

this project): • **3: The required implementing partner assessments (capacity assessment, HACT micro assessment) have been conducted, and there is evidence that options for implementation modalities have been thoroughly considered. There is a strong justification for choosing the selected modality, based on the development context. *(both must be true to select this option)*** • **2: The required implementing partner assessments (capacity assessment, HACT micro assessment) have been conducted and the implementation modality chosen is consistent with the results of the assessments.** • **1: The required assessments have not been conducted, but there may be evidence that options for implementation modalities have been considered.** *Note: Management Action or strong management justification must be given for a score of 1	**Evidence** Capacity assessment and HACT micro assessment for Ministry of Energy and Mineral Development done for Implementation of the Green Charcoal project	
19. Have targeted groups, prioritizing marginalized and excluded populations that will be affected by the project, been engaged in the design of the project in a way that addresses any underlying causes of exclusion and discrimination? • **3: Credible evidence that all targeted groups, prioritising marginalized and excluded populations that will be involved in or affected by the project, have been actively engaged in the design of the project. Their views, rights and any constraints have been analysed and incorporated into the root cause analysis of the theory of change which seeks to address any underlying causes of exclusion and discrimination and the selection of project interventions.** • **2: Some evidence that key targeted groups, prioritising marginalized and excluded populations that will be involved in the project, have been engaged in the design of the project. Some evidence that their views, rights and any constraints have been analysed and incorporated into the root cause analysis of the theory of change and the selection of project interventions.** • **1: No evidence of engagement with marginalized and excluded populations that will be involved in the project during project design. No evidence that the views, rights and constraints of populations have been incorporated into the project.**	2 **Evidence** Draft project document	
20. Does the project conduct regular monitoring activities, have explicit plans for evaluation, and include other lesson learning (e.g. through After Action Reviews or Lessons Learned Workshops), timed to inform course corrections if needed during project implementation?	Yes (3)	
21. The gender marker for all project outputs are scored at GEN2 or GEN3, indicating that gender has been fully mainstreamed into all project outputs at a minimum. *Note: Management Action or strong management justification must be given for a score of "no"	Yes (3) **Evidence**	
22. Is there a realistic multi-year work plan and budget to ensure outputs are delivered on time and within allotted resources? (select from options 1-3 that best reflects this project): • **3: The project has a realistic work plan & budget covering the duration of the project *at the activity* level to ensure outputs are delivered on time and within the allotted resources.** • **2: The project has a work plan & budget covering the duration of the project at the output level.** • **1: The project does not yet have a work plan & budget covering the duration of the project.**	3 **Evidence** Draft Project document	
SUSTAINABILITY & NATIONAL OWNERSHIP		
23. Have national partners led, or proactively engaged in, the design of the project? (select from options 1-3 that best reflects this project): • **3: National partners have full ownership of the project and led the process of the development of the project jointly with UNDP.** • **2: The project has been developed by UNDP in close consultation with national partners.** • **1: The project has been developed by UNDP with limited or no engagement with national partners.**	3 **Evidence** UNDAF Draft Project document Minutes / Report of Prodoc preparation inception and validation meetings	
24. Are key institutions and systems identified, and is there a strategy for strengthening specific/ comprehensive capacities based on capacity assessments conducted? (select from options 0-4 that best	2.5	

reflects this project): • **3: The project has a comprehensive strategy for strengthening specific capacities of national institutions based on a systematic and detailed capacity assessment that has been completed. This strategy includes an approach to regularly monitor national capacities using clear indicators and rigorous methods of data collection, and adjust the strategy to strengthen national capacities accordingly.** • **2.5: A capacity assessment has been completed. The project document has identified activities that will be undertaken to strengthen capacity of national institutions, but these activities are not part of a comprehensive strategy to monitor and strengthen national capacities.** • **2: A capacity assessment is planned after the start of the project. There are plans to develop a strategy to strengthen specific capacities of national institutions based on the results of the capacity assessment.** • **1.5: There is mention in the project document of capacities of national institutions to be strengthened through the project, but no capacity assessments or specific strategy development are planned.** • **1: Capacity assessments have not been carried out and are not foreseen. There is no strategy for strengthening specific capacities of national institutions.**	**Evidence** HACT	
25. Is there is a clear strategy embedded in the project specifying how the project will use national systems (i.e., procurement, monitoring, evaluations, etc.,) to the extent possible?	Yes (3)	
26. Is there a clear transition arrangement/ phase-out plan developed with key stakeholders in order to sustain or scale up results (including resource mobilisation strategy)?	Yes (3)	

Annex I: UNDP Risk Log

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
Lack of investor appetite: A number of factors may hinder investor interest in MSW-based biogas energy projects including: • Perceived risks of a commercial approach including PPPs for waste management and biogas. • High operational and financial risks. • Lack of guaranteed revenues on non-electricity products. • Limited successful examples**.**	Financial	Moderate	The project will explain the benefits and value chain of MSW-based biogas plants, different business models and PPPs. The project will engage key financial sector players, notably the Uganda Investment Authority, Private Sector Foundation Uganda, the Uganda Energy Credit Capitalization Company, commercial banks and IFIs. The project will work closely with potential PPP stakeholders, building their knowledge of technology and business models and providing technical assistance to assess feasibility and finance options under the Activities of Components 2 and 3. Furthermore, the Ugandan Government is committed to increasing private sector participation in the waste sector. Under component three, the project will assist private project developers to access finance under financial mechanisms such as grants and guarantees – increasing the financial attractiveness and decreasing risks from project finance. The Grant and Technical Assistance Fund developed under Output 3.3 will leverage private sector investment and lending from IFIs and local FIs. The project also facilitates access to available guarantee schemes from Sida and UECCC that would also help to facilitate financial closure. By developing knowledge, capacity and proposing business models for MSW-based biogas plants alongside technical assistance and grants, the project will remove access to finance barriers.	UNDP CO	No change
Feedstock risk: In Uganda, the municipal sector, and to a lesser extent the agro-processing sector, has been slow to adopt new technologies to address waste management. Furthermore, in the absence of examples of MSW-based biogas, investment costs are high and often seen as risky. Therefore, the waste sector in Uganda requires	Operational	Moderate	Risks will be mitigated by technical assistance activities supporting the development and strengthening the capacities and regulatory framework of the waste management sector in Uganda. Under Component 1, the Project will support MLHUD to develop the National Waste Management Strategy and IWM enforcement strategies by submitting proposals and providing updates and recommendations for inclusion of waste-to-energy considerations. Experts will also assist councils update local municipal ordinances in line with the National Waste Management Strategy and IWM enforcement strategies. Risks are further mitigated through Output 1.5, whereby multiple stakeholders take on responsibility for addressing waste through the establishment of a multi-stakeholder platform on waste management and biogas. A lack of financial incentives will be mitigated through Output 1.4 that will introduce incentives into the national policy, legal and regulatory	UNDP CO	No change

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
incentives or enforcement to attract investors in waste management and biogas technologies – which will allow for separation of waste sources.			environment to promote increased uptake of IWM and biogas technology. These measures will aim to reduce the financial risks for investors and ensure bankable projects.		
Environment/ climate risk: Environmental factors, including the effects of climate change such as drought and other factors) could lead to a loss of feedstock and delay or abandonment of MSW-based biogas projects.	Operational	Low	This is an external risk to the project that will be mitigated in the context of a variety of other activities such as; Uganda enacting the National Drought Policy; the Strategy for Enhancing Communities Resilience to Drought; strengthening the institutional framework, resource mobilization and allocation as well as measures to ensure balance between emergency response and long-term development. Loss of feedstock due to drought and other factors will be considered as part of the feasibility studies for the biogas digesters, which will use conservative assumptions regarding the minimum amount of waste effluent feedstock that will be needed to operate on a commercial basis and the risk of an interruption in supply because of drought-related factors.	UNDP CO	No change
Environment/ operational risk: Negative environmental impacts of the biogas pilots could lead to a delay or abandonment of MSW-based biogas projects.	Operational	Low	Local environmental factors will be assessed during the feasibility and commissioning phase of MSW-based biogas sites. Principal risks include contamination of aquifers, nuisance, odours, health risks and animal diseases. A due diligence project development process, monitoring of operations, and active intervention if needed are foreseen to ensure operation will be within established parameters and in compliance with the applicable regulations. The impact of biogas energy systems mainly involves safety aspects related to the collection and piping of the combustible gas. Where biodigesters are planned, these bring along transport of organic material, and some additional space for handling. These effects are negligible at the scale of a large, integrated MSW treatment facility. The GEF project will prepare the environmental, safety and social studies and paragraphs applicable to the biogas energy projects as required for the permitting process.	UNDP CO and NEMA	No Change
Technical/ operational risk: Energy production from MSW-based biogas has been proven in other country situations to be technically and economically feasible	Operational	High	The project intends to utilise proven, feasible and affordable biogas technologies and duplicate solutions successfully introduced in countries with developed biogas sectors (with adaptation to local conditions). To mitigate risks of limited technical capacity, sufficient capacity will be created to ensure sound operation of biogas digesters. Technical support and training programmes for technical staff for pilot sites and	UNDP CO	No change

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
solution. However, high-tech biogas technology is unfamiliar in Uganda, there is a lack of successful examples, and there is limited capacity to manage high-end biogas systems. Technical failures, either due to equipment failure or poor installation, poor operational management and maintenance lead to loss of trust in the performance of biogas technology.			preparation of manuals and procedures under Output 2.3 will develop sufficient capacity for adequate operation of biogas digesters. Issues that may affect operation including feedstock composition and contamination (plastics), traces of inhibitors and toxic substances (such as heavy metals), and temperature control. Mitigation measures under 2.3 including monitoring and optimisation of operational procedures and technical performance of pilot plants as well as ensuring adequate process controls regarding plant operation and feedstock sorting processes will be introduced as part of project preparation and where necessary corrective actions will be taken. Monitoring and optimisation of operational procedures will provide lessons for replication of biogas technology for MSW in Uganda. Due to the high level of risk of technical failure, the project employs additional risk mitigation measures. Measures include: i) the technical backstopping activities provided by the Waste and Biogas expert; and ii) technology providers/contractors shall include a training programme for operators in their offers, as well as extensive after-sales services and provisions for technical failure to be delivered under Output 2.5.		
Construction risk: Construction and operation of biogas plants pose a range of safety issues, potential risks and hazards for humans, animals and the environment	Organizational	High	Appropriate precautions and safety measures will be taken to avoid related risks and hazardous situations, and ensure a safe operation of the proposed biogas plants. Training of biogas plant construction and operating personnel will be aligned with the Government's occupational health and safety regulations and international best practices in the biogas sector. Training provided to operators by contractors under Output 2.5 will include a specific module on health and safety in the workplace. The GEF project will prepare the environmental, safety and social studies and paragraphs applicable to the biogas energy projects as required for the permitting process.	UNDP CO	No change
Environmental risk: The Project may potentially result in the release of pollutants to the environment due to routine or non-routine circumstances with the potential for adverse local, regional, and/or transboundary impacts.	Environmental	Moderate	During Project preparation similar Project activities have been visited by the team of experts to evaluate the risks. During Project implementation this level of risk is likely to be moderate if specific training is provided to personnel and a systematic M&E plan is implemented to include the use of devices where appropriate and indicators to identify pollutants due to routine practices. Similarly, non-routine circumstances will need to be addressed within an Emergency Plan to coordinate the rapid response in the plant to prevent the impact due to these pollutants. Additionally, to ensure all potential pollutants are identified and assessed an Environmental Impact Assessment specific to each implementation site will study this potential risk at both Project	UNDP CO and NEMA	No change

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
			preparation and implementation and provide the pertinent measures to minimise it. Subsequently, an autonomous Environmental Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with Project goals and especially with the social and gender safeguards identified along the Project. The Environmental Impact Assessment and Environmental Management Plan will be developed as part of a comprehensive ESIA / ESMP.		
Stakeholder / social risk: The Project may not give local communities or individuals the opportunity to raise concerns regarding the Project during the stakeholder engagement process.	Social	Moderate	A stakeholder platform will be established to be representative vertically (i.e. are all the groups affected well represented) and horizontally (i.e. weight of voice within platform), appropriate channels of communication will be provided for each represented group (i.e. in particular for the informal sector that may be illiterate), and will be provided with an active role throughout all phases of the Project (i.e. from the design to M&E). For that a consultation and communication plan will be prepared and implemented at the investment preparation phase as well as the implementation phase to clearly disseminate information and gather feedback in time regarding the needs and priorities of all stakeholders. All sessions and communication modes will be offered also in local languages and follow the customs and norms of local communities. For that the implementation tools elaborated in 2013 at the REDD+ program in Uganda will be used. The mechanism includes components: (i) Consultation and Participation Plan; (ii) Communication Strategy; (iii) Conflicts and Grievances Management Strategy, and (iv) Mainstreaming Gender Considerations in Uganda's Process. This will be required for each site in the Project which will address the specific risks. For example through a public log in the Project areas that will be available to local communities and individuals to gather and resolve their concerns.	UNDP CO	No change
Social risk: The Project would potentially reproduce discriminations against women based on gender, especially regarding participation in design and implementation or access to opportunities and benefits.	Social	Moderate	The Project preparation team included a dedicated gender expert, with gender-related expertise, local knowledge, and experience. A Gender Assessment by the local gender expert will be carried out specific to each implementation site as part of a comprehensive ESIA / ESMP during Project preparation with women's groups involved in waste management and their participation will be targeted and enhanced in the Project design. The following activities will be undertaken or implemented to ensure that proposed strategies are non-discriminatory and empowering for women, men and other vulnerable social groups: o Identify constraints to women's and vulnerable social groups' participation and develop strategies to minimize the	UNDP CO	No change

Project risks					
Description	**Type**	**Impact & Probability**	**Mitigation Measures**	**Owner**	**Status**
			constraints and enhance their participation; o Develop a strategy for skills building and training needs related to women and vulnerable social groups participation in the Project; o Positive discrimination and/or reservations for women's participation at specific phases of the Project (as promoters or guides of resource separation); o Project management structures will include provision for women (1/3) in such committees; and Gender specific outputs and indicators will be incorporated. Subsequently, an autonomous Gender Management Plan will establish how, who, when, and where the measures will be managed including the cost of implementation. The plan will be designed in accordance with the environmental and social safeguards identified along the Project.		
Management risk: The Implementing Partner (MEMD) would lack the managerial and technical capacity to implement the Project.	Organizational	Low	The MEMD have ample experience executing programmes financed by multilateral agencies (World Bank) and are familiar with reporting procedures, audits and evaluations as required by multilateral agencies. The Ministry also has specific experience with UNDP and the GEF.		
Political risk: In the face of competing priorities, the political will to comprehensively address waste management may not be sustained.	Political	Low	The broad engagement of stakeholders through the NAMA identification process has ensured the ownership and commitment of lead government agencies. The stakeholder-driven process has naturally selected the most engaged and committed stakeholders to develop the NAMA.	UNDP CO	No change

Annex J: Results of the capacity assessment of the project implementing partner and HACT micro assessment

Annex K: Additional agreements

STANDARD LETTER OF AGREEMENT BETWEEN UNDP AND THE GOVERNMENT FOR THE PROVISION OF SUPPORT SERVICES

HOW TO USE THIS LETTER OF AGREEMENT

- This agreement is used to provide appropriate legal coverage when the UNDP country office provides support services under national execution.
- This agreement must be signed by a governmental body or official authorized to confer full legal coverage on UNDP. (This is usually the Minister of Foreign Affairs, the Prime Minister /or Head of State.) The UNDP country office must verify that the government signatory has been properly authorized to confer immunities and privileges.
- A copy of the signed standard letter will be attached to each PSD and project document requiring such support services. When doing this, the UNDP country office completes the attachment to the standard letter on the nature and scope of the services and the responsibilities of the parties involved for that specific PSD/project document.
- The UNDP country office prepares the letter of agreement and consults with the regional bureau in case either of the parties wishes to modify the standard text. After signature by the authority authorized to confer immunities and privileges to UNDP, the government keeps one original and the UNDP country office the other original. A copy of the agreement should be provided to UNDP headquarters (BOM/OLPS) and the regional bureau.

Dear *Dr. Isabalija*,

1. Reference is made to consultations between officials of the Government of *Uganda* (hereinafter referred to as "the Government") and officials of UNDP with respect to the provision of support services by the UNDP country office for nationally managed programmes and projects. UNDP and the Government hereby agree that the UNDP country office may provide such support services at the request of the Government through its institution designated in the relevant programme support document or project document, as described below.

2. The UNDP country office may provide support services for assistance with reporting requirements and direct payment. In providing such support services, the UNDP country office shall ensure that the capacity of the Government-designated institution is strengthened to enable it to carry out such activities directly. The costs incurred by the UNDP country office in providing such support services shall be recovered from the administrative budget of the office.

3. The UNDP country office may provide, at the request of the designated institution, the following support services for the activities of the programme/project:

(a) Identification and/or recruitment of project and programme personnel;
(b) Identification and facilitation of training activities;
(a) Procurement of goods and services;

4. The procurement of goods and services and the recruitment of project and programme personnel by the UNDP country office shall be in accordance with the UNDP regulations, rules, policies and procedures. Support services described in paragraph 3 above shall be detailed in an annex to the programme support document or project document, in the form provided in the Attachment hereto. If the requirements for support services by the country office change during the life of a programme or project, the annex to the programme support document or

project document is revised with the mutual agreement of the UNDP resident representative and the designated institution.

5. The relevant provisions of the *UNDP Standard Basic Assistance Agreement with Government of Uganda of 1977* (the "SBAA"), including the provisions on liability and privileges and immunities, shall apply to the provision of such support services. The Government shall retain overall responsibility for the nationally managed programme or project through its designated institution. The responsibility of the UNDP country office for the provision of the support services described herein shall be limited to the provision of such support services detailed in the annex to the programme support document or project document.

6. Any claim or dispute arising under or in connection with the provision of support services by the UNDP country office in accordance with this letter shall be handled pursuant to the relevant provisions of the SBAA.

7. The manner and method of cost-recovery by the UNDP country office in providing the support services described in paragraph 3 above shall be specified in the annex to the programme support document or project document.

8. The UNDP country office shall submit progress reports on the support services provided and shall report on the costs reimbursed in providing such services, as may be required.

9. Any modification of the present arrangements shall be effected by mutual written agreement of the parties hereto.

10. If you are in agreement with the provisions set forth above, please sign and return to this office two signed copies of this letter. Upon your signature, this letter shall constitute an agreement between your Government and UNDP on the terms and conditions for the provision of support services by the UNDP country office for nationally managed programmes and projects.

Yours sincerely,

_____

Signed on behalf of UNDP
Almaz Gebru
Country Director

_____

For the Government
Dr. Stephen Robert Isabalija
Permanent Secretary
Ministry of Energy and Mineral Development
[*Date*]

Attachment

DESCRIPTION OF UNDP COUNTRY OFFICE SUPPORT SERVICES

1. Reference is made to consultations between *Ministry of Energy and Mineral Development*, the institution designated by the Government of *Uganda* and officials of UNDP with respect to the provision of support services by the UNDP country office for the nationally managed programme or project *project number* 00103399 **–** *NAMA for Integrated waste management and Biogas project*, *"the Project*".

2. In accordance with the provisions of the letter of agreement signed on [*insert date of agreement*] and the *project document*, the UNDP country office shall provide support services for the *Project* as described below.

3. Support services to be provided:

Support services	**Schedule for the provision of the support services**	**Cost to UNDP of providing such support services (where appropriate)**	**Amount and method of reimbursement of UNDP (where appropriate)**
1. Recruitment of an International Consultants ($ 325,000)	To be recruited as per AWP	As per Universal Price List (UPL), the service fee is estimated at USD 1,330.31	ATLAS billing
2. Recruitment of Local Consultants ($ 359,000)	To be engaged as per AWP	As per UPL, the service fee is estimated at USD 341.89	ATLAS billing
3. Contractual service (Individual contracts for Project staff) ($ 56,000)	To be recruited as per AWP	As per UPL, the service fee is estimated at USD 341.89	ATLAS billing
4. Grants and Equipment ($ 1,200,000)	To be engaged as per AWP	As per UPL, the service fee is estimated at USD 10,789.89	ATLAS billing
5. Events/ Trainings ($ 41,000)	To be engaged as per AWP	As per UPL, the service fee is estimated at USD 310.34	ATLAS billing
6. Communication equipment ($ 30,000)	To be arranged as per AWP	As per UPL, the service fee is estimated at USD 310.34	ATLAS billing
7. Travel ($ 89,000)	To be arranged as per AWP	As per UPL, the service fee is estimated at USD 310.34	ATLAS billing
		$13,735	

Line item in project budget

Atlas Budgetary Account Code	ATLAS Budget Description	Amount Year 1 ($)	Amount Year 2 ($)	Amount Year 3 ($)	Amount Year 4 ($)	Amount Year 5 ($)	Total ($)	See Budget Note:
74500	Direct Project Costs	2,747	2,747	2,747	2,747	2,747	13,735	29

Budget note

29 Estimated UNDP direct project service / cost recovery charges for the following services requested by MAIL, as indicated in the Letter of Agreement in Annex II of the Project Document. Recruitment of an international consultant = $1,330.31; Local consultants = $ 341.89; Contractual services = $ 341.89; Grants and Equipment = $10,789.89; Events/ trainings = $310.34; Communication equipment = $310.34; and travel = $310.34

4. Description of functions and responsibilities of the parties involved:

Functions and responsibilities of Ministry of Energy and Mineral Development and Responsible parties shall be to:

- Prepare TORs and Specifications for procurement of services, goods and equipment and request UNDP to procure the International / Local Consultants,
- Prepare Job descriptions and request UNDP to advertise and recruit Project staff,
- Set up Grant management committees and request UNDP to disburse grants/ procure equipment,
- Request UNDP to procure services for some events,
- Request UNDP to procure some communication equipment

Functions and responsibilities of UNDP

- Procurement of services, goods and equipment and request UNDP to procure the International / Local Consultants,
- Advertise and recruit Project staff,
- disburse grants, monitor and evaluate them/ procure equipment,
- Procure services for some events,
- Procure some communication equipment

XIII. ADDITIONAL ANNEXES

L. GHG calculations
M. Gender Analysis
N. Site prefeasibility analyses
O. Site selection criteria and objective criteria
P. Biogas experience in East Africa

Annex L: GHG calculations

The project interventions will lead to renewable energy production and consequent GHG emission reductions resulting from the investment in the demonstration and diffusion of waste-to-biogas-to-electricity technology at 3 initial sites with additional scaling up planned. This is to be undertaken within Component 2 of the project "Demonstration and investment in integrated wastewater treatment and biogas plants".

The global benefits in terms of avoided GHG emissions were calculated for renewable energy and the reduction of methane emissions. Direct and consequential reductions related to increased renewable energy (biogas based power) and continued reduction of methane emissions were estimated using the methodology described in the document "Manual for calculating GHG benefits of GEF Projects: Energy Efficiency and Renewable Energy Projects".[39] The associated worksheet templates were used to conduct the calculation.[40]

The total reductions are estimated as follows:

- Direct GHG reductions: 88,315 tonnes CO_2eq per year and 1,766,000 tonnes CO_2eq over the lifetime of investments
- Consequential GHG reductions: Between 3,533,000 tonnes CO_2eq (estimate using bottom-up methodology) and 3,771,000 tonnes CO_2eq (estimated using top-down methodology)

Direct GHG reductions

In total, the project is expected to result in a total of 88,315 tonnes CO_2eq per year in the last year of the project (2022) and 1,766,291 tonnes CO_2eq over the lifetime of investments – calculated in the table below based on the estimated power production from the pilot sites.

Table 11: Calculation 1: Reductions from replacing the grid energy with renewable energy

Parameter	Units	Value	Calculation	*Source of information*
MW capacity	MW	2.90	A	*Assumption*
Operating hours per year	hours/year	7,000	B	*Assumption*
Electricity production	MWh/year	20,300	C = A x B	*Calculated*
Grid emissions factor	tonnes CO2eq/MWh	0.5500	D	*Table 2 of the approved standardized baseline document available at https://cdm.unfccc.int/methodologies/standard_base/2015/sb45.html*
GHG reductions per year from electricity production	tonnes CO2eq/year	11,165	E = C x C	*Calculated*
Lifetime of investment	years	20	F	*Assumption for standard biogas plant technology*
Lifetime GHG reductions from electricity production	tonnes CO2eq	223,300	G = E x F	*Calculated*

Note that emissions from the transport of waste were not accounted for in the calculation as for the waste being transported, it is expected that it would have to be transported to a similar site in the business as usual scenario in any case.

[39] Available here: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.33.Inf_.18%20Climate%20Manual.pdf. The updated guidance from the GEF from June 2015 GEF/C.48/Inf.09 is not applicable in terms of the methodology utilized.
[40] Available here: https://www.thegef.org/gef/node/313

The reduction of methane emissions by burning biogas from waste is also an important potential environmental benefit to the project. If the organic waste is not processed properly and is only landfilled, it is likely it would result in methane emissions and leakage at a later date. It is noteworthy that the environmental benefits could be quite large – estimated to be an additional 1.5 million tonnes of CO_2eq. The calculation below shows how this estimate is reached.

Table 12: Calculation 2: Additional GHG reductions from burning methane

Parameter	Units	Value	Calculation	*Source of information*
% conversion	%	40%	H	*Assumption*
Energy in biogas	MWh	50,750	I = C / H	*Calculated*
MWh per 1000 m3 of biogas	MWh/1000 m3	5.83	J	*Assumption*
Biogas required	1000 m3	8,700	K = I / J	*Calculated*
Methane content	%	55%	L	*Assumption*
Methane reduced	1000 m3	4,785	M = K x L	*Calculated*
CO2eq per 1000 m3 of methane emitted	tonnes CO2eq/ 1000 m3	16.93	M	*https://www3.epa.gov/gasstar/tools/calculations.html*
Global warming potential of methane versus CO2	tonnes CO2eq (methane)/ tonnes CO2 eq (CO2)	21	N	*IPCC (2006) Guidelines for National GHG Inventories*
CO2eq per 1000 m3 of methane burned	tonnes CO2eq/1000 m3	0.806	O = M/N	*Calculated*
CO2eq reduced per 1000 m3 of methane burned	tonnes CO2eq/1000 m3	16.12	P = O - M	*Calculated*
CO2eq reduced by the project due to methane reduction per year	tonnes CO2eq/year	77,150	Q = P x M	*Calculated*
CO2eq reduced due to methane reduction per MWh of power	tonnes CO2eq/MWh	3.80	R = Q/C	
Lifetime of investments	Years	20	S	*Assumption*
Lifetime GHG reductions	tonnes CO2eq	1,542,991	T = S x Q	*Calculated*

Total direct emissions reductions				
Direct emissions reduction from displacement of electricity	tonnes CO2eq/year	11,165	U	*Calculated in other table*
Direct emissions reduction from reduction of methane	tonnes CO2eq/year	77,150	V	*Calculated in other table*
Total direct emissions reduction per year	tonnes CO2eq/year	88,315	W = U + V	*Calculated*
Total direct emissions reduction over the lifetime of investments	tonnes CO2eq	1,766,291	X = W x 20	*Calculated*

Consequential GHG reductions

This project is designed to ensure sustainability and replication of energy efficiency improvements beyond the project cycle. It will do so as a result of the following outputs:

- Output 1.1 Capacity development of town councils and NGOs on integrated waste management
- Output 1.2 Support towns and municipalities on the design and development of waste management plans and introduction of MSW disposal/off-taker fees
- Output 1.3 Promotion of MSW biogas technology among municipalities, project developers, industry and the general public
- Output 1.4 Integration of MSW-based biogas in national policies, programmes and incentive instruments targeting renewable energy development, environmental protection and climate change mitigation
- Output 1.5 Multi-stakeholder platforms on waste management and biogas established, whereby stakeholders will take on joint responsibility
- Output 3.1 Development of a pipeline of MSW-based biogas projects
- Output 3.2 Mid and long-term strategy for the replication of biogas projects developed and implemented
- Output 3.3 Grant/technical assistance fund and approach to attract investment into MSW-based biogas sector developed
- Output 4.1 Project website
- Output 4.2 Guidelines on waste management practices updated, lessons learned and best practices documented and disseminated
- Output 4.3 Biogas technology for energy generation and lessons learned from pilot projects integrated into the national renewable energy and MEMD programmes, standardized baselines for calculating emission reductions established, and NAMA registered on the UNFCCC NAMA Registry.

Consequential bottom-up emissions reductions estimate

The consequential emissions reductions were estimated using the bottom-up methodology. As a result of the activities described above within the project, the "Number of Replications Post-project as Spillover" was conservatively chosen to be 2, resulting in the following bottom-up emissions reductions:

Table 13: Consequential bottom up estimate

Label	Unit	Value
Direct emissions reductions	tonnes/CO2eq	1,766,291
Replication factor	#	2
Consequential bottom up estimate	tonnes/CO2eq	3,532,582

Consequential Top-down emissions reduction estimate from Renewable Energy

In order to calculate the Consequential-Top-down emissions reduction estimate, the 10-year market potential for GHG emissions reductions from biogas installations was evaluated based on analysis of waste streams in a few municipalities and the number of sugar/ food processing facilities which could develop biogas plants. The 10-year market potential from 2023 to 2032 were based on the assumption that approximately 33% of the total technical potential would be realized in this period. The causality factor was estimated to be 80% since the project's TA and grant schemes will be critical to kick-starting the market. The calculation of the 10-year market potential and Consequential top-down estimate is described in the tables below.

Table 14: Estimated technical potential for power production from waste-to-biogas

Municipality	Tonnes of market waste (or other waste) per year	Estimated potential for biogas production based on feedstock	Power production potential
Unit	**tonnes or m3 per year**	**MWel**	**MWh/year**
Variable	**A**	**B**	**C = B x 7000**
Kampala	57,000 tonnes of market waste alone	2.00	14,000
	730,000 tonnes per year of waste generated (~344,000 collected)	9.00	63,000
	6,400 tonnes of dissolved solids sludge waste from wastewater – estimated 1.6 -	0.50	3,500

	million m3 of biogas		
Mbale	5,500 tonnes of food processing waste (composted	0.20	1,400
	25,000 tonnes of organic waste (composted)	0.90	6,300
	18,000 tonnes of brown bin waste collected (not composted)	0.50	3,500
	7,300 tonnes of crop residues	0.40	2,800
	900,000 m3 of wastewater	Unlikely to be significant	-
Jinja	12,000 to 13,000 of market waste	0.50	3,500
	36,000 tonnes of brown bin waste collected	1.00	7,000
	1 million tonnes or more of bagasse produced	Unclear – likely better utilized for thermal purposes	-
	2,000,000 m3 or more of wastewater each year	Unlikely to be significant	-
Mbarara	11,000 tonnes of market waste	0.45	3,150
Other municipalities and industries	Unknown amounts of waste, but estimated 5 additional municipalities and 2 additional sugar companies	8.00	56,000
Total		**23.45**	**164,150**

Table 15: 10-year market potential for GHG reductions due to biogas-to-electricity power production and methane reductions

Parameter	Units	Value	Calculation	*Source of information*
Power production				
Power production potential	**MWh/year**	164,150	A	*From previous table*
Expected amount of realisation in 10 years after project closure	**%**	33%	B	*Assumption*
Grid emissions factor	**tonnes CO2eq/MWh**	0.550	C	*Table 2 of the approved standardized baseline document available at https://cdm.unfccc.int/methodologies/standard_base/2015/sb45.html*
Annual emissions reduction - power production	**tonnes CO2eq/year**	29,793	D = A x B x C	*Calculated*
Total 10-year market potential - power production	**tonnes CO2eq**	595,865	E = D x 20	*Calculated*
Methane reduction				
CO2eq reduced due to methane reduction per MWh of power	**tonnes CO2eq/MWh**	3.80	F	*From previous table*

Annual emissions reduction - methane reduction	**tonnes CO2eq/year**	205,870	G = A x B x F	*Calculated*
Lifetime emissions reductions - methane reduction	**tonnes CO2eq**	4,117,392	H = G x 20	*Calculated*
Total 10-year market potential				
Total 10-year market potential	**tonnes CO2eq**	4,713,257	I = H + E	*Calculated*

Table 16: Consequential estimate of GHG reductions using top-down methodology

Label	Unit	Value
10-year market potential	tonnes/CO2eq	4,713,257
Causality factor	%	80%
Consequential top-down estimate	tonnes/CO2eq	3,770,605

Annex M: Gender Analysis

Justification

Project designs if not well prepared can exacerbate existing gender inequalities; and women and other vulnerable social groups are likely to face larger (or disproportional) negative impacts than men and other social groups during project implementation and operation. Where gender analysis is applied to inform the design of the project, it can help identify ways to mitigate possible risks and impacts that may exacerbate gender inequality, and highlight opportunities to enhance positive project outcomes and impacts.

Population Characteristics and Gender Situation

The total population of Uganda was 34.6 million persons in 2014. This represents an increase of 10.4 million persons from the 2002 census. The census enumerated a total of 7.3 million households countrywide with the majority of the households (75 percent) being resident in rural areas. Thirty percent of the households are female headed. About 22 percent of the population above 18 years had never married while 65 percent were married / cohabiting. The Mean Household Size is 4.7 persons and has remained fairly stable over the past four decades.

Age and sex are two attributes that largely influence an individual's role and or subsequent vulnerability in a society. According to the National Housing and Population Census Report for 2014, there were more males than females at younger age groups (0-14 years), resulting in a sex ratio of over 100 males per 100 females. In the subsequent age groups there is a persistent dominance in the number of females in the total population (National Housing and Population Census Main Report, 2014). The age dependency ratio is 103 implying that for every 100 economically active persons there are 103 dependents. The dependency ratio active age is higher for males (110) and for females (97). Seventy-one percent of the population aged 10 years and above was working in 2014. The proportion of males that were working (74 percent) was higher than females which stood at 68 percent (National Housing and Population Census Main Report, 2014).

National Interventions and Gender Situation

The government has since 1986 acknowledged gender issues as central to sustainable development of Uganda. The government has since then demonstrated a commitment to tackle the issue of gender inequality. Significant progress has been made in strengthening gender equality and women's empowerment. There has been formulation of a gender responsive regulatory framework since 1986, including policies and strategies. Affirmative action as enshrined in The 1995 Constitution under Article 32(1) and is pursued to redress historical and present forms of discrimination against women and girls in political, economic, and social spheres. Special clauses meant to narrow the gender divide are enshrined in The 1995 National Constitution. In Article 21 of The 1995 Constitution, discrimination on the basis of gender is prohibited. The Constitution gives more concrete recognition for the rights of women in Article 33 of the Constitution specifically provides for reservation of one seat for a woman member of Parliament for each district and at least one third of local council seats to be reserved for women. This has resulted in increased number of women in leadership and decision-making. For example, the proportion of women in local councils rose from 6% in early 1990s to 44% in 2003. In Parliament, the proportion of women legislators rose from 18.8% in 1996 to 24.4% in 2003 and 30.4% in 2006.

The national gender policy (1997) was formulated with a main objective to mainstream gender in the national development process in order to improve the social, legal / civic, political, economic and cultural conditions of the people, especially of women. The policy defines structures plus key target areas for ensuring that gender concerns are routinely addressed in the identification, design, appraisal, implementation, monitoring and evaluation of national, sectoral and local government policies, plans and programs. Affirmative action for women in Uganda has also been implemented in the education sector. An example is the 1.5 extra points given to all girls entering government universities and higher institutions of learning, to enable them compete favourably with boys. The

enrolment of girls / females in Public Universities (Makerere University) rose from 23.9% in the academic year 1989/90 to 29.2% in 1990/91 when it was introduced and 45.2% by 2005/06 (Namukasa and Buye, 2007[41]).

Further, there has been a process for institutionalization of gender planning in all sectors and increased collection of gender disaggregated data and information through research. As a result, there has been improvement in the number of women in political leadership and gender parity in enrolment of girls at primary level, in addition to increased ownership of land by women. Despite the progress made, only 27 percent of registered land is owned by women and although 70 percent of the women are engaged in agriculture, less than 20 percent control the outputs and proceeds from their efforts (NDP II, 2015-2020). Various national mechanisms and policies for promoting gender equality, empowerment and facilitating gender mainstreaming were also instituted by the government. These have included the creation of the Ministry of Gender, Labour and Social Development (MoGLSD) in 1988. Uganda moved from 43rd to 29th in the global gender gap ranking between 2008/09 and 2011/12 suggesting some successes in equalizing access to services and opportunities between women and men (NDP II, 2015-2020). The implementation of Universal Primary Education (UPE) program since 1997 resulted in increased access from 2.5 million to 8.5 million in 2013; while the gender gap in primary schools narrowed to about 1percent (50.5 percent girls and 49.5 percent boys). The UPE program is however dodged by several challenges including a high drop out among girls especially in upper primary and secondary levels (NDP II, 2015-2020). According to the National Housing and Population Census Report, 2014, about 72 percent of the population were literate[42], higher than about 70 percent in 2002. Literacy among females was lower (68 percent) than for males (77 percent). Literacy rates were higher in urban areas (where the project sites are going to be based) than rural areas. Other outcomes from other national interventions include increased ownership of land by women, improved access to water and sanitation, gender and equity budgeting as a requirement for sectors and local governments.

Gender Related Customs, Norms, Challenges and Constraints

There are still several gender related challenges, vulnerabilities and constraints to narrowing the gender divided with implications for development interventions. Women continue to face constraints related to access to, control over and ownership of businesses and productive resources such as land and credit due to long standing participial norms and customs that continue to domesticate the roles of women and limit the life chances of the girl child in the development process right from home. The social structure of most ethnic groups in the country is defined and arranged around kinship systems built along the male heredity lines. Decision making around most households and family groupings is largely done by the males. Despite the Universal Primary Education (UPE) program, there is still preference for the male child education in some of the societies in the country, especially when it comes to secondary and tertiary education that involves critical allocation of resources from the household. This is centred around patriarchal values about the girl child in relation to housekeeping and nurturing roles. There is limited employment of women in skill-based industries outside home and this constrains further women's income potential. Women are also marginalized in skills development, access to financial resources, employment in non-agriculture sectors and inheritance rights due to the associated with patriarchal values and customs in the country.

Land, a critical factor of production in the country is obtained and largely managed through patriarchal systems that disadvantage the females. Only 27 percent of registered land is owned by women. Although 70 percent of the women are engaged in agriculture, less than 20 percent control outputs from their efforts. Women comprise of the majority of labour force in the agriculture sector while men form the majority of the labour force in the industry and service Sectors. In wage employment, fifty percent of the employed women work in the three of the lowest paying sectors compared to 33 percent of men (NDP II, 2015-2020). In respect to survival, there are more women surviving from the informal sector around urban market areas as compared to the males. For most of the urban areas around Uganda including Kampala, there are more women working in the agro-crop subsector in the markets which generates substantial amounts of solid organic waste.

[41] Namukasa, I. & Buye, R. (2007). Decentralisation and Education in Uganda. Canadian and international education/education canadienne et international: vol.36:Iss.1. Article 7. Available at: http://ir.lib.uwo.ca/cie-eci/vol36/iss1/7

[42] According to the National Housing and Population Census Report, 2014, literacy is the ability for one to read with understanding and to write a simple sentence meaningfully in any language. Literacy leads to an increase in opportunities for an individual.

HIV/AIDS prevalence rates indicate higher vulnerability of women and girls arising out of their limited control over decisions for safe sex. Gender Based Violence (GBV) in all its manifestations (physical, sexual, emotional and psychological) remains a critical human right, public health and economic concern with 56 percent of women having experienced physical violence by the age of 15 years while 28 percent women aged 15-49 citing having ever experienced sexual violence (NDP II, 2015-2020). There is almost balance between girls and boys who have completed primary education indicating that gender parity has been achieved at this level. However, the share of girls who had completed the secondary, vocational and tertiary level of education is lower than the share of boys (National Housing and Population Census Main Report, 2014) indicating that chances of females possessing technical and vocation education and skill are lower for than that of males.

Absence of clear indicators for monitoring and evaluation of gender mainstreaming and limited availability of gender disaggregated data for effective programme design has made it difficult to assess impact attributable to gender mainstreaming efforts.

Project Assumptions on Gender and Key Issues

This project is premised on a number of assumptions.

1. The first assumption is that there are legal and policy frameworks that support the integration of gender into project design and planning. The 1995 National Constitution (Article 21 and Article 32(1) and Article 33(6)[43] The National Development NDP II (2015-2020) and National Gender Policy[44] 1997; and National Plan of Action for Women are all legal and policy instruments aimed at narrowing the gender (inequality) gap and promoting equity in access to livelihood opportunities and control of resources or development outcomes.
2. Secondly, from a technical point of view, women are likely to possess lower skills and abilities to directly benefit from the project as potential employees. The project components that target capacity building will have a clear target of attracting women and other vulnerable social groups as part of the project target groups and beneficiaries.
3. Thirdly, sources of substantial organic waste for one of the sites (KCC) are likely to come from selected urban area markets, where women are the major dealers in agro-crop products, while men dominate in the agro-livestock subsector. The other sources of organic liquid waste for one of the sites (NWSC) are the households where women control the disposal process and practices.
4. Fourthly, some of the selected sites are likely to have already established codes of conduct and operation such that consideration of gender issues is not a priority in the running business strategy and procedure.
5. Fifth, some of anticipated project outputs (such as clean energy, slurry etc.) are likely to be used at home or household level where women and girl children are key players in energy collection and use. Their integration into the project design is critical for them to not only benefit from the project outputs but sustainably appreciate, embrace and promote cleaner energy technologies

There are key gender issues that have been identified in the solid and liquid waste sector in general and these include; many women are employed in the informal waste sector in and around urban areas, there are few women are in decision-making positions in the solid and liquid waste sector, women's voices about proper and integrated waste management often go unheard, yet they are very often the people dealing (generating and informally recovering) with household and institutional solid waste, lack of access to and control over income, and limited skills in solid waste recovery and reuse results in women's inability to get attracted, or invest and participate in waste management solutions or even access the benefits from resources recovered from waste after recycling.[45]

[43] Article 21 of the constitution affirms equality of all persons and prohibits discrimination based on, amongst other things, sex. Article 32 of the 1995 constitution establishes the rights of the socially and physically disadvantaged. and Article 33(6) of the National Constitution prohibits laws, cultures and traditions that undermine women's welfare, interest and or status.

[44] The national gender policy (1997).

[45]UNDP and Global Gender Climate Alliance (GGCA), 2012, 'Gender and Climate Change Capacity Development Series, Africa, Training Module 1: Overview of Linkages between Gender and Climate Change'

Gender Mainstreaming Strategy[46]

This sub-section describes the project activities that will be followed in making sure that women's as well as men's concerns and experiences are an integral part of the design, implementation, monitoring and evaluation of the project. Therefore, three issues have been emphasized in this gender mainstreaming strategy; gender representation, engagement and responsiveness in terms of content and design of the project. These considerations are also echoed in a number of local legislation[47] and international safe guard policies.

The proposed project has three major components;
Component 1: Institutional strengthening and capacity building for improved waste management and regulation;
Component 2: Demonstration and investment in integrated wastewater treatment and biogas plant;
Component 3: Scaling up the use of biogas technologies in other municipalities.

For all the three components, there are pertinent gender issues that have been considered throughout the project cycle for each of the project components. These gender mainstreaming activities will also cut across the project cycle key phases. The following activities will be under taken or implemented to ensure that proposed strategies are **empowering** for women, men and other vulnerable social groups:

1. Stakeholder engagement during project implementation will include the identification of and integration of women groups within the identified sites throughout the project phases.

2. Identify constraints to women's participation (such as lack of skills, poor mobilization) and develop activities to minimize the constraints and enhance their participation. A sub strategy for skills building and training needs related to women participation in the project forms part of the project component for institutional capacity building.

3. Positive discrimination for women participation at specific phases of the project will be implemented as part of the project sub-components activities.

4. Project management and implementation coordination structures will provide for the representation of women on such committees.

5. Special collaborative and or assistance programs or interventions will be arranged for women groups in collaborating Civil Society Organisations (i.e. KODA for the Kaira Site). For example, as part of the capacity building component programs, some members of these women groups will also be trained for example in basic technology and skill for waste sorting, constructing and / or maintenance of domestic biogas plants.

6. Some of the jobs during the construction of the biogas plants will be reserved for local women s groups.

7. Adequate budget provisions for women participation in the project implementation at relevant levels have been included in this project proposal.

[46] UNDP prioritizes gender mainstreaming as the main strategy to achieve gender equality. Gender mainstreaming is the process of assessing the implication for women and men of any planned action, in all areas and at all levels.
[47] The 1995 National Constitution (Article 21 and Article 32(1) and Article 33(6)[47]The National Development Plan (NDP) I (2010-2015) and II (2015-2020) and National Gender Policy (1997); and National Plan of Action for Women are all legal and policy instruments aimed at narrowing the gender (inequality) gap and promoting equity in access to livelihood opportunities and control of resources or development project(s) outcomes.

Annex N: Site prefeasibility analyses

Potential business models

There are three potential business models for developing integrated municipal waste/ waste water treatment and biogas facilities. They include:

Those included within the scope of the PIF:

- Municipal waste conversion to biogas converted to electricity/heat
- Municipal wastewater treatment resulting in biogas converted to electricity/heat

Not included within the scope of the PIF but which involves waste streams:

- Industrial/food production/ agricultural waste conversion to biogas converted to electricity/heat

These are further discussed below. All of these potential business models have a few key issues related to income possibilities:

- **Ability to sell electricity to the grid:** The present connection policy limits the grid connection to an installation of at least 0.5 MW. If this amount is generated under one administrative umbrella at different locations, the installation capacity is added up and has to be above 0.5 MW to be eligible for grid connection. However, having a number of installations in separate locations adding up to 0.5 MW would be very challenging.
- **Ability to utilise/ sell discharged surplus water for fertigation.** This can only be realised if the wastewater production and the treated water reuse is managed by the same company. Sugar factories are doing this traditionally.
- **Ability to utilise/ sell discharged sludge as soil conditioner.** A soil conditioner can be marketed and sold, as this is already being done for cow dung from slaughter houses, and compost, in Mbale. However, this may face stiff competition from commercially available fertilisers. Therefore, it may require rigorous marketing and information campaigns, involving key stakeholders such as Ministry of Agriculture, Animal Industries and Fisheries, farmer groups etc.

The specific technical issues related to for the four main potential business models are described below.

Business model 1: Municipal waste conversion to biogas converted to electricity/heat

In order to implement this business model at a scale which would allow for electricity production at a unit of 500 kW (3.5 GWh of electricity production per year), it is estimated that 13,000 to 14,000 tonnes of organic waste would be necessary for processing each year – or 35 to 40 tonnes/day. Assuming that 60% of the waste is organic, this would mean processing 60 to 65 total tonnes of municipal solid waste per day (i.e. separating organic from inorganic waste).

Assuming that the technology can be implemented, it is necessary that most or all benefits of the technology are claimed (as described above). Furthermore, in order to incentivize sorting and waste treatment, it is highly likely that the introduction of a tipping fee system at the solid waste treatment plant would be necessary. However, this seems very unlikely.

Based on initial investigations, the most promising waste streams in most of Uganda come from market wastes. In Kampala – where a waste to biogas plant is already being considered – waste is generally available, but it is not currently source-separated.

The separation of wastes at the site of utilization (either land-fill or composting site) can be highly problematic. This process for composting sites has failed in Jinja and is experiencing challenges in Mbale. Biogas production at publicly operated composting plants sites is presently not feasible. The composting plants have only recently been constructed (first batch of nine in 2008, and the second batch of three in 2012). There exists agreements between municipalities and NEMA that 70 tonnes/day of organic wastes must be processed at these facilities. Given the

population sizes of the towns under consideration (72,931 to 195,013 people), removal of 70 tonnes/day of clean organic wastes might leave little for large scale production of biogas.

The likely best sources of organic wastes are expected to come from market wastes which are almost entirely organic and could be sorted at the market sites and then transported to the biogas sites.

Business model 2: Municipal wastewater treatment resulting in biogas converted to electricity/heat

In order to implement this business model at a scale which would allow for electricity production at a unit of 500 kW (4 GWh of electricity production per year), it is estimated that over 10 million m3 of wastewater per year would be necessary for processing each year – or over 27,500 m3/day.[48]

At the wastewater treatment plant in Kampala, the capacity per day is reported at 45,000 m3 per day though it is likely that the plant is only operating at less than half capacity. There may be sufficient waste availability for a 500 kW installation but likely only if additional waste streams can be identified. This also indicates that there is unlikely to be sufficient scale of wastewater system in Uganda outside of Kampala.

Based on 4 municipalities investigated, the potential for biogas from municipal solid waste and wastewater are presented in the table below.

Municipality	Tonnes of waste per year	Estimated potential for biogas production based on feedstock (MW_{el})	Notes
Kampala	57,000 tonnes of market waste alone	2.0	This waste is spread over 5 sites
	730,000 tonnes per year of waste generated (~344,000 collected)	9.0	Potentially the capacity could be double if waste collection rates increased
	6,400 tonnes of dissolved solids sludge waste from wastewater – estimated 1.6 million m3 of biogas	0.5	Potentially the capacity could be increased by other organic wastes
Mbale	5,500 tonnes of food processing waste (composted	0.2	It is unclear how much waste is organic versus not organic and how much of the organic waste is composted
	25,000 tonnes of organic waste (composted)	0.9	
	18,000 tonnes of brown bin waste collected (not composted)	0.5	
	7,300 tonnes of crop residues	0.4	
	900,000 m3 of wastewater	Unlikely to be significant	
Jinja	12,000 to 13,000 of market waste	0.5	The current system of source separation is not functioning effectively
	36,000 tonnes of brown bin waste collected	1.0	
	1 million tonnes or more of bagasse produced	Unclear – likely better utilized for thermal purposes	
	2,000,000 m3 or more of wastewater each year	Unlikely to be significant	
Mbarara	11,000 tonnes of market waste	0.45	Amounts of other wastes are not known.

[48] Based on a similar pre-feasibility study carried out in South Africa: http://www.cityenergy.org.za/uploads/resource_323.pdf

Business model 3: Industrial/ food production/ agricultural waste conversion to biogas converted to electricity/heat

This business model was not explicitly mentioned in the PIF, though it was recommended in the study carried out as a pre-cursor to the PIF. It also has links to municipal solid waste/wastewater treatment since development of biogas plants by industry using their own waste streams would reduce waste streams to landfills and wastewater treatment plants. Furthermore, if the financial aspects are sufficiently favourable, this type of industrial biogas plant could create an incentive for plant owners to take waste from the land-fill operators, sort it themselves and utilise the organic content.

In order to implement this business model at a scale which would allow for electricity production at a unit of 500 kW (4 GWh of electricity production per year), it is estimated that the following waste streams would be necessary per year as an example:

Feedstock	**Waste per year (tonnes)**	**Waste per day (tonnes)**
Fruit wastes	25,000 – 30,000	70 – 80
Fruit residuals	35,000 – 40,000	95 – 110
Animal carcasses (e.g. from abattoirs)	8,000 – 10,000	20 – 25
Manure	30,000 – 40,000 (e.g. 3,000 – 4,000 cows)	80 – 110

For most such biogas installations, a mix of a number of different substrates is likely to yield better outcomes (in particular for those based on animal wastes – where crop residues are likely to be necessary). These are rather large quantities of waste required. During the project preparation period, three potential projects were screened:

1. Kakira Sugar Ltd is currently operating a bagasse based biomass electricity production unit (5.2 MW) and is planning to install an additional 0.4 MW of power based on a biogas digester using waste materials. This investment is likely to go forward, but technical assistance is needed in the planning and optimal operation of the plant.

2. There are planned fruit juice industries planned in Soroti and Luweero which plans to produce approximately 2,000 tonnes and 3,400 tonnes of fruit residue per year (respectively). This would not be sufficient waste for 500 kW of electricity production (more likely 0.1 MW). Additional potential waste streams could not be identified which could supplement these inputs.

3. A large agricultural farm in Western Uganda was proposing to build a 1 MW biogas installation. However, further investigation did not reveal sufficient livestock operations to justify a large biogas installation – though the operation may grow in the future.

Further investigation into other large industries and agricultural holdings dealing with large sums of organic waste also showed that a number of sugar industries are considering biogas plants, but not moving forward yet. Furthermore, a large abattoir near the waste water treatment plant in Kampala needs a better way to dispose of its organic waste. This waste could likely be included in the planned wastewater treatment facility which will include a biogas digester and CHP unit.

As a result of utilising the site selection criteria matrix described in Annex O, it has been decided that the project will therefore support the following three projects initially with potential for scaling up:

1. Municipal solid waste-to-biogas development at a new landfill in Kampala, which is expected to be implemented via a public private partnership with KCCA and a private investor (to be identified) utilising primarily market wastes initially – Expected initial capacity of 0.5 MW.
2. Wastewater-to-biogas at the wastewater treatment plant in Kampala, which is expected to be implemented by NWSC and would have a capacity of 2 MW. In order to reach this capacity, additional organic waste from the nearby abattoir is expected to be utilised.
3. Waste-to-biogas at the Kakira Sugar Ltd facility which will be implemented by Kakira Sugar Ltd and is expected to increase capacity of their existing biomass plant by 0.4 MW.

Initial pre-feasibility analysis shows that these projects deserve support for full technical analysis and strong consideration for grant funding for implementation.

Summary of potential biogas projects related to municipal solid waste

While each business model is replicable, it is likely that the model with the highest potential volume of biogas plants for development is related to municipal solid waste. To provide a guide for analysing the feasibility, a pre-feasibility analysis was conducted to gauge the financial costs and benefits of such an investment. The following information is therefore preliminary and indicative as a part of a pre-feasibility study of potential investments in biogas based on municipal solid waste in Uganda. It is not to be understood as a final feasibility study. The information does, however indicate the potential for profitable investment in waste-to-biogas electricity production at the project site. It is based on information from Kampala – where a new land-fill site is currently in development stages.

Proposed Location: Uganda, at the same site as any proposed or existing land-fill.

Technology: Methane biogas based on waste streams primarily from markets and potentially from other municipal solid waste streams (brown bin).

Size: 0.5 kW_{el} with potential scale up based on waste available.

Total project cost: In addition to the landfill development costs and land, an additional estimated USD 2.61 million would be necessary for construction and technology.

Total proposed financing structure: There are numerous options for investors for this project, which would likely need to be carried out as a public private partnership with a loan mechanism and a grant from the GEF to support part of the investment.

The structure used for financial calculations are as follows:
- USD 522,100 in equity participation by a private investor (20%);
- USD 522,100 in grants by the GEF project (20%);
- USD 1,566,300 in loans by a lending institution (60%) with a 9-year maturity period at 8% annual interest and 1% bank fee – potentially scalable to an additional ~USD 4 million for scaling up the project.

Business model - proposed project ownership and operation structure: The proposed business model for implementation of the project would be for implementation under a build-own-operate (BOO) contract modality under a public-private partnership (PPP) wherein:

- The municipal waste company would provide the land and a long-term agreement (at least 15 years) for providing organic wastes from markets. In Kampala, this company is KCCA while other municipalities have different municipal waste companies.
- The private company would sort the waste streams either at the site of collection (markets) or at the site of disposal (the landfill), operate the plant, and have ownership over the by-products of the biogas plant (fertilizer and soil conditioner).

Time between financial draw-down and commissioning: 6-10 months.

Projected Key Performance Indicators:

EBITDA	~USD 370,000 – 380,000 without heat sales and with sales of fertiliser, off-taker fees for organic waste
EBITDA to investment ratio	~14%
Simple payback period	~7 - 8 years from commissioning
Non-leveraged 15-year IRR	~13%
Leveraged 15-year IRR (with grant)	~22%

Additional information on the project:

The following table shows a number of typical investor requirements for investing in a biogas facility and how such a business model would meet these requirements.

Typical Investor Requirement	How the project meets the requirement
Legally valid Feed in Tariff arrangement for biogas	The project is in Uganda. There is a Government guaranteed price of USD 115 per MWh for electricity from biogas which would grow with inflation if the project is at least 0.5 MW_{el}. Lower capacity can also qualify for the Feed in Tariff subject to negotiations – but this would make implementation more risky and likely not as profitable.
A preference for projects using wastes and input materials available	This type of project modality is not expected to require any energy crops to supplement the organic wastes from markets/ municipal waste. Feasibility studies analysing the waste system in Kampala show that there is a lot of organic waste which is disposed of either in landfill or elsewhere. Analysis by COWI conducted in 2013 shows that from markets alone there are over 57,000 tonnes of waste produced – which are almost entirely organic. This amount of waste would yield over 6.8 million m3 of biogas per year – enough to power over 2 MW_{el} (operating at 7000 hours per year).[49] Additional waste could be utilised based on sorting other municipal solid waste streams – which are estimated to be 70 - 80% organic.
Positive social/ environmental impacts	The project would result in increased employment for plant management and waste sorters. The environmental impact of the project would be positive due to reduced methane emissions at the landfill. There are significant potential positive multiplier effects due to scaling up of the project in Kampala and in other municipalities. Additionally, the biogas plant would provide organic fertiliser and soil conditioner (instead of chemical fertilisers) for local farmers available at market rates. No negative social impact is expected – though measures should be taken to ensure access to non-organic waste streams for “waste pickers” who sell metal and plastic for income.

Basic investment parameters for 0.5 MW

The following table shows the estimated basic investment parameters for installation of a 0.5 MW_{el} biogas facility based on pre-sorted organic waste streams. This investment could be scaled up for likely a lower cost per installed kW_{el}. The amount does not reflect the costs of waste sorting sites, waste delivery trucks, and land – since these are assumed to be in-kind contributions.

Investment	**Cost**
Organic waste crusher system	$ 95,000
Hydrolysis system	$ 115,000
Digester	$ 281,000

[49] Based on the following standard ratios for food waste:
- 20% Dry Solids
- 85% organic Dry Solids (as % of Dry Solids)
- 700 m3 biogas per tonne of organic Dry Solids

Gas storage	$ 71,000
After storage system	$ 162,000
Foundation and infrastructure and construction	$ 702,000
Gas compressor	$ 16,000
Analytic system	$ 20,000
Feeding produced current	$ 108,000
Condensate separator	$ 20,000
Biogas flow gauge	$ 7,000
E- and instrumentation control	$ 198,000
Earthwork and outdoor facilities	$ 272,000
Piping and accessories	$ 102,000
Office	$ 43,000
Acceptance platform	$ 25,000
Acceptance truck weighbridge	$ 33,000
Contingency	$ 340,500
Total investment	**$ 2,610,500**

Ongoing costs and sources of income

The following table demonstrates the expected ongoing operations and maintenance costs and income of the operation.

Operations and Maintenance costs are expected to include: waste sorters, maintenance of the digester, and maintenance of the Combined Heat and Power (CHP) unit.

Income categories are expected to include: income from tipping fees for organic waste, electricity sales, and sale of fertilizers/ soil conditioner which is a natural by-product of the biogas plant process.

Category	Unit	Total over 15 years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
Inflation	%		2.0%	2.0%	2.0%	2.0%	2.0%	2.0%	2.0%
Ongoing costs									
Labour - waste sorters	USD/ person-year	$51,880	$3,000	$3,060	$3,121	$3,184	$3,247	$3,585	$3,958
# of waste sorters	#	$120	8	8	8	8	8	8	8
Total for waste sorters	USD	$415,042	$24,000	$24,480	$24,970	$25,469	$25,978	$28,682	$31,667
Maintenance costs (CHP) per MWh	USD/MWh	$346	$20.00	$20.40	$20.81	$21.22	$21.65	$23.90	$26.39
Maintenance costs (CHP) per MWh	USD/year	$1,140,539	$-	$71,400	$72,828	$74,285	$75,770	$83,656	$92,364
Maintenance costs (digestor) per MWh)	USD/MWh	$173	$10.00	$10.20	$10.40	$10.61	$10.82	$11.95	$13.19
Maintenance costs (digestor) per MWh)	USD/year	$570,270	$-	$35,700	$36,414	$37,142	$37,885	$41,828	$46,182
Maintenance costs - miscellaneous (25% of other maintenance costs)	%		25%	25%	25%	25%	25%	25%	25%
Maintenance costs	USD/year	$427,702	$-	$26,775	$27,311	$27,857	$28,414	$31,371	$34,636
Total ongoing costs	**USD**	**$2,553,553**	**$24,000**	**$158,355**	**$161,522**	**$164,753**	**$168,048**	**$185,538**	**$204,849**
Total costs	**USD**	**$5,164,053**	**$2,634,500**	**$158,355**	**$161,522**	**$164,753**	**$168,048**	**$185,538**	**$204,849**
Feedstock									

Category	Unit	Total over 15 years	Year 1	Year 2	Year 3	Year 4	Year 5	Year 10	Year 15
costs/benefits									
Feedstock #1									
Canteen waste/food waste	USD/ tonne		$5.00	$5.10	$5.20	$5.31	$5.41	$5.98	$6.60
Tonnes of feedstock	Tonnes/year	196,000	-	14,000	14,000	14,000	14,000	14,000	14,000
Total - Feedstock #1	USD/ year	$1,140,539	$-	$71,400	$72,828	$74,285	$75,770	$83,656	$92,364
Total tonnes	Tonnes/year	196,000	-	14,000	14,000	14,000	14,000	14,000	14,000
Feedstock - total	**USD/ year**	**$1,140,539**	**-**	**71,400**	**72,828**	**74,285**	**75,770**	**83,656**	**92,364**
Benefits									
Electricity off-taker price	USD/MWh		$115	$117	$120	$122	$124	$137	$152
Electricity production per year	MWh	49,000	-	3,500	3,500	3,500	3,500	3,500	3,500
Electricity revenue	USD	$4,004,763	$0	$410,550	$418,761	$427,136	$435,679	$481,025	$531,090
Heat sales	USD/MWh		$-	$-	$-	$-	$-	$-	$-
Total heat production	MWh/year	-	-	-	-	-	-	-	-
Heat revenue	USD	$-	$0	$0	$0	$0	$0	$0	$0
Fertilizer price	USD/tonne		$5.00	$5.10	$5.20	$5.31	$5.41	$5.98	$6.60
Fertilizer sales	tonnes	90,000	-	10,000	10,000	10,000	10,000	10,000	10,000
Fertilizer sales	USD/year	$497,486	$0	$51,000	$52,020	$53,060	$54,122	$59,755	$65,974
Total benefits	**USD**	**$4,502,249**	**$-**	**$461,550**	**$470,781**	**$480,197**	**$489,801**	**$540,779**	**$597,064**
Total net benefit (costs)	**USD**	***3,349,257***	**$-2,634,500**	**$374,595**	**$382,087**	**$389,729**	**$397,523**	**$438,898**	**$484,579**
Cumulative net benefit	USD		$-2,634,500	$-2,259,905	$-1,877,818	$-1,488,089	$-1,090,566	$1,019,535	$3,349,257

Key Performance Indicators

The first table below shows the Key Performance Indicators in terms of finance for such an investment. It should be noted that a high discount rate has been used (20%) based on experience in developing biogas facilities in other countries. It can be seen that there is a negative Net Present Value (NPV) for the project due to the high discount rate. This discount rate could be reduced depending upon perceptions of risk for such a project.

15-year Internal Rate of Return	%	Calculated	**13%**
Discount rate	%	Assumption	**20%**

Net Present Value	USD	Calculated	**- 639,407**
Payback period	Years	Calculated	**8**

Leveraged financial calculations

The following table shows the leveraged financial calculations based upon assumed loan conditions and investment structuring. In the case of a 20% grant, the NPV becomes positive.

Category	Unit	Total	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10	Year 15
Total investment	**USD**	**$2,610,500**	**$2,610,500**	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**	**$-**
Total ongoing costs	**USD**	**$2,553,553**	**$24,000**	**$158,355**	**$161,522**	**$164,753**	**$168,048**	**$171,409**	**$174,837**	**$178,333**	**$181,900**	**$185,538**	**$204,849**
Feedstock - total	**USD**	**$1,140,539**	**-**	**71,400**	**72,828**	**74,285**	**75,770**	**77,286**	**78,831**	**80,408**	**82,016**	**83,656**	**92,364**
Total benefits	**USD**	**$4,502,249**	**$-**	**$461,550**	**$470,781**	**$480,197**	**$489,801**	**$499,597**	**$509,588**	**$519,780**	**$530,176**	**$540,779**	**$597,064**
Total net benefit (costs)	**USD**	***3,349,257***	**$-2,634,500**	**$374,595**	**$382,087**	**$389,729**	**$397,523**	**$405,474**	**$413,583**	**$421,855**	**$430,292**	**$438,898**	**$484,579**
Cumulative net benefit	USD		$-2,634,500	$-2,259,905	$-1,877,818	$-1,488,089	$-1,090,566	$-685,093	$-271,509	$150,345	$580,637	$1,019,535	$3,349,257
Paid back?	No/Yes		No	No	No	No	No	No	No	Yes	Yes	Yes	Yes
Calculation with GEF intervention													
Own resources	%		20%										
Own resources	USD	**$522,100**	$522,100	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Grant resources	%		20%										
Grant resources	USD	**$522,100**	$522,100	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Loan resources	%		60%										
Loan resources	USD	**$1,566,300**	$1,566,300	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maturity period	year	**9**											
Credit interest rate	%	**8.0%**											
Bank fees	%	**1.0%**											
		Year	0	1	2	3	4	5	6	7	8	9	14
Balance brought forward	**USD**		-	1,455,280	1,318,462	1,170,699	1,011,115	838,764	652,624	451,594	234,482	0	0
Drawdown	**USD**	*1,566,300*	1,566,300										
Bank fees	**USD**	*15,663*	15,663										

Principle repayment	**USD**	*-1,581,963*	-126,683	-136,818	-147,763	-159,584	-172,351	-186,139	-201,030	-217,113	-234,482	-	-
Interest repayment	**USD**	*-697,199*	-126,557	-116,422	-105,477	-93,656	-80,889	-67,101	-52,210	-36,128	-18,759	-	-
Total debt service	**USD**	*-2,279,162*	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-	-
Balance carried forward	**USD**		1,455,280	1,318,462	1,170,699	1,011,115	838,764	652,624	451,594	234,482	0	0	0
Cash flow for the investor/project developer													
Investment	USD	*-522,100*	-522,100	-	-	-	-	-	-	-	-	-	-
EBITDA	USD	*5,959,757*	-24,000	374,595	382,087	389,729	397,523	405,474	413,583	421,855	430,292	438,898	484,579
Debt service	USD	*-2,279,162*	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-253,240	-	-
Total net benefit (costs) (pre-tax)	**USD**		**-799,340**	**121,355**	**128,847**	**136,488**	**144,283**	**152,233**	**160,343**	**168,615**	**177,052**	**438,898**	**484,579**
Cumulative net benefit	USD		-799,340	-677,985	-549,139	-412,650	-268,367	-116,134	44,209	212,824	389,876	828,773	3,158,496
Paid back?	No/Yes		No	No	No	No	No	No	Yes	Yes	Yes	Yes	Yes
Key performance indicators													
15-year Internal Rate of Return - leveraged	%	**22%**											
Discount rate	%	20%											
Net Present Value	USD	80,123											
Payback period	Years	**7**											

Sensitivity analysis

Sensitivity analysis was conducted to evaluate the leveraged NPV and IRR based on changes to the grant amount to be provided. The results for comparison are shown in the table below. This analysis shows that without a grant the leveraged IRR would be approximately 14%. This is considered on the low side for such an investment, though if the technologies and processes are proven, and additional revenue streams such as GHG credits, heat sales, or increased tipping fees can be incorporated, the project could be sufficiently profitable.

Sensitivity analysis		
Grant	**NPV**	**Leveraged IRR**
0%	$ (260,144)	14.2%
5%	$ (175,077)	15.9%
10%	$ (90,011)	17.8%
15%	$ (4,944)	19.9%
20%	$ 80,123	22.1%
25%	$ 165,190	24.5%
30%	$ 250,257	27.2%
35%	$ 335,324	30.1%
40%	$ 420,391	33.2%
45%	$ 505,458	36.6%
50%	$ 590,525	40.3%

Sensitivity analysis was also conducted based to evaluate the leveraged NPV and IRR based on changes to off-taker price of electricity – eliminating the grant and with an equity-to-debt ratio of 40%/60%. The results for comparison are shown in the table below. This analysis shows that – assuming there is no grant, the leveraged IRR would be approximately equal to the discount rate given a feed-in tariff of between $130 and $145 per MWh.

Electricity off-taker price (US $/MWh)	**NPV**	**Leveraged IRR**
$ 70.00	$ (1,022,275)	0.4%
$ 85.00	$ (799,837)	5.1%
$ 100.00	$ (577,398)	9.5%
$ 115.00	$ (354,960)	13.6%
$ 130.00	$ (132,522)	17.6%
$ 145.00	$ 89,917	21.6%
$ 160.00	$ 312,355	25.5%
$ 175.00	$ 534,793	29.4%
$ 190.00	$ 757,232	33.3%
$ 205.00	$ 979,670	37.1%

Annex O: Site selection criteria

The sites chosen for initial inclusion as pilot projects were chosen based on a number of weighted criteria via as described below. If for any of the criteria the score was zero, the potential site was excluded as an option.

Interest expressed by the project developers/counterparts (10% out of 100%)

- 0 - no interest or interest but no follow up
- 5.0 - interest and limited follow up
- 7.5 - interest and extensive follow up
- 10 - likely champion of the technology and process

Potential feedstock available (30% out of 100%)

- 0 - insufficient feedstock for 0.5 MW
- 7.5 - feedstock supply is mostly available but complicated
- 15.0 - more than enough feedstock available but complicated
- 22.5 – more than enough feedstock available
- 30.0 – more than enough feedstock available and fully controlled by operator

Technical feasibility of the plant construction/implementation (15% out of 100%)

- 0 - no grid/heat off-taker access
- 4 - grid access, no heat off-taker
- 8 - grid access, land available
- 11 - grid access, land available, heat off-taker access
- 15 - grid access, land available plus potential expansion, heat off-taker access

Realistic possibility of positive social, environmental, and gender impact (10% out of 100%)

- 0 - likely negative social, environmental, and gender impact
- 5.0 - likely neutral social, environmental, and gender impact
- 7.5 - likely positive social, environmental, and gender impact
- 10.0 - certain positive and sustainable social, environmental, and gender impact

Potential financial/ in-kind contribution by the project developers/counterparts (30% out of 100%)

- 0 - no financial or in-kind contribution possible
- 7.5 - limited in-kind contribution possible but no finances available
- 15.0 - in-kind contribution and limited finances available (under 5% of total investment)
- 22.5 - in-kind contribution and finances available (30% of total investment)
- 30.0 - in-kind contribution, finances available, and bankable loan off-taker

Potential for replication (5% out of 100%)

- 0 - not replicable at other sites
- 2 - similar projects would be possible at a few other sites
- 3 - similar projects would be possible at many other sites
- 5 - almost identical projects would be possible at many other sites

Selection criteria	Interest expressed		Potential feedstock available		Technical feasibility		Realistic possibility of positive social, environmental, and gender impact		Potential financial/ in-kind contribution		Potential for replication		Total	
Weighting	**10%**		**30%**		**15%**		**10%**		**30%**		**5%**		**100%**	
Municipal waste sites - Municipalities/ government														
Kampala Capital City Authority - KCCA	7.5	Very interested in cooperating	15.0	Kiteezi landfill full, a new one not yet acquired, process ongoing. Enough waste for over 2 MW but it is not sorted and could be high risk. The KCCA also expresses a desire to have the sites decentralised.	8.0	Perhaps decentralised	7.5		15.0	PPP Required, but potential co-financing from IFC as part of the landfill investment.	5.0	Many within the city and outside	58.0	Low possibility for implementation
Jinja Municipal Council	5.0	Answered, after several reminders	7.5	Enough waste, but not easily sorted	8.0	Likely electricity grid access	7.5		7.5	PPP Required	3.0	In other cities	38.5	Very low possibility for implementation
Mbale Municipal Council	5.0	Answered, after several reminders	7.5	Enough waste (potentially for over 1 MW), but not easily sorted	8.0	Likely electricity grid access	7.5		7.5	PPP Required	3.0	In other cities	38.5	Low possibility for implementation
Mbarara Municipal Council	7.5	Expressed interest	-	Enough market waste only for 0.4 MW	8.0	Likely electricity grid access	7.5		7.5	PPP Required	3.0	In other cities	33.5	Not fully investigated yet, but expected to have a low possibility for implementation
Wastewater treatment plants														

Selection criteria	Interest expressed		Potential feedstock available		Technical feasibility		Realistic possibility of positive social, environmental, and gender impact		Potential financial/ in-kind contribution		Potential for replication		Total	
Weighting	**10%**		**30%**		**15%**		**10%**		**30%**		**5%**		**100%**	
NWSC - Nakivubo WWTP/ Kampala Abbatoir	7.5	Very interested in cooperating	30.0	1 MW with just waste water at 30% capacity, abattoir site just next door would bring it closer to 80%	8.0	Not likely a heat off-taker (except for effluent treatment), but the land and electricity connection are available.	10.0	High positive environmental impact, neutral on social & gender impact	22.5	PPP Required, PhD could be funded by SIDA for TA for the project. Grant needed for blending machine, transportation, and sorting facility	2.0	Probably not at that scale for wastewater, but the abattoir waste usage is replicable.	80.0	High possibility for implementation with technical assistance and some grants for specific things.
Private project developers														
Kakira Sugar Factory	7.5	Very willing to cooperate	22.5	Have plenty of their own waste, may be able to incorporate other wastes	15.0	Already in the implementation phases	5.0	Not likely to have a direct impact	30.0	They are fully capable of financing the plant, maybe would like technical assistance for adding sewage	3.0	Replication at other sugar industry and other agri-businesses	83.0	High possibility for implementation with technical assistance to help expand slightly to include sewage
Private farmer in Fortportal	10.0	Very interested in cooperating	-	700 cows expected, but would need additional waste streams	8.0	Grid access, no heat off-taker	7.5		15.0	Unclear financial package	5.0	Many other large farmers	45.5	Medium possibility for implementation
Uganda Development Corporation (UDC) (Soroti fruit factory belongs to them)	10.0	Very interested in cooperating	-	Do not have enough waste either internally or from the municipality. May be possible if more agri-business there.	4.0	Land not easily available	7.5		7.5	Likely no cash available. Maybe in-kind.	5.0	Many other medium agribusinesses	34.0	Probably low possibility for implementation
Greenheat International	-	Not enough information	-	Not enough information	-	Not enough information	-	Not enough information	-	Not enough information	-	Not enough information	-	They gave information of their client, not them.

Selection criteria	Interest expressed		Potential feedstock available		Technical feasibility		Realistic possibility of positive social, environmental, and gender impact		Potential financial/ in-kind contribution		Potential for replication		Total	
Weighting	**10%**		**30%**		**15%**		**10%**		**30%**		**5%**		**100%**	
Sugar Corporation of Uganda Limited	5.0	Expressed interest	-	Not enough information	15.0		5.0		30.0		3.0		58.0	Insufficient information about feedstock - but potential for scaling up existing biogas operations.
Kinyara Sugar, Masindi	5.0	Expressed interest	7.5	700 m3 biogas a day insufficient for electricity, but perhaps for just biogas?	4.0		5.0		30.0		3.0		54.5	Already produce more electricity than the grid can accept. But biogas could perhaps be produced.

Annex P: Biogas experience in East Africa

The following table provides an overview on high Tech Biogas Plants known in Tanzania.

Characteristic	Unit	Arusha Winery	Mwanga Ethanol	Hale Sisal	Naivasha, Flower Farm
Size of digester	M^3	622	10,000	1,700+500 (Main-and Post-digester)	5,600
Pre-treatment		Settler	Not known	Hydrolysis	Hydrolysis
Size of pre-treatment	M^3	100	Not known	300	1,400
Substrate			Distillery waste	Only sisal leaf waste	
Other treatment steps		Inoculation, Planted gravel filter, Sludge drying beds	Not known, most likely ponds for post treatment	A sieve drum is installed to remove long fibre before going to biogas plant	
Amount of substrate	M^3/day and type	26, watery fraction after settling	Not known, Distillery waste originating from Molasses.	65, sisal leaf waste	120, maize, baby corn, vegetable waste from processing, flower production waste
Technology description		Up-flow Anaerobic Sludge Blanket	Single phase, parallel vessels	Hydrolysis	Hydrolysis
Gas production	M^3/day	22	Not known	1,800	24,000
Main Purpose		Effluent cleaning, wastewater treatment, heat for boilers	Waste stabilisation, energy provision Heat for steam boilers	Waste stabilisation, electricity generation	Electricity for the grid
Employees for the system	person	2	Not known	Not known	Not known
Financing		Multiple Donor, SIDA	Company investment	Multiple Donor CFC, Unido, Katani	Multiple donor:
Investment cost		Not yet known	Not known	For the total project 1,5 mio US$	6,5 million US$
Operational issues		Capacity constraints	Not known	Chinese CHP (combined heat and power unit), often breaks down without sufficient maintenance and operation procedures.	Biological, not enough inoculum found at the start up

Characteristic	Unit	Arusha Winery	Mwanga Ethanol	Hale Sisal	Naivasha, Flower Farm
				Spare parts hard to get	
Learning		The management as well as the operator does not have the knowledge to assess the system and do small changes to get full benefits. Technically the system is over engineered and complex (overkill) with many pumps and valves and unnecessary elements.	Management *aggressively* rejected any form of cooperation and did not want the consultant to visit the site. This was communicated through several e-mails with the CEO.	Even though grid connection was planned, management did not succeed. There are plans to increase the production capacity, in order to reach the 300 kW installed capacity, TANESCO has defined as the minimum installed capacity for purchase from an electricity producer.	The start-up turns out to be very difficult as the system is so big.
Cross cutting Lessons learned		1. All sites seem to have managerial issues when it comes to electricity production. Heat for boilers is the easier option for gas use. 2. Little, or rather nothing, is known about the potential benefits from the slurry as organic fertilizer. All systems have received aid money for constructions and implementation. It is questionable if these systems are profitable in real bank terms. 3. Projects can be environmentally beneficial, however, these benefits are unclear. Social benefits include employment and operational experience of biogas systems. Depending on the size of the system and the atomisation level, a number of workers are required to be employed. In all cases no gender impacts have been observed.			

Annex Q: Financial products offered by Ugandan Energy Credit Capitalisation Company

Credit Enhancement Instruments

Liquidity Refinance Option
This is liquidity insurance facility to enable Participating Financial Institutions (PFIs) extend the tenure of the loans. The PFIs have the option of drawing down on the liquidity between 5 - 7 years from loan origination. Currently, the upper ceiling for the refinance option is US $ 3 million.

Cash Reserving
In order for the liquidity refinancing to carry market legitimacy, and as an incentive to the PFIs, cash is reserved with the PFI in a fixed deposit account for each refinance option undertaken by the UECCC

Partial Risk Guarantee (PRG)
This is a cost overrun insurance facility, available during the construction phase of the investment projects. This facility enables projects to initially access guaranteed cover for cost overruns of up-to 15% of the total project cost. Additional overruns beyond the 15% but in any case not exceeding 50% of the project cost may be financed on a 50%:50% basis between UECCC and the developer

Pipeline Additional Credit Support Instruments

Bridge Financing Facility
To cover interest payments during the construction stage of a project, before it starts generating cash flows. It is repayable on project commissioning

Subordinated Debt Finance
This is aimed at addressing the lack of sufficient equity by project developers who have some equity, but which falls short of the levels required by financial institutions

Interest Rate Buy Down
The aim of this instrument is to buy down the interest charged by the banks. This is to address the current high interest rates that are not in line with the requirements of project financing. Energy Efficiency projects are a priority

Annex R: African Development Bank (AfDB) - Borrowing Private Sector Window

The AfDB provides a range of financial products for the private sector to complement its traditional lending operations to governments. Lending can be done for the following major sectors;

Manufacturing, Mining, Oil & Gas, Agribusiness, Hospitality, Health and Education, Energy/Power, ICTs, Transport, Water and Sanitation.

Terms and Conditions/Eligibility Criteria

1. Loans are normally in hard currency and must be repaid in currency borrowed
2. Interest rates: ADB lends at market rates, pricing its loan at a spread above an appropriate market indicator i.e. Libor or Euribor. Spreads are set according to the credit worthiness of the borrower and after applying appropriate margins for country and project risks, as well as a reasonable rate of return.
3. Maturities and Repayment: Generally run for terms of 5-15 years with suitable grace periods
4. Fees: In accordance with normal market price depending on the nature, complexity and risk profile of the project being financed. Fees may include;
    - Front –end
    - Commitment
    - Arrangement
    - Appraisal
    - Syndication
5. Security: Determined on a case by case basis but may consist of; a mortgage on real property, a chattel mortgage, industrial pledge on movables, a floating charge on cash, inventories and other current assets
6. Total project cost must be above USD$30m
7. Owner's equity must be at least 30% of the total project cost.
8. An enterprise/project must be located and incorporated in the Regional Member Countries (RMCs) of the Bank, whether promoted by African or non-African investors.
9. An enterprise/project must be majority-owned (more than 51 per cent) by private-sector investors, or publicly owned with strong financial standing and proven managerial autonomy.
10. Projects for the establishment, expansion, diversification and modernization of productive enterprises (i.e. CAPEX). No direct financing of trade.
11. Investment size determined by Single Obligor Limit and other prudential considerations.
12. Maximum AfDB participation cannot exceed 33 per cent of total project cost for Greenfield projects; however it can be higher for projects entailing expansion of existing facilities. Minimum AfDB participation usually exceeds US $3 million or equivalent.
13. Evidence of strong integrity, good reputation and adequate financial standing.
14. See Annex 1 for the FAQ.

Application Procedure

To enable the Bank to promptly assess the eligibility of a project for investment, interested enterprises should submit a preliminary application covering in general the following information;

1. Description of project (sector, location, production volumes etc.)
2. The sponsors, including financial and managerial background
3. Cost Estimates; including foreign exchange requirement
4. Financing plan, indicating the amount of ADB financing desired
5. Key Technical and Environmental features
6. Feasibility Indicators
7. Business Climate, Market prospect, including proposed marketing arrangements
8. Implementation Plan, including the status of required licences, permits certificates etc.

Having determined the eligibility of a project financing application, the Bank will initiate a full application review. To facilitate this, the Bank will require the following:

- Feasibility study
- Business plan
- Environmental and social impact assessment (depending on the nature of the project)

Annex S: List of studies and reports

Output	Study, report or activity type	Responsible party
1.2 Support towns and municipalities on the design and development of waste management plans and introduction of MSW disposal/off-taker fees	Review and compile existing data on organic quantity and composition of waste streams for IWM plans for five municipalities and provide recommendations	**Project expert team:** International Waste Management expert National institutional development expert National waste management and biogas expert
	Analysis of "willingness to pay," providing recommendations for changes to local ordinances to include disposal/off-taker fees and recommendations for enforcement frameworks.	**Project expert team:** International Waste Management expert National institutional development expert International biogas and finance expert
1.3 Promotion of MSW biogas technology among municipalities, project developers, industry and the general public	Promotional materials including producing brochures	**Project expert team:** National communications expert
1.4 Integration of MSW-based biogas in national policies, programmes and incentive instruments targeting renewable energy development, environmental protection and climate change mitigation	Design and submit proposals to enhance the regulatory framework to promote increased uptake of IWM and biogas technology	**Project expert team:** International Waste Management expert National institutional development expert
	Review draft National Solid Waste Management Plan and provide updates and recommendations	
2.1 Business models designed for biogas digester systems for a range of plant sizes	Business plans for pilot plants	**Project expert team:** International Waste Management expert National institutional development expert
2.2 Feasibility studies, permitting procedures and final engineering plans executed and formalization of responsibilities of project partners	Feasibility studies, permitting procedures and final engineering plans	**Project expert team:** National Waste and Biogas expert National institutional development expert International biogas and finance expert
2.3 Technical support and training for pilot projects	Manuals and procedures for Training of technical staff	**Biogas plant construction companies:** as part of the contract for construction of the biogas plants (under Output 2.5)
3.2 Mid and long-term strategy for the replication of biogas projects developed and implemented	Biogas strategy and implementation plan	**Project expert team:** National Waste and Biogas expert National institutional development expert International biogas and finance expert
4.2 Guidelines on waste management practices updated, lessons learned and best practices documented and disseminated	Guidelines on waste management practices will be formulated, lessons learned and best practices will be documented	**Project expert team:** National communications expert National Waste and Biogas expert

		National institutional development expert International biogas and finance expert
4.3 Biogas technology for energy generation and lessons learned from pilot projects integrated into the national renewable energy and MEMD programmes, standardized baselines for calculating emission reductions established, and NAMA registered on the UNFCCC NAMA Registry	Design and submit proposals to update and enhance regulatory framework for Biogas technology for energy and integrate lessons learned from pilot projects into the national renewable energy and MEMD programmes	**Project expert team:** National Waste and Biogas expert National institutional development expert International biogas and finance expert
4.4 Annual Project Implementation Reviews	Conduct annual Project Implementation Reviews	**UNDP Country Office**
4.5 Mid Term Review	Conduct Mid Term Review	**Contracted independent consultant**
4.6 Project Terminal Evaluation	Conduct Terminal Evaluation	**Contracted independent consultant**