Technical Assistance Response Plan - Terms of Reference

Country	**Mauritius**
Request ID#	**2020000014**
Title	*Feasibility study of anaerobic digestion of the organic fraction of solid wastes in Mauritius*
THE COUNTRY	Mr. Jogeeswar Seewoobaduth Ag. Director, Department of Environment Ministry of Environment, Solid Waste Management and Climate Change Phone: +230 210 5620, +230 203 62 00 Email:jseewoobaduth@govmu.org
Proponent	Mr. Bhagutsing Beerachee Deputy Director Solid Waste Management Division Ministry of Environment, Solid Waste Management and Climate Change

Summary of Climate Technology Centre and Network (CTCN) technical assistance

The small island developing state (SIDS) Mauritius is facing severe challenges in terms of solid waste management and its heavy dependence on fossil fuels for its energy requirements. With its only existing Mare Chicose landfill being close to saturation, Mauritius needs to identify solutions for its Municipal Solid Waste (MSW) and has identified anaerobic digestion as a promising solution for the organic fraction of the MSW, a process in which biogas as an electricity source and digestates as organic fertilizer can be generated. The treatment of organic waste through anaerobic digestion is considered a highly beneficial alternative instead of disposing organic waste on landfills. This circular economy approach to use organic waste for energy generation results in a reduced usage and reliance of fossil fuels and a reduction of greenhouse gas (GHG) emissions from the use of fossil fuels.

For that purpose, the Climate Technology Centre and Network (CTCN) will support the Solid Waste Management Division under the Ministry of Environment, Solid Waste Management and Climate Change with a study on the technical and economic feasibility of anaerobic digestion of the organic fraction of solid wastes in Mauritius, specifically focusing on waste from markets, households and hotels. The direct outputs of this technical assistance should be a schematic design and concept, a business model and plan for a new biogas plant and a draft proposal for a private-public-partnership (PPP) that lay the foundation for a future implementation phase. Expected long-term effects are the creation of quality employment, the delivery of technology transfer, the improvement of solid waste management and the reduction of GHG emissions in Mauritius, while complying with its nationally determined contributions (NDC) and sustainable development goals (SDGs).

Agreement:

(If possible, please use electronic signatures in Microsoft Word file format)

National Designated Entity to the United Nations Framework Convention on Climate Change (UNFCCC) Technology Mechanism

Name: Mr. Jogeeswar Seewoobaduth
Title:Ag. Director of Environment
Date:10 February 2021
Signature:

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Signature:

Climate Technology Centre and Network (CTCN)

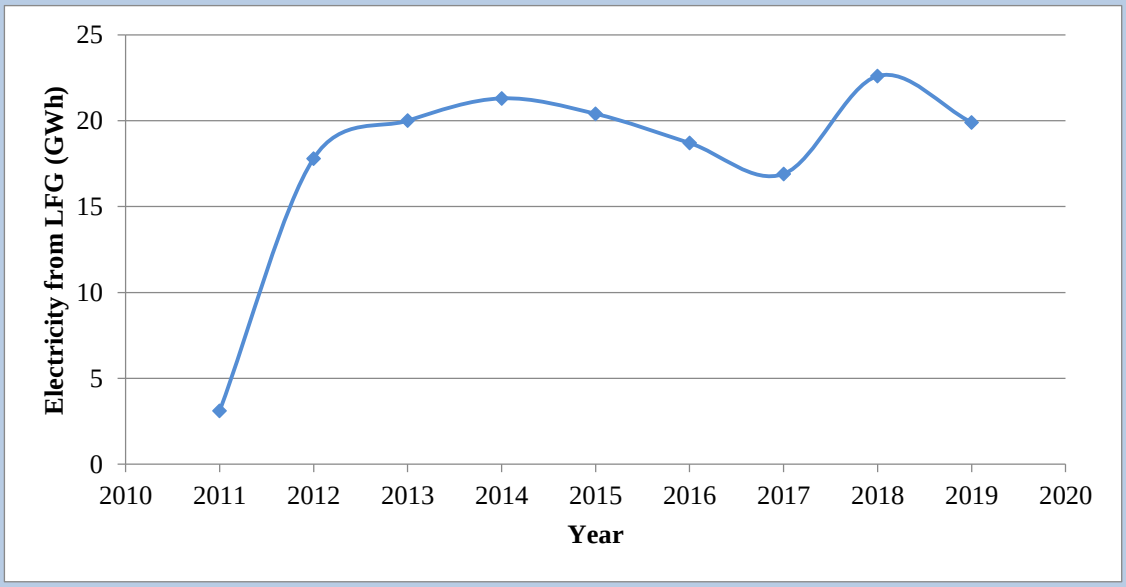
Name: Rose Mwebaza
Title: Director of CTCN
Date: 15-02-2021
Signature:

1. Background and context

Solid waste management is an ever-increasing issue in the small island developing state (SIDS) of Mauritius. Economic growth, urbanization, improvement of living standards, coupled with change in consumption patterns, create an exponential growth in waste generation. Over the past 10 years, solid wastes generation has been increasing at an average annual rate of 2.8%, reaching almost 540,000 tonnes in 2019.

The Mare Chicose Landfill, the sole waste disposal site of Mauritius, is in operation since 1997. In 2019, it received the entirety of solid waste generated, as mentioned above. The landfill is an engineered facility over 50 Ha equipped with a double liner system, efficient leachate and landfill gas (LFG) collection systems to minimize any adverse impacts of solid wastes disposal on the environment. At the initial stages of operation of the Mare Chicose landfill site, the LFG was only flared to reduce its greenhouse gas (GHG) effects. However, since 2011, the LFG is abstracted through a network of horizontal and vertical gas wells and directed to an LFG-to-energy plant, consisting of three engines (1.1 MW each), for combustion and production of electricity. Since 2011, over 160 GWh of electricity has been generated from LFG and injected into the grid network.

Electricity generated from landfill gas (2011 – 2019)



Source: Solid Waste Management Division (SWMD)

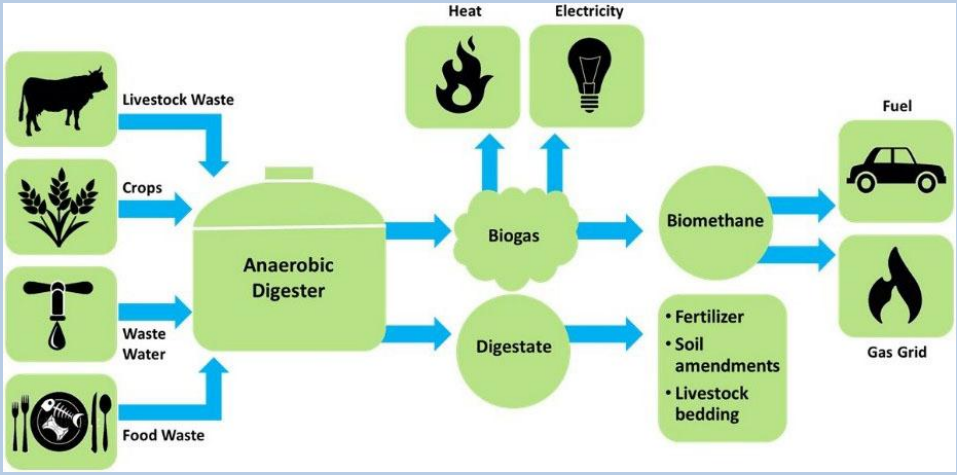
With an anticipated increase in solid wastes generation and considering the limits of the current waste management infrastructure, including the Mare Chicose landfill, Mauritius faces an ongoing problem in terms of solid waste management.

More than 60% of the solid waste in Mauritius is organic waste, mainly coming from households, markets, offices and the agricultural sector. The large quantities of organic waste are rapidly filling up landfills and in the process are also creating methane, an extremely powerful GHG.

Coupled with the issue of solid and organic wastes, Mauritius also faces a heavy dependence on fossil fuels for its energy requirements, with 87% of the total primary energy requirement of Mauritius being met through fossil fuels.

As a SIDS, Mauritius is limited in land resources, implying that continued landfilling is not a viable option for solid waste management (SWM). Wastes that are being disposed of in landfill are not valorized at all and represent a huge loss of materials and resources that could have been reused, recycled or transformed into energy sources so as to enhance the country's energy security. In view of tackling the country's immediate issue regarding the upcoming saturation of its sole sanitary landfill and its reliance on fossil fuels for energy generation, energy recovery from Municipal Solid Waste is seen as a solution to tackle these challenges. In particular, the treatment of organic waste through anaerobic digestion is considered a highly beneficial alternative instead of disposing organic waste on landfills. As part of the digestion process, a digestate is produced and this can be used as organic fertiliser or composted with fresh wastes to produce compost, in line with sustainable agricultural practices. As for the biogas produced from the anaerobic digestion process, this is combusted to produce electricity. The anaerobic digestion process also assists in reduction of GHG emissions through three main ways. Firstly, uncontrolled emission of methane gas from decomposition of organic wastes is prevented since the biogas is properly collected. Secondly, the biogas produced (consisting of methane) is combusted to produce electricity and carbon-dioxide. The lower global warming potential of CO2 as opposed to CH4 further assists in the reduction of the impacts of the emitted GHG. Thirdly, the generation of electricity from biogas assists in the avoidance of GHG emissions from fossil fuels if these were instead used to produce electricity.

Anaerobic digestion process



Source: Sara Tanigawa, Environmental and Energy Study Institute (EESI)

Consequently, implementation of the anaerobic digestion in Mauritius will lead to a cleaner and greener island catering for future generations. This is in line with one of the five pillars of Vision 2030 on Sustainable Development of the Mauritian Government, with the Intended Nationally Determined Contribution submitted by the Republic of Mauritius in 2015 wherein a sustainable and integrated waste management system including waste to energy is listed, and with the Long-Term Energy Strategy plan (LTES) 2016 – 2030 which foresees to integrate 4% of electricity from waste-to-energy technologies in the national grid by 2025.

2. Problem statement

Prior to implementation of the anaerobic digestion technology on large scale, a detailed feasibility study is primordial to investigate its technical and economic viability. The main challenges that Mauritius is facing in that context are the lack of knowledge on the technologies and process linked to anaerobic digestion, the complexity of evaluating the technical and economic viability as well as the design of a robust business model that will be accepted by the market, resulting in a seamless integration into the existing waste and energy infrastructure and energy network with its various stakeholders from the private and public sector.

For that purpose, the Solid Waste Management Division under the Ministry of Environment, Solid Waste Management and Climate Change requires technical assistance in the elaboration of a detailed feasibility study on the technical and economic feasibility of anaerobic digestion of the organic fraction of solid wastes in Mauritius. This study should result in a schematic design and concept as well as a business model for a biogas plant. More specifically, this will include detailed investments costs, operating and maintenance costs, cost-benefit-analyses, design and sizing of the different components of the biogas plant and siting criteria, among other others. Additionally, a draft proposal for a public-private-partnership (PPP) shall be developed as well in order to enable the engagement of the private sector. Besides the feasibility, assistance is also being requested for capacity building and training of staffs of the Solid Waste Management Division in the field of anaerobic digestion.

This circular economy approach to use organic waste for energy generation should result in a reduced usage and reliance of fossil fuels and a reduction of GHG emissions from the use of fossil fuels.

3. **Logical Framework for the CTCN Technical Assistance:** (Proposed start date: 01 March 2021, end date: 31 March 2022)

	Month[1]											
	1	2	3	4	5	6	7	8	9	10	11	12
***Goal**: Feasibility study of anaerobic digestion of the organic fraction of solid wastes in Mauritius*												
***Outcome**: Mauritius has a technical and financial feasibility study at hand*												
Output 1: Development of an implementation plan and communication documents												
Activity 1: *All implementers must undertake the following activities at the beginning and at the end of the CTCN technical assistance.* **Activity 1.1**: Drafting a detailed implementation plan for all activities, deliverables, outputs, deadlines and responsible persons/organizations, including a gender study and an itemized budget for implementing the Response Plan. The detailed implementation plan and budget must be based directly on this Response Plan. **Activity 1.2**: Based on the indicators listed in the Closure and Data Collection Report, drafting a monitoring and evaluation plan with specific, measurable, achievable, relevant and time-bound indicators that can be used to monitor and evaluate the timeliness and appropriateness of implementation. The monitoring and evaluation plan should enable the implementer to complete the CTCN Closure and Data Collection Report at the end of the technical assistance (please refer to Item 1.4 and Section 14 of the Response Plan); **Activity 1.3**: A two-page description of the expected impact of the CTCN technical assistance at the start of the assistance, updated at the end of the technical assistance (a template will be provided). **Activity 1.4**: A CTCN Closure and Data Collection report completed at the end of the technical assistance (a template will be provided).												

[1] The project timeline can be adjusted according to the level of development of the participating country.

Deliverable 1:												
1.1 Implementation plan	X											
1.2 Monitoring and evaluation plan	X											
1.3 Impact description document (initial and final version)	X											X
1.4 Closure and Data Collection Report												X
Output 2: Status quo and baseline analysis of organic waste												
Activity 2.1: Kick-off meeting for the presentation of the technical assistance with the different stakeholders Present the technical assistance plan (Deliverable 1.1). Collect information on current situation of organic waste management in Mauritius. Map relevant stakeholders and identify data sources.												
Activity 2.2: Analysis of the current value chain for organic waste across collection, transport, treatment and disposal Analyse the current value chain for organic waste across collection, transportation, treatment and disposal. This analysis should provide clarity as to where organic waste is generated and disposed as of now and what collection and transportation infrastructure is existing. Include a gender and youth perspective in the analysis of the current value chain.												
Activity 2.3: Baseline analysis of the organic waste from markets, household and hotels including waste composition, characterization and quantification Establish a baseline for organic waste in Mauritius that provides information on the composition, characterization and quantification of waste, and more specifically the organic portion. The analysis should result information on the moisture content, total solid (TS), and volatile solid (VS). For the purpose of establishing this analysis, available secondary data should be used and complemented with primary data through waste sampling. This technical assistance sets a specific focus on organic waste from markets, households and hotels.												
Deliverable 2: 2.1 Meeting report. 2.2 Organic Waste Value Chain Report 2.3 Baseline Analysis of Organic Waste including composition, characterization and quantification		X	X X									
Output 3: Anaerobic digestion analysis including quantification of biogas / methane and energy production potential												

Activity 3.1: Quantification of biogas and energy production potential Based on the quantity, composition and character of organic waste collected, calculate the biogas and energy production through the anaerobic digestion process. Take into account the biogas yield, biogas turbine generator efficiency, biogas energy density as well as operational parameters such as temperature, carbon to nitrogen ratio (C:N), organic loading rate (OLR), hydraulic retention time (HRT) and mixing.												
Activity 3.2: Identification, quantification and valorisation of by- products Identify any side products that are generated during the anaerobic digestion process. Quantify and valorise them if any usage is possible.												
Deliverable 3: 3.1: Report on the biogas and energy production potential. 3.2: Overview of side products and their utility				X	X							
Output 4: Identification of best available and appropriate technologies and of suitable sites												
Activity 4.1: Identification of appropriate technologies and processes for anaerobic digestion Based on the limitations with regards to waste composition, character and volume, as well as the expected final result of electricity generation (or other application if previously identified), identify appropriate technologies and processes for anaerobic digestion in Mauritius. For that purpose, the following elements should be taken into account: • Stages: One-stage continuous process, multi-stage continuous process, batch process, etc. • Type of digestion / fermentation: Dry or wet digestion • Size of anaerobic digester • Biogas storage: Low-, medium, or high-pressure storage system Manufacturers should be identified along the identification and prioritization of technologies and processes. An overview on the technology options with type, efficiency and estimated cost should be prepared.												
Activity 4.2: Identification of suitable site for the biogas plant Together with the NDE project proponent and relevant other stakeholders, identify suitable site options for the												

eventual commissioning of the biogas plant based on on-site investigations and basic parameters such as accessibility, space required, waste supply and connection to grid network.												
Activity 4.3: Stakeholder meeting on identified technologies and sites Throughout a stakeholder meeting, the prioritized technologies and sites should be presented and a selection should be made together with the NDE, project proponent and other relevant stakeholders.												
Deliverable 4: 4.1: Overview on identified technologies and processes 4.2: Overview on identified sites 4.3: Meeting report including selected technology and site						X X X						
Output 5: Schematic design of the biogas plant												
Activity 5.1: Development of a schematic design and inventory of the biogas plant Develop a schematic design of the biogas plan based on the selected technologies and processes for anaerobic digestion as well as the calculated biogas and energy potential. This schematic design should incorporate a material and energy flow diagram. The schematic design should be complemented by an inventory on the equipment, building and logistics infrastructure, and any other elements.												
Activity 5.2: Considerations for the integration into the existing value and supply chain Beyond the biogas plant, requirements and opportunities for the integration into the existing value / supply chain should be evaluated, based on the value and supply chain analysis under Activity 2.2. Please consider any implications, requirements and opportunities related to gender and youth.												
Deliverables 5: 5.1: Schematic design and inventory 5.2: Overview on integration requirements and opportunities into existing value and supply chain								X X				
Output 6: Cost and revenue analysis and development of business model												
Activity 6.1: Cost analysis The cost analysis to be developed is structured as follows:												

(1) Determine the total capital investment, including equipment, installation, piping, land, building and logistics infrastructure and service facilities. (2) Evaluate the operation and maintenance costs, including transportation (3) Estimate the costs per unit of electricity												
Activity 6.2: Revenue analysis Analyse the revenue potential of the biogas plant considering various revenue streams, including the electricity sold to the grid, tipping fee for each ton of waste processed, side products such as compost and opportunities linked to carbon credits.												
Activity 6.3: Development of a cost-benefit analysis Based on the previous cost and revenue analysis, a cost-benefit analysis should be conducted that will include the calculation of the net present value (NPV), the internal rate of return (IRR), and the pay-back period (PB). Furthermore, a sensitivity analysis of NPV should be conducted based on factors such as the different revenue streams, fuel price change, price of gate fee, change of capital cost, change in interest rate, change in price of emission or change in TS content of organic waste.												
Activity 6.4: Development of a business model Using the input of the cost-benefit analysis, a business model for the biogas plant should be developed providing a detailed overview of activities, value creation processes, as well as the selected and financially viable revenue model.												
Deliverables 6: 6.1: Cost Analysis 6.2: Revenue Analysis 6.3: Cost-Benefit Analysis 6.4: Business Model								X 	 X X X			
Output 7: Development of an implementation plan including a preliminary proposal for a Public-Private-Partnership												
Activity 7.1: Development of an implementation plan Develop an implementation plan including an overview on activities, infrastructure, business model, required investment, timeline and stakeholder responsibilities.												

Activity 7.2: Development of a preliminary proposal for a PPP Based on the business model and implementation plan, develop a preliminary proposal for a Public-Private-Partnership. Frame the general arrangements through interviews with relevant stakeholders.												
Activity 7.3: Capacity building on anaerobic digestion Provide a capacity building and training on anaerobic digestion to relevant national stakeholders, including the Solid Waste Management Division of the Ministry of Environment, Solid Waste Management and other relevant institutions required.												
Activity 7.4: Closure meeting In a closure meeting with the NDE, project proponent and other relevant stakeholders, provide a summary of the technical and economic feasibility study as well as the business model, implementation plan and draft PPP.												
Deliverables 7: 7.1: Implementation plan 7.2: Draft PPP Proposal 7.3: Capacity building material and report 7.4: Meeting Report										X 	 X X X	

4 Resources required and itemized budget:

Provide an <u>indicative summary</u> of the necessary resources and detailed budget required to implement the technical assistance of the CTCN, including monitoring and evaluation activities, with the help of the following table. It is important to note that a minimum of 1 per cent of the budget must be explicitly aimed atgender-specific activities related to technical assistance (see Section 10 for more information on gender). Once the response plan is completed, the Climate Technology Centre (CTC) will select the implementers responsible for implementing the response. *The CTCN and the chosen lead implementer will need to agree on a detailed activity-based budget.*

Activities and Outputs	**Input: Human resources** *(Title, role, estimated number of days)* *NB: the names indicated below will be*	**Input: Travel** *(Purpose, national vs. international, number of days)*	**Inputs: Meetings and events** *(Meeting title, number of participants, number of days)*	**Input: Equipment and resources** *(Item, purpose, buy/rent, quantity)*	**Estimated cost (US $)** *Please indicate the cumulative cost of the activities and outputs and provide an estimated cost range for each activity and the entire*

					Response Plan.	
	those of lead team members				**Minimum**	**Maximum**
Planning and preparation (CSIR)	*CSIR internal engagements*				*3,600*	*4,140*
Output 1: Development of an implementation plan and communication documents	*Dr Oscar Mokotedi (preliminary)*				*5,500*	*6,325*
Output 2: Status quo and baseline analysis of organic waste	*Dr Njabulo Siyakhatshana (preliminary)*	*Local travel(if COVID-19 regulations permit) (5 days)*	*Virtual Kick-off meeting* *Online or in-person meetings and expert interviews* *Waste sampling*	*Waste sampling equipment*	*10,000*	*11,500*
Output 3: Anaerobic digestion analysis including quantification of biogas / methane and energy production potential	*Dr Shingi Mutanga (preliminary)*				*13,500*	*15,525*
Output 4: Identification of best available and appropriate technologies and of suitable sites	*Mr Stanley Semelane (preliminary)*	*Local travel(if COVID-19 regulations permit) (2 days)*	*Site visits (if COVID-19 regulations permit)*		*16,000*	*18,400*
Output 5: Schematic	*Prof. William Stafford*				*13,000*	*14,950*

design of the biogas plant	*(40 days)(preliminary)*					
Output 6: Cost and revenue analysis and development of business model	*Mr Stanley Semelane (preliminary)*				*18,000*	*20,700*
Output 7: Development of an implementation plan including a preliminary proposal for a Public-Private-Partnership	*Dr Shingi Mutanga (preliminary)*	*Local travel (if COVID-19 regulations permit) (2 days)* *International travel (if COVID-19 regulations permit) (2 days)*	*Virtual or in-person consultatations for PPP proposals* *Virtual or in-person closure meeting*		*30,000*	*34,500*
Estimated cost range for the entire Response Plan (US$)					***109,600***	***126,040***

5 Profile and experience of experts

Experts required	Brief description of required profile
International Consultant (IC1) – Commercial engineer, team leader	Economist or commercial engineer, M.Sc., with experience in the development of economic feasibility studies, knowledge and experience in the waste and energy sector, as well as with project management, technological innovation, industry 4.0, climate change, SDGs and NDC with a minimum of seven years of experience. Fluency in English is required.
International Consultant (IC2) – Waste management engineer	Industrial, chemical, environmental or mechanical engineer, M.Sc., with specialisation in the waste sector, knowledge and experience with anaerobic digestion, biogas and waste-to-energy, waste quantification and characterisation, technological innovation, industry 4.0, climate change, SDGs and NDC with a minimum of seven years of experience. Fluency in English is required.
National Consultant 1 (NC1) – Waste management engineer	Industrial, chemical, environmental or mechanical engineer, M.Sc., with specialisation in the waste sector, knowledge and experience with waste-to-energy, waste quantification and characterisation, technological innovation, industry 4.0, climate change, SDGs and NDC with a minimum of seven years of experience. Knowledge of the waste sector in Mauritius is highly required. Fluency in English is required.

National Consultant 2 (NC2) – Local policy expert	Economist or policy expert with experience in the evaluation and development of industrial and environmental policies (technological innovation, waste management, climate change, NDCs, public-private-partnerships, etc.), with a minimum of seven years of experience. Experience working in Mauritius is highly required. Fluency in English is required.
National Consultant 3 (NC3) – Gender expert	Social science professional (sociologist, anthropologist or psychologist) expert in gender studies and management of equality policies, with experience in research methodologies and data processing, with a minimum of seven years of experience. Experience working in Mauritius. Fluency in English is required.

6 Intended contribution to the expected impact of the technical assistance

The products developed under output 6 and 7 will allow Mauritius to take informed and targeted decisions in the context of the implementation of a waste-to-energy biogas plant. In particular the design of the process flow diagram, the economic analysis (cost-benefit), the resulting recommended business model as well as the implementation plan and draft PPP proposal are expectedto be of significant help for a successful implementation of a biogas plant. Furthermore, considerations with regards to the integration in the existing waste management infrastructure as well as the identification of gender and youth benefits will help Mauritius to guarantee technology acceptance, and to implement the biogas plant in an effective and environmentally as well as socially conscious manner.

7 Relevance to NDCs and other national priorities

Within its Nationally Determined Contributions submitted to the UNFCCC in 2015, the Government of Mauritius foresees the transition to a sustainable and integrated waste management making a specific reference to waste-to-energy concepts (p.2). The Technology Needs Assessment that was elaborated in 2012 lists biogas from anaerobic digestion as an identified mitigation option in the energy industry sector.

8 Links to relevant parallel activities:

To date, the Mare Chicose Landfill is the only waste disposal site in Mauritius in operation since 1997. Several studies have been conducted with regards to the waste situation in Mauritius. A 2012 master thesis from KTH Stockholm Sweden, with support from the Livestock division of the Agricultural Research and Extension Unit (AREU) in Mauritius has evaluated the feasibility of stand-alone small-scale digestion systems to produce biogas for local use. A 2019 research paper entitled “Energy recovery from municipal solid waste in Mauritius: Opportunities and challenges” by researchers from the Department of Chemical and Environmental Engineering of the University of Mauritius as well as the Ecological Living in Action Ltd. has evaluated the viability of different energy recovery options for the local context. However, no directly linked activities are ongoing at this moment of time.

Different ongoing projects focus on other waste streams. As such, a project funded by the Agence Française de Développement (AFD) is focusing on the development of a circular economy in solid waste management through reduction, recycling and reuse of solid waste. A regional project entitled “ExPLOI” and funded through the Fonds Français pour l’Environnement (FFEM) of the AFD focuses on reducing plastic pollution in countries situated in the South-West of the Indian Ocean. Linked to this, a project including specifically the Islands of the South-West Indian Ocean focuses on ocean pollution through PET, oil, tyres and batteries. Another FFEM supported project aims to build circularity in the plastics economy of Mauritius.

Finally, two projects are currently at a draft or submission stage. These include a GEF application (GEF-7 Islands) on “Conducting a supply chain analysis for single use plastic packaging and plastic bags and making recommendations for further phase-out of their use” as well as a project funded under the Small Grants Programme as part of BRS-Norad-2 entitled “Developing a regional strategy towards the environmentally sound management and controlled transboundary movement of plastic

waste in the SADC region and strengthening regional capacity".

9 Anticipated follow-up activities after this technical assistance is completed:

As a result of this technical assistance, various follow-up activities are anticipated: (1) Establishment of a Public-Private-Partnership for the setup and operation of the biogas plant (2) Setup of the biogas plant (3) Improvement of the waste management infrastructure for an optimal utilization of the new biogas plant (4) GCF Readiness project to scale up interventions on valorisation of organic waste products

10 Benefits in terms of gender and co-benefits:

Imbedded into the design of the activities:	Along the implementation of the activities under this technical assistance, a gender expert will analyse the role of women and youth within the current organic waste supply chain, integrate gender and youth related factors into the decision making process for the biogas plant that is to be built and identify requirements and opportunities for women and youth that arise with the new biogas plant.
Gender and co-benefits of the activities:	Gender and co-benefit swill be in line with the aspiration of Mauritius as communicated in the country's Nationally Determined Contributions and other key strategic policy documents, as well as the results of the analyses, requirements and targeted benefits for gender and youth that arose from the workof the gender expert during the execution of the technical assistance. Further co-benefits linked to the establishment of a waste-to-energy biogas plant in Mauritius are related to improved health, reduced environmental degradation, the generation of employment and economic benefits. Inappropriate management organic waste can cause the contamination of the environment and groundwater, leading to health challenges. Besides the environmental and health benefits of a biogas plant, using organic waste in an appropriate and circular manner brings along economic benefits, reduces the dependency on fossil fuels, thus reducing greenhouse gas emissions, and creates employment.

11 Main national stakeholders in the implementation of the technical assistance activities:

National Stakeholder	**Function in the implementation of the technical assistance**

Project Proponent Solid Waste Management Division, Ministry of Environment, Solid Waste Management and Climate Change	Project proponent, provision of documents and data, support of coordination, stakeholder meetings, site visits, etc.
National Designated Entity Ministry of Environment, Solid Waste Management and Climate Change	National designated entity, support of coordination efforts and administrative matters
Central Electricity Board	Beneficiary upon implementation (energy generation)
Hotel Industry	Beneficiary upon implementation (organic waste disposal), facilitation of waste sampling
Households	Beneficiary upon implementation (organic waste disposal), facilitation of waste sampling
Markets	Beneficiary upon implementation (organic waste disposal), facilitation of waste sampling
Local authorities and communities	Facilitation of site visits

12 Contribution to the SDGs:

Goal:	Sustainable Development Goal	Direct contribution from CTCN TA
1	End poverty in all its forms everywhere	
2	End hunger, achieve food security and improved nutrition, and promote sustainable agriculture	
3	Ensure healthy lives and promote well-being for all at all ages	
4	Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all	
5	Achieve gender equality and empower all women and girls	
6	Ensure availability and sustainable management of water and sanitation for all	
7	Ensure access to affordable, reliable, sustainable, and modern energy for all (consider adding targets for 7)	
	7.1 - By 2030, ensure universal access to affordable, reliable and modern energy services	
	7.2 - By 2030, increase substantially the share of renewable energy in the global energy mix	The implementation of a waste-to-energy biogas plant contributes to the reduction of the reliance on fossil fuels for energy generation in Mauritius. This contributes to the goal to increase substantially the

		share of renewable energy in the energy mix.
	7.3 - By 2030, double the global rate of improvement in energy efficiency	
	7.a - By 2030, enhance international cooperation to facilitate access to clean energy research and technology, including renewable energy, energy efficiency and advanced and cleaner fossil-fuel technology, and promote investment in energy infrastructure and clean energy technology	
	7.b - By 2030, expand infrastructure and upgrade technology for supplying modern and sustainable energy services for all in developing countries, in particular least developed countries, small island developing States, and land-locked developing countries, in accordance with their respective programmes of support	The implementation of a biogas plant expands and upgrades the energy infrastructure of the small island developing State of Mauritius.
8	Promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all	
9	Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation	
10	Reduce inequality within and among countries	
11	Make cities and human settlements inclusive, safe, resilient and sustainable	
12	Ensure sustainable consumption and production patterns	As a circular economy concept, using organic waste for energy generation is directly related to SDG 12, promoting sustainable consumption through an improved waste value chain.
13	Take urgent action to combat climate change and its impacts	*All technical assistance should indicate relevance to SDG 13 and at least one of the following targets (13.1 to 13.b).*
	13.1 - Strengthen resilience and adaptive capacity to climate-related hazards and natural disasters in all countries	
	13.2 - Integrate climate change measures into national policies, strategies and planning	
	13.3 - Improve education, awareness-raising and human and institutional capacity on climate change mitigation, adaptation, impact reduction and early warning	
	13.a - Implement the commitment undertaken by developed-country parties to the United Nations Framework Convention on Climate Change to a goal of mobilizing jointly $100 billion annually by 2020 from all sources to address the needs of developing countries in the context of meaningful mitigation actions and transparency on implementation and fully operationalize the Green Climate Fund through	

	its capitalization as soon as possible	
	13.b - Promote mechanisms for raising capacity for effective climate change-related planning and management in least developed countries and small island developing States, including focusing on women, youth and local and marginalized communities	
14	Conserve and sustainably use the oceans, seas and marine resources for sustainable development	
15	Protect, restore and promote sustainable use of terrestrial ecosystems, sustainably manage forests, combat desertification, and halt and reverse land degradation and halt biodiversity loss	
16	Promote peaceful and inclusive societies for sustainable development, provide access to justice for all and build effective, accountable and inclusive institutions at all levels	
17	Strengthen the means of implementation and revitalize the global partnership for sustainable development	

13 Classification of technical assistance:

Please tick the relevant boxes below	Primary	Secondary
☐ 1. Decision-making tools and/or information provision	X	
☐ 2. Sectoral roadmaps and strategies	X	
☐ 3. Recommendations for legal reforms, policies and regulations		X
☐ 4. Financing facilitation		
☐ 5. Private sector engagement and market creation	X	
☐ 6. Research and development of new technologies		
☐ 7. Feasibility of technology options	X	
☐ 8. Piloting and deployment of technologies in local conditions		
☐ 9. Technology identification and prioritization		X

Please note that all CTCN technical assistance contributes to strengthening the capacity of in-country actors.

14 Monitoring and evaluation process

Upon contracting the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance.This monitoring and evaluation plan must include specific, measurable, achievable, relevant, and time-bound indicators that will be used to monitor and evaluate the timeliness and appropriateness of the implementation.The CTCN Technology Manager responsible for the technical assistance will monitor the timeliness and appropriateness of the Response Plan implementation.Upon completion of all activities and outputs, evaluation forms will be completed by (i) Mauritius on overall satisfaction level with the technical assistance service provided;(ii) the Lead Implementer on the experience and knowledge gained through the technical assistance;and (iii) the CTCN Director on the timeliness and appropriateness of the activities and outputs.