CTCN
CLIMATE TECHNOLOGY CENTRE & NETWORK

CTCN Technical Assistance
Request Submission Form

Guidelines:

- This Request Submission Form should be completed by the organisation requesting technical assistance from the Climate Technology Centre & Network (CTCN) in collaboration with the National Designated Entity (NDE) of the country in question
- The Form must be signed by the NDE. Please see updated contact list of NDEs here: http://unfccc.int/ttclear/support/national-designated-entity.html
- The Form can be submitted as a Word file containing a digital signature or as a signed and scanned PDF file in combination with an un-signed Word file
- For requests submitted by multiple countries, all the NDEs of the respective countries shall sign identical Forms before official submission to the CTCN
- NDEs have the opportunity to submit CTCN requests in collaboration with National Designated Authorities (NDAs) for the Green Climate Fund (GCF) if targeting the GCF Readiness Programme.

Requesting country or countries:	Mauritius
Request title:	**Feasibility study of anaerobic digestion of the organic fraction of solid wastes in Mauritius**
NDE	Ministry of Environment, Solid Waste Management and Climate Change Mr. Jogeeswar Seewoobaduth Position: Ag. Director, Department of Environment Phone: +230 210 56 20, +230 203 62 00 Emails:jseewoobaduth@govmu.org
Request Applicant:	Mr. Prakash Kowlesser Director Solid Waste Management Division Ministry of Environment, Solid Waste Management and Climate Change

Climate objective:

☐ Adaptation to climate change
☒ Mitigation of climate change
☐ Combination of adaptation and mitigation of climate change

Geographical scope:

☐ Community level
☐ Sub-national
☒ National
☐ Multi-country

If the request is at a sub-national or multi-country level, please describe specific geographical areas (provinces, states, countries, regions, etc.).

Problem statement related to climate change (up to one page):

This section should answer the question "what is the problem?" Please summarise the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

Solid waste management is an ever-increasing issue in the small island developing state 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 over 535,000 tonnes in 2019. With an anticipated increase in solid wastes generation and considering limits of the current waste management infrastructure, including the Mare Chicose landfill, Mauritius faces an ongoing problem in terms of solid wastes 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 greenhouse gas (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.

The treatment of organic waste through anaerobic digestion is considered a highly beneficial alternative instead of disposing organic waste on landfills. In line with the Nationally Determined Contribution (NDC) of Mauritius to focus on waste to energy, the anaerobic digestion process produces biogas that is combusted to produce electricity. Thereby, the anaerobic digestion process leads to a reduction of GHG emissions in several ways, including the prevention of uncontrolled emission of methane gas from decomposition of organic wastes, the biogas production combusted to produce electricity, and the related replacement of fossil fuels by biogas.

Past and on-going efforts to address the problem (up to half a page):

This section should answer the question "what has been done or is currently being done to address the problem?" Please describe past and on-going processes, projects or initiatives implemented in the country or region to tackle the climate problem as described above.

The Mare Chicose Landfill, the sole waste disposal site of Mauritius, is in operation since 1997. In 2019, it received nearly 540,000 tonnes of solid waste. The landfill is an engineered facility over 50 Ha, equipped with a double liner system, efficient leachate and landfill gas (LFG) collection systems to minimise 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 effects. However, since 2011, the LFG is abstracted through a network of horizontal and vertical gas wells and directed to a 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.

Other past and ongoing projects focus on other waste streams. As such, an ongoing 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.

Specific technology[1] barriers (up to one page):

This section should answer the questions "what are the technology barriers that hinder national efforts

[1] ***"any equipment, techniques, practical knowledge and skills** needed for reducing greenhouse gas emissions and adapting to climate change" (Special Report on Technology Transfer, IPCC, 2000)*

described above" and "how will the CTCN technical assistance complement these efforts?" Building upon the problem statement and taking into consideration the existing efforts described above, please describe the specific technology barriers encountered by the requesting applicant to identify, assess or deploy climate technology(ies) in an effort to address the problem statement. The described barriers should be within the scope of the requested CTCN technical assistance (described in the section below).

Technology barriers for the implementation of a biogas plant for anaerobic digestion in Mauritius are mainly linked to the complexity of the evaluation of technological and economic feasibility as well as the design of a robust business model that will be accepted by the market, resulting in a lack of financing for this activity from the private sector.

Sectors:

Please indicate the main sectors related to the request:

☐ Coastal zones	☐ Early Warning and Environmental Assessment	☐ Human Health	☐ Infrastructure and Urban planning
☐ Marine and Fisheries	☐ Water	☐ Agriculture	☐ Carbon fixation
☐ Energy Efficiency	☐ Forestry	☐ Industry	☐ Renewable energy
☐ Transport	☒ Waste management		

Please add other relevant sectors:

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

☐ Communication and awareness	☒ Economics and financial decision-making	☒ Governance and planning	☐ Community based
☐ Disaster risk reduction	☐ Ecosystems and biodiversity	☐ Gender	

Technical assistance requested (up to one page):

Founded on the problem statement, past/on-going efforts and technology barriers, please describe the requested technical assistance. The technical assistance should clearly contribute to mitigation or adaptation to climate change as described in the problem statement and contribute to overcome the specific technology barriers.

Objective:
The objective of this initiative is to provide a technical and economic feasibility study for the effective implementation of a biogas plant for anaerobic digestion of the organic fraction of solid wastes in Mauritius. This circular economy approach to use organic waste for energy generation should ultimately result in a reduced usage and reliance of fossil fuels and a reduction of GHG emissions from the reduced use of fossil fuels.

Activities and Methodology:

Activity 1: Baseline analysis of the organic waste from markets, household and hotels including waste characterization and quantification

Activity 2: Analysis of the current value chain for organic waste across collection, transport, treatment and disposal

Activity 3: Quantification of the methane potential of solid wastes to be subjected to the anaerobic digestion process and calculation of capacity requirements

Activity 4: Identification of best available and appropriate technology based on multi-criteria decision analysis

Activity 5: Schematic design of the biogas plant including different unit operations/equipment and infrastructure

Activity 6: Determination of the installation and operational cost of the biogas plant

Activity 7: Estimation of costs per unit of electricity and other revenues of the biogas plant based on electricity sold to the grid, as well as compost, etc.

Activity 8: Development of a business model for the biogas plant, including, transportation modalities, cost-benefit analysis, tipping fee, pay-back period, net present value and internal rate of return

Activity 9: Development of implementation plan including preliminary site identification and PPP proposal

Expected output:

- Report on the quantification of current and future organic waste and its methane potential
- Specifications and design of the biogas plant
- Business model, cost and revenue plan and infrastructural modalities
- Implementation plan with PPP draft proposal

Expected timeframe:

Please indicate the expected duration period for the requested technical assistance. Please note CTCN technical assistance is limited to a maximum duration of 12 months.

12 Months

Anticipated gender and other co-benefits from the technical assistance:

Please describe the activities with gender linkages as well as the anticipated gender and other co-benefits (e.g. biodiversity, economic, social, cultural, etc.) that are likely to be generated as a result of the technical assistance.

The implementation of a biogas plant for anaerobic digestion of the organic fraction of solid waste holds various gender and other co-benefits. Women are an important stakeholder along the waste value chain, for example by participating in waste collection and separation in households and markets. Following the feasibility study for the planned biogas plant, a later preparation of awareness campaigns and capacity building on the value of organic waste should integrate a strong gender perspective. Biogas plants do not only provide more sustainable alternatives to currently used fossil fuels, but also provide additional economic benefits through the production of digestate that can be used as organic fertilizer or composted

with fresh wastes to produce compost for sustainable agricultural practices.

Key stakeholders:

Please list the stakeholders who will be involved in the implementation of the requested CTCN technical assistance and describe their role during the implementation (for example, government agencies and ministries, academic institutions and universities, private sector, community organizations, civil society, etc.).

Stakeholders	Role to support the implementation of the technical assistance
National Designated Entity	NDE Mauritius
Request Applicant	Solid Waste Management Division (SWMD) to spearhead the project locally, facilitate stakeholder meetings and provide any available documentation that may assist in the implementation of the project
Central Electricity Board	Purchase of electricity
Planters	Use of compost/digestate as a soil amendment

Alignment with national priorities (up to 2000 characters including spaces):

Please describe how the technical assistance is consistent with national climate priorities such as: Nationally Determined Contribution, national development plans, poverty reduction plans, technology needs assessments, Low Emission Development Strategies, Nationally Appropriate Mitigation Actions, Technology Action Plans, National Adaptation Plans, sectorial strategies and plans, etc.

Reference document (please include date of document)	**Extract** (please include chapter, page number, etc.).
Nationally Determined Contribution (NDC)	*Direct alignment and contribution to NDC implementation is required for all CTCN technical assistances. Please include a direct reference to the INDC/NDC document (chapter, page number, etc.).* Within its NDC from 2015, the government of Mauritius foresees the sustainable and integrated waste management, including waste to energy (page 2).
Technology Needs Assessment	Within the TNA from 2012, Mauritius listed Biogas from anaerobic digestions as one identified mitigation option in the energy industries sector.
National Adaptation Plans	This project will help to better manage and dispose of solid wastes, hence reducing impacts of inappropriate disposal of solid wastes which can enhance vulnerabilities of ecosystems.
Nationally Appropriate Mitigation Actions	Implementation of a biogas plant for anaerobic digestion will help to reduce the emission of methane which is a potent greenhouse gas.
Add others here as relevant	

Development of the request (up to 2000 characters including spaces):

Please describe how the request was developed at the national level and the process used by the NDE to approve the request before submitting it (who initiated the process, who were the stakeholders involved

and what were their roles?) and describe any consultations or other meetings that took place to develop and select this request, etc.

This technical assistance concept has been developed by the CTCN. In line with its commitments to the COP and also the recipient countries to develop a workplan for future activities which also encourages a regional approach to technical assistance. In line with this approach, the concept, CTCN selected (five) countries who share the common strategies of developing advancing Circular Economy roadmaps for abating GHG emissions from the Waste Sector.

Background documents and other information relevant for the request:

- Please list all relevant documents that will help the CTCN analyse the context of the request and national priorities. Please note that all documents listed/provided should be mentioned in this request in the relevant section(s), and that their linkages with the request should be clearly indicated. For each document, please provide web-links (if available) or attach to the submission form. Please add any other relevant information as required.
- Please indicate if this request has been developed with the support of the CTCN Request Incubator.

National Determined Contributions (2015): https://www.ctc-n.org/sites/d8uat.ctc-n.org/files/UNFCCC_docs/final_indc_for_mauritius_28_sept_2015.pdf

Technology Needs Assessment (2012): https://tech-action.unepdtu.org/wp-content/uploads/sites/2/2014/02/tna-report-mauritius.pdf

OPTIONAL: Linkages to Green Climate Fund Readiness and Preparatory Support

The CTCN is collaborating with the GCF in order to facilitate access to environmentally sound technologies that address climate change and its effects, including through the provision of readiness and preparatory support delivered directly to countries through their GCF NDA. These actions are in line with the guidance of the GCF Board (Decision B.14/02) and the UNFCCC, particularly paragraphs 4 and 7 of 14/CP.22 that addresses Linkages between the Technology and the Financial Mechanisms[2].

The CTCN is therefore implementing some of its technical assistance using GCF readiness funds accessed via the country's NDA. Any application for GCF support, including the amount of support provided, is subject to the terms and conditions of the GCF and should be developed in conjunction with the NDA.

Please indicate whether this request has been identified as preliminarily eligible by the NDA to be considered for readiness support from the GCF.

☐ Initial engagement: The GCF NDA of the requesting country has been engaged in the design of this request and the NDA will be involved in the further process leading to an official agreement for accessing GCF readiness support.

☐ Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating

[2] Please see: https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

Signature:

Monitoring and impact of the assistance:

By signing this request, I affirm that processes are in place in the country to monitor and evaluate the technical assistance provided by the CTCN. I understand that these processes will be explicitly identified in the CTCN Response Plan and that they will be used in the country to monitor the implementation of the technical assistance following standard CTCN procedures.
I understand that, after the completion of the requested assistance, I shall support CTCN efforts to measure the success and effects of the support provided, including its short, medium and long-term impacts in the country.

Signature:

NDE name: Mr. Jogeeswar Seewoobaduth

Date: 18 Jan 2021

Signature:

THE COMPLETED FORM SHALL BE SENT TO THE CTCN@UNEP.ORG

The CTCN is available to answer all questions and provide guidance on the application process.