

Country	Viet Nam
Request ID#	
Title	<i>Technical Capacity Enhancement to Promote Waste-to-Energy Technology in Viet Nam</i>
NDE	<p><i>Pham Van Tan (Mr.)</i></p> <p><i>Deputy Director General, Department of Climate Change (DCC), Ministry of Natural Resources and Environment (MONRE)</i></p> <p><i>Phone: +84-4-37955116, +84-4-37759770 / Emails: pvtan11@gmail.com</i></p>
Proponent	<p><i>Nguyen Thanh Yen (Mr.)</i></p> <p><i>Deputy of Waste Management Department (WMD), Vietnam Environment Administration (VEA), Ministry of Natural Resources and Environment (MONRE)</i></p> <p><i>Email: ngthanhyen@gmail.com / Mobile: (+84) 912 444 401</i></p>

Summary of the CTCN technical assistance

The summary should provide a brief description of the problem (barrier to climate technology deployment) and how the technical assistance will address it (brief summary of outputs and activities). Please also briefly indicate national actors involved and the anticipated timeline. Please note this summary will be used for public communication purposes so it is important that it is well written. (maximum 1250 characters including spaces)

Owing to its rapid growth of population and economy in particular in urban areas, Viet Nam is getting suffered from the increased amount of municipal solid waste (MSW), and has challenges to manage adequately them. Indeed, the “National Environmental Status Report 2019 – solid waste management (SWM) subject” estimates the amount of urban domestic solid waste (DSW) in Viet Nam to increases to 35,624 t/day in 2019, compared to 32,000 t/day in 2014.

The conventional waste disposal practices are in general ‘open dumping’ to final disposal sites where MSW delivered are to be landfilled. Such landfilling practices are still seen in many places not only in Viet Nam but in a lot of different developing countries. The increased MSW generation due to population and economic growth would cause shortening the lifetime of existing landfill sites, and now the MSW appropriate management including 3R (Reduce, Reuse, Recycle) become one of key issues.

With this background situation, Viet Nam is interested in the Waste-to-Energy (WtE) technology with waste incineration process, which would achieve the decreased volume of wastes delivered to the final landfill disposal sites, and the thermal recycle technology to supply energy such as

electricity.

In the context of climate change, Viet Nam has recognized the waste management sector as one of key areas for climate change mitigation measures. In Vietnamese Nationally Determined Contribution (NDC), one of measures to achieve its GHG emissions mitigation targets is described as “Utilize landfill gas and solid waste combustion for power generation”. The conventional waste treatment practice of open dumping into landfill sites is one of major GHG emission sources because the decomposition of organic waste generates methane gas (CH₄) whose GWP is 25 times to CO₂ GWP. When the WtE technology is introduced and deployed in Viet Nam, the multi-benefits are achieved: GHG emission reduction, prolonged lifetime of final waste disposal sites, avoidance of odor and insect problems nearby landfill sites, and energy security. The WtE technology is desired in Viet Nam.

However, such desirable technology of the WtE technology has not been deployed in Viet Nam so far. One of the reasons is the lack of technology evaluation capacity, expertise and experiences. The Vietnam Environmental Administration (VEA) of the Ministry of Natural Resources and Environment (MONRE) is in charge of the policy and regulation development, and of the direction of implementers including local governments. In December 2020, the Law on Environmental Protection was amended, and its Article 78 Clause 5 provides that the Minister of MONRE promulgates the criteria for technology of domestic solid waste treatment, and guides the model of urban and rural domestic solid waste treatment. In this context, MONRE-VEA has to develop the criteria for waste treatment technologies one of which should be the WtE technology, within one year, but they need external supports due to the lack of their expertise and experiences.

As such, guidance and assistance from CTCN to develop technology evaluation criteria, which will guide the MONRE-VEA and other concerned entities including local governments (People’s Committee of cities and/or provinces) on how to apply the criteria to any model projects of WtE in order to disseminate the WtE technology introduction through widely sharing of the experiences of the criteria applications practices.

Agreement:

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

**National Designated Entity to the UNFCCC
Technical Mechanism**

Name: Pham Van Tan

Title: Deputy Director General, Department of
Climate Change, Ministry of Natural
Resources and Environment of Viet Nam

Date: 16 July 2021

Signature



Proponent (signature of the Proponent is optional)

Name: Nguyen Thanh Yen

Title: Deputy of Waste Management Department (WAMA), Vietnam Environment Administration (VEA), Ministry of Natural Resources and Environment (MONRE)

Date: 02/07/2021

Signature:



UNFCCC Climate Technology Centre and Network (CTCN)

Name: Rose Mwebaza

Title: CTCN Director

Date: 22.07.2021

Signature:



Background and context

Please provide a brief description of the background and context for the CTCN Response Plan. Please indicate national and sectoral information using recognized and publicly available sources. (Maximum 2500 characters including spaces).

The amount of solid waste generation in Viet Nam has sharply increased in line with its rapid economic growth and urbanization accompanied with population growth. The domestic solid waste (DSW), composed of organic matters, which shares large portion of generated solid waste in Viet Nam, has been one of substantial GHG emission sources. That is, organic components of solid wastes to be open dumped to landfill sites are decayed to generate methane gas (CH₄) whose global warming potential (GWP) is 25. Since such landfill open dumping treatment has still been dominant in Viet Nam, the waste sector is identified as one of the target areas to be addressed in terms of climate change mitigation. Furthermore, the increased waste has been the emergent issue because citizens and households as well as daily-life services (such as restaurants, shops, etc.) and industries generate solid waste every day, and the generated waste should be treated and/or disposed. If solid waste is delivered to landfill sites and dumped there, the capacity of landfill sites is expected to be filled up. In this context, the minimization of the amount of solid waste is also pursued.

The amount of DSW in Viet Nam has increased by 46 percent from 2010 to 2019, that is, from 44kt/day in 2010 to 64kt/day in 2019. The majority of DSW is produced in urban areas (35kt/day), while rural areas only release about 28kt/day. DSW generation is significantly higher in localities with high urbanization and industrialization rates, like Hanoi at 6,500t/day and HCMC at 9,400t/day. When it comes to the amount of DSW released per capita, Hanoi records 0.81kg/day/person, while HCMC records 1.05kg/day/person.

Regarding the treatment methods, 71% of collected DSW is buried (landfilled), 16% is turned into compost, while 13% is burned (incinerated). While burial remains the dominant method of waste treatment, there has been a shift to incineration in recent years.

Accordingly, the Vietnamese National Strategy for Integrated Management of Solid Waste to 2025, with a vision to 2050 was approved in 2009, to set a target that is “85% of the total generated urban domestic solid waste is collected and treated in an environmentally manner, of which 60% is recycled, reused, energy recovered or organic fertilizer is produced.”

In addition, the bilateral environmental policy dialogues between Viet Nam and Japan was held to cover important environmental issues such as “solid waste management”. The 4th dialogue held in March 2018 agreed to establish a joint committee on solid waste management, where ministries, agencies and city governments participate to build waste management projects. The joint committee was convened in February 2020 and concluded to promote the waste incineration practices in Viet Nam under the cooperative framework.

Incineration of solid waste can not only contribute to the minimization of the waste amount, but to

mitigate GHG emissions by avoidance of methane release into the atmosphere. In addition, high-temperature exhaust gas from the incinerator can be utilized for electricity generation through steam turbines to replace the fossil fuel-based grid electricity. This can also contribute to the GHG mitigation as well as to the energy security in the country.

1. Problem statement

Founded on the national and sectoral context as detailed in the section above, please include a brief problem statement clarifying the main problem and barriers for climate change mitigation and/or adaptation in terms of climate technologies that the CTCN Response Plan will address and overcome. (Maximum 1250 characters including spaces).

As Viet Nam has been facing the difficulties about its solid waste treatment in terms of both the reduction of the amount and the mitigation of GHG (methane) emission. The waste-to-energy (WtE) technology with controlled incineration process is one of the best suitable technologies to address the both challenges, that is, to reduce the amount of the waste to be finally landfilled and to avoid the methane release into the atmosphere from existing landfill sites. However, as seen in 1990s in developed countries, waste incineration process with insufficient temperature had released the harmful exhaust gas containing dioxin. Other emissions including substances contained in incineration exhaust gas should be minimized not to cause environmental pollutions. In order to ensure to avoid such environmental pollutant emissions from the waste incineration process, both the regulations and the practices are essential.

In Viet Nam where few precedent waste incinerators with small capacities exist, the technological evaluation capacity and expertise are still lacked. Although the technological and technical assessment and evaluation of the proposed plants are to be undertaken by local municipalities, i.e., Department of Natural Resources and Environment (DONRE) of provinces/cities, local capacity development for the technological assessment and evaluation is also needed.

In November 2019, the revision of the Law on Environmental Protection was approved by Vietnamese National Assembly Nam. The revised law provides that the Minister of Natural Resources and Environment shall promulgate criteria for domestic solid waste treatment technologies. In this regard, the technological criteria for the waste treatment technologies including the WtE technology should be established. However, there are less experiences of the WtE technology application and evaluation, so that Viet Nam needs to be supported to promulgate the effective and appropriate criteria for waste management technology evaluation.

Followed by the criteria establishment, local municipalities' capacities for practical technology assessment and evaluation should also be developed and enhanced, in order to secure the introduction/construction of an appropriate technology without any environmental pollutions. Since such local capacity building activities are provided by experienced trainers with technological expertise.

Therefore, the assistance to be provided to central government (Ministry of Natural Resources and

Environment (MONRE)) for criteria development and to local municipalities (DONREs) for evaluation criteria practices will be needed. This Technical Assistance will focus on the supports to both the MONRE and a DONRE as a model, and lead to the practical application of the WtE technology assessment and evaluation in order to deploy the introduction of the WtE technology with sound incineration plants with no environmental pollution to realize less final waste society in the near future.

<p>public (both central and local governments) and private sector technical knowledge development.</p> <p>One meeting will be organized to kick-start Activity 3. Relevant stakeholders in the country will be invited to join in order for them to contribute to the discussion and provide information required for the technical assistance.</p>											
<p>Activity 2.1: Waste management technology analysis</p> <p>An overview of worldwide best practices and reference to relevant waste management projects will be prepared in order to provide the country with a reference on the current state of the art of the waste management technologies including WtE technology. In this activity pros and cons of various waste management technologies will be identified, with particular attention to WtE technologies. As per WtE technology there are several types of technologies and applications to generate energy in form of electricity and/or heat. Types of WtE technologies will be categorized, and effects of each type of the technology will be identified, taking into account the applications. Prerequisite for the appropriate solid waste management and treatment will also be identified.</p>											
<p>Activity 2.2: Waste management assessment in Viet Nam</p> <p>An analysis of the waste generation of the country should be conducted to assess the potential of WtE technology introduction and application and to prepare the appropriate technological criteria to be applied for the evaluation and assessment of the proposed projects.</p> <p>Detailed and updated data and information on the current solid waste generation and management methods should be supplied by NDE and request proponent (MONRE-VEA).</p> <p>Vietnamese environmental policy including waste management policy is currently at the turning point when its Law on Environmental Protection has just been revised. In terms of solid waste management, suitable technology application along with local circumstances is sought so that the technology evaluation criteria should be prepared by the Minister of Natural Resources and Environment of Viet Nam. The final report of the country assessment will represent a detailed blueprint of the country waste management practice as a scenario that will be taken as a reference for the elaboration of the technological criteria</p>											

(Output 3).																			
Activity 2.3: Online meeting to present the waste management technology analysis																			
The outcomes of the waste management technology analysis will be presented to NDE, the request proponent and other selected local governments in order to enhance the knowledge. CTCN web platform can be used to host the meeting.																			
Deliverable 2.1: Country assessment report																			
<i>(Guidance: The deliverable is to the product and/or services submitted to the CTCN for benefit of the relevant national stakeholders, capturing all activities undertaken towards this Output. Please mark the month in which this deliverable will be submitted with a mark in the appropriate box.) One Output can include several deliverables, if required.</i>																			
The report shall include a technology summary, a list of various types of technologies, and pros and cons of each technology and its applications, with reference to best practices in other countries.																			
Deliverable 2.2: State of the art presentation webinar																			
Output 3: WtE technological criteria																			
The results of output 2 will inform the draft WtE technological criteria. The criteria should consider Article 78 Clause 5 of the revised Law on Environmental Protection 2020, which states “the Minister of MONRE promulgates the criteria for technology of DSW ¹ treatment, and guides the model of urban and rural DSW treatment” as well as the NDC (see section 2, in particular 2.4.4). The section 2.4.4 of the NDC states that “Taking measures to manage, develop and apply technology for treatment of domestic solid waste, ordinary industrial solid waste and special solid waste to limit GHG emissions.”																			

¹ DSW stands for domestic solid waste.

<p>Activity 3: Draft WtE technological criteria</p> <p>In accordance with the provision of Article 78 Clause 5 of the revised Law on Environmental Protection 2020, the specific technology evaluation criteria will be drafted, taking into account the results of output 2. It should include the safety criteria for emissions from WtE plants (e.g., exhaust gas and air pollutants) and for ashes generated from the incineration process of the WtE plant. The draft criteria are expected to be a basis of a part of the criteria for technology of DSW treatment to be promulgated by the Minister of Natural Resources and Environment. The close communication and cooperation with MONRE-VEA shall be ensured, to reach the agreement with MONRE-VEA.</p>												
<p><u>Deliverable 3</u>: WtE technology evaluation criteria report</p>				X								
<p>Output 4: Training for WtE technological evaluation practice</p> <p>The WtE technological criteria elaborated in the Activity 3 will be used to conduct a training for the selected local governments to evaluate their proposed waste management technologies to be applied and installed.</p>												
<p>Activity 4.1: WtE technology evaluation handbook</p> <p>As a reference manual of WtE technological evaluation for local governments, a handbook including the technological information and WtE technological criteria elaborated in the Activity 3 should be developed. It will also guide the local governments in charge of their waste management administration to understand how to assess the financial feasibility of a WtE project.</p> <p>Firstly, a draft of the handbook will be developed by the implementers of this project with appropriate inputs from experts and/or the request proponent. Then the draft handbook will be reviewed and/or revised through the training detailed in Activity 4.2 and 4.3 based on the inputs and/or comments from the trainees to enhance the practicability of the handbook. The final draft of the handbook will be reviewed by the request proponent.</p>												

3. Resources required and itemized budget:

Please provide an indicative overview of the resources required and itemized budget required to implement the CTCN technical assistance, including for M&E-related activities, using the table below. Important to note that minimum 1% of the budget should explicitly target gender specific activities related to the technical assistance (please see section 10 for further information on gender). Once the Response Plan is completed, a Response Implementation partner(s) will be selected by the Climate Technology Centre (CTC). A detailed activity-based budget for the CTCN assistance will be finalized by the CTCN and selected Implementer.

Activities and Outputs	Input: Human Resources <i>(Title, role, estimated number of days)</i>	Input: Travel <i>(Purpose, national vs. international, number of days)</i>	Inputs: Meetings/events <i>(Meeting title, number of participants, number of days)</i>	Input: Equipment/Material <i>(Item, purpose, buy/rent, quantity)</i>	Estimated cost	
					Minimum	Maximum
Output 1: Development of implementation planning and communication documents	<i>11 days; IC, NC, E1, E2, GE</i>					
Activity 1: Formulation of i) Detailed work plan	<i>4 days</i>					
ii) Monitoring and evaluation plan	<i>5 days</i>					
iii) CTCN Impact	<i>5 days</i>					

Description						
iv) Closure and Data Collection report	<i>7 days</i>					
Output 2: Country assessment						
Activity 2.1: Waste management technology analysis	<i>IC 3 days; E1 10 days; E2 2 days</i>					
Activity 2.2: Waste management assessment in Viet Nam	<i>IC 3 days; NC 14 days; E1 2 days; E2 2 days</i>	<i>National travel of NC (1 person x 14 days)</i>				
Activity 2.3: Online meeting to present the waste management technology analysis	<i>IC 5 days; NC 5 days; E1 5 days; E2 2 days</i>					
Output 3: WtE technological criteria						

Activity 3: Draft WtE technological criteria	75 days; <i>IC, NC, E1, E2, GE</i>	<i>International travel of IC, E1 and E2 (7 people x 4 days), to join the consultative meeting</i>	<i>Consultative meeting to finalize draft criteria. 10 people from implementers and 5 people from MONRE, for 2-day meeting</i>	1 Translator <i>(EN-VN)</i>		
Output 4: Training for WtE technological evaluation practice						
Activity 4.1: WtE technology evaluation handbook	95 days; <i>IC, NC, E1, E2, GE</i>			1 Translator <i>(EN-VN)</i>		
Activity 4.2: Lectures on WtE technology and technology evaluation practice	95 days; <i>IC, NC, E1, E2, GE</i>	<i>International travel of IC, E1 and E2 (5 people x 10 days), to provide training to local stakeholders</i>	<i>1-week training, to be participated by 20 local stakeholders (i.e., DONRE/URENCO & MONRE)</i>	2 Interpreters <i>(EN-VN) (7 days)</i>		
Activity 4.3: Training and learning through plant observation	65 days; <i>IC, E1, E2</i>	<i>International travel of local stakeholders to visit overseas WtE operational plant (15 people x 6 days)</i>	<i>1-week field tour training, to be participated by 10 local stakeholders (i.e., DONRE/URENCO &</i>	2 Interpreters <i>(EN-VN) (5 days)</i>		

			MONRE)			
Activity 4.4: Final workshop	45 days; IC, NC, E1, E2, GE	International travel of IC, E1 and E2 (7 people x 4 days), to join the final workshop	Final Workshop. 10 people from implementers and 50 people from MONRE and local stakeholders (DONREs/URENCOs)	2 interpreters (EN-VN) (2 days)		
Estimated range of costing for the entire Response Plan						

4. Profile and experience of experts

Based on the required Human Resources identified in section 4 (Resources required and itemized budget) please provide a description of the required profile of all involved experts for the implementation of the CTCN Response Plan.

Experts required	Brief description of required profile
Please use the same titles for all experts as applied in section 4.	Please provide a short description of expertise and experience needed (education, sectors of expertise, years of experience, country experience, language requirements, etc.).
International Consultant (IC) (Project manager)	Engineer or social science specialist, M.Sc. or M.A., with experience in the design and development of waste management projects, knowledge and experience on policies and development in energy, sustainability and circular economy related topics: strong project management experience, knowledge of technological innovation, climate change, waste management, SDGs and NDC with a minimum of 10 years of experience. Experience in interacting with senior government officers is desired. Fluency in English is required.
National consultant (NC)	Engineer or social science specialist, expert in evaluation and development of waste management policies and environmental policies (climate change, NDC (nationally determined contributions), TNAs (technology needs assessments), NAPs (national action plans) or NAMAs (nationally appropriate mitigation actions),

	according to the experience of each country), with a minimum of five years of experience. Fluency in English is required.
Expert 1 (E1)	Industrial or chemical engineer (or similar background) with specific experience and knowledge in waste-to-energy technology, i.e. waste management and incineration treatment with the energy recovery, with a minimum of seven years of experience. Fluency in English is required.
Expert 2 (E2)	Engineer with experience in local environmental administration including waste management policies and/or strategies, with a minimum of seven years of experience. Fluency in English is required.
Gender expert (GE)	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. Fluency in English is required.

5. Intended contribution to impact over time

Please provide a brief description of the intended contribution to impact over time of the outcome and outputs provided by this technical assistance on resilience to climate change and/or carbon abatement. To the extent possible, please quantify the intended impact contribution, for example by indicated estimated number of people potentially impacted over time, GCP contribution of the focus sector, carbon emissions by the focus sector, etc. This intended contribution to impact is what will happen if the objective (as articulated in section 3) is met. Please ensure relevant complementarity with text in section 7 to 12. (maximum 1250 characters including spaces)

The intended contribution over time of this technical assistance can be summarized through the following elements:

- Lower GHG emissions in the waste sector. A detailed assessment of the reduction potential through waste-to-energy (WtE) technology applications and disseminations, taking into account the effects of the avoidance of methane gas emissions at landfill sites, in the country will be quantified.
- Contribute to the establishment of a healthy society and economy in the country, and the increased energy security, with the private investment mobilization and the public-private partnership.
- Raise ambition of the country NDC by introducing the advanced modern low-carbon technologies that can become an integral part of successive updated versions of NDC.

The WtE technology evaluation criteria would lower the foreseeable risks of the possible domestic and/or international private investment, and the appropriate WtE technology evaluation processes conducted by Vietnamese local governments would also attract the proposed WtE projects, which would create new job opportunities, in particular for women (such as machinery control/operation, and educational task). Moreover, the disseminated WtE projects would promote the early closure of existing landfill sites, to resolve the issues about odor, insects, pests, and explosion/fire risks. Finally this technical assistance may also bring opportunities to Viet Nam for south-south cooperation with neighboring countries thanks to the capacity building module that will train national stakeholders on WtE technologies.

6. Relevance to NDCs and other national priorities

Please identify relevance and contribution from the technical assistance to the Nationally Intended Contributions (NDC) and other relevant national prioritized efforts (TNAs, TAPs, NAPs, NAMAs, etc.). (maximum 2500 characters including spaces)

As per the mitigation targets in the country updated NDC 2020, the Government of Viet Nam has defined the following targets:

The mitigation component identifies measures for the period 2021-2030 in the following sectors: energy; agriculture; waste; land use, LULUCF; and the industrial processes (IP).

The domestic mitigation measures in the updated NDC include: (i) improving energy saving and energy efficiency, and reducing energy consumption; (ii) changing the fuel and energy structure in industry and transportation; (iii) shifting passenger and cargo transportation models; (iv) promoting efficient exploitation of renewable energy sources and increasing their proportion in energy production and consumption; (v) reducing GHG emissions through sustainable agricultural development, and improving the effectiveness and competitiveness of agricultural production; (vi) managing and developing sustainable forests, enhancing carbon sequestration and environmental services; conservation of biodiversity associated with economic development and increasing incomes for forest-dependent communities and people; (vii) managing wastes; (viii) reducing GHG emissions by replacing construction materials and improving the cement and chemical production processes together with reducing the consumption of HFCs.

2.4.4 Waste:

Taking measures to manage, develop and apply technology for treatment of domestic solid waste, ordinary industrial solid waste and special solid waste to limit GHG emissions.

The objective of this target is to disseminate the modern advanced waste management technologies to promote 3R (reduce, reuse, and recycle), so as to limit GHG emissions. In addition, waste-to-energy technology is for a kind of waste recycling (thermal recycle) at the same time for a kind of renewable energy technology (biomass).

The country so far has undertaken a TNA mitigation, which only focusing on energy and transportation sectors. Therefore, this technical assistance will provide a valuable contribution not only to the planning for the mitigation targets of the NDC, but will also represent an assessment of a climate technology that could be a part of a updated mitigation TNA to select the most appropriate technologies to fulfil the country climate mitigation targets in the waste sector.

7. Linkages to relevant parallel on-going activities:

Please identify relevant previous and ongoing public and private sector initiatives, projects or programmes that the CTCN assistance will specifically build on and contribute to. To the extent possible, please add practical and operational details on the linkages between existing activities and the CTCN assistance. (maximum 2500 characters including spaces)

A number of activities including public initiatives and private projects have been undertaken to pursue appropriate waste management in the country.

The bilateral environmental policy dialogues between the Ministry of Natural Resources and Environment of Viet Nam (MONRE) and the Ministry of the Environment of Japan (MOEJ), periodically held, has established a joint committee on solid waste management.

Japan International Cooperation Agency (JICA) implemented the "Project for Capacity Development on Integrated Management of Municipal Solid Waste in Vietnam" (2014-2018), to develop an integrated management system of solid waste and to comprehensively strengthen the capacity of the central and local government officials to manage municipal solid waste. The project developed a series of guiding references to establish waste treatment facilities suitable and applicable to local situations.

The first waste-to-energy project in Viet Nam was constructed by Everbright, which treats solid waste of 400 tons per day and generates 7.5MW of electricity for the grid. The exhaust gas emissions comply with the Euro 2010 Standard, due to lack of Vietnamese own criteria. The Everbright's WtE facility is located in Can Tho City.

As per the legitimization by the Government of Viet Nam, the National Strategy on Integrated Management of Solid Wastes up to 2025, with a Vision toward 2050, was approved in 2009, which was revised in 2018, to set out quantitative targets for the solid waste management.

The government has also promulgated the "Decree No. 38/2015/ND-CP" on management of wastes and scraps, which is the basic regulation on waste management and provides the general principles of waste management.

In 2020, the amendment of the Law on Environmental Protection was approved by the National Assembly, which provides for the promulgation of technical criteria for solid waste treatment technology by the Minister of MONRE.

This response plan will contribute to the progress or the achievements of these activities and initiatives.

8. Anticipated follow up activities after this technical assistance is completed:

Please describe the expected future use of the outputs and deliveries produced by this technical assistance, after the CTN implementation is completed, towards contributing to the anticipated impacts over time articulated in section 6. For example, what organizations or stakeholders will use the outputs of the technical assistance after it is completed, for what purpose, at what scale and scope the outputs and deliveries will be applied, when and what will be the next steps undertaken, etc. (maximum 2500 characters including spaces)

The technical assistance will help Vietnamese local governments developing WtE projects as means of appropriate solid waste management solutions with socio-economic and environmental safeguards. MONRE-VEA-WAMA will push local governments to use the technological criteria for WtE projects in order to wide application of WtE technologies, and a number of WtE plants will be planned, developed and constructed.

The model case for the practical technology evaluation will also be disseminated to nationwide, in order for other local governments to refer the successful activities to install WtE technology for treating large amount of solid waste.

In terms of climate change mitigation, subsequent construction and operation of WtE plants will lead to further reduction of GHGs, including the avoidance of methane gas included in landfill gas due to anaerobic digestion of open-dumped organic wastes as well as the reduction of carbon dioxide (CO₂) by replacing grid electricity supplied from fossil fuel thermal power plants with generated electricity from WtE plants.

9. Gender and co-benefits:

Imbedded in design of the activities	<p><i>A gender mainstreaming analysis is mandatory to include for all technical assistances. A gender expert will be assigned to carry out an assessment and evaluation regarding gender mainstreaming during the implementation of the TA.</i></p> <p><i>In addition, please describe all support to gender aspects, women's equality and other co-benefits embedded into the Response Plan (please include a reference to the actual activities and outputs as described in section 3).</i></p> <p>A gender expert (GE) will be required for the implementation of this TA. Since the objectives of the work are to produce the criteria of WtE</p>
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	<p>technology installation and the handbook for practical application of the criteria, the gender aspect takes a relevant role so to make sure that the criteria and/or the handbook incorporate a balanced gender mainstreaming. For this purpose the GE involvement has been foreseen in the main outputs of the TA and, in order to assure effective of his/her contribution, a gender mainstreaming budget of approximately 5% of the total has been allocated.</p>
<p>Gender and co-benefits intended as result of the activities</p>	<p><i>Please describe all gender aspects, women's equality and other co-benefits expected as a result of the CTCN technical assistance.</i></p> <p>The benefits in terms of gender will be the inclusion of women into new business models based on WtE plants that will contribute to form skilled labor, offer new and quality opportunities for their education and training. Thanks to the innovative nature of WtE technology, women will have the possibility to get involved in economic activities featuring circular business models, as well as in the creation of new academic research.</p> <p>The benefits in terms of society will be the expansion of existing landfill site lifetime due to newly installed WtE plants to reduce the volume of buried waste mainly composed of ash. Prolonged lifetime of existing landfill sites will avoid the construction of new landfill sites which needs new land possession/concession which possibly causes relocations of residents. Another social benefit is the abatement of risks of fire and/or explosion. The incinerated waste, i.e. ash has less carbon contents so to reduce combustible reaction possibility. Safer conditions around landfill sites will be assured.</p> <p>The benefits in terms of environment will be the improvement of surrounding conditions of air and water. As mentioned above, the landfilled waste after WtE process does not include reactive carbon contents, so to avoid the chemical reaction to generate pollutants including odor substances. The air and water quality around existing landfill sites will be improved. In addition, this TA will create the technological criteria which will address environmental pollutant emissions, so to WtE plants themselves do not either emit any substances to affect the surrounding environment.</p>

10. Main in-country stakeholders in implementation of the technical assistance activities:

Using the table below, please list and describe the role of in-country stakeholders, participants and beneficiaries who will be involved in or directly consulted during implementation of the assistance.

In country stakeholders	Role in implementation of the technical assistance
National Designated Entity – Ministry of Natural Resources and Environment	Liaison with CTCN and TA implementer
Request Applicant – Waste Management Department, under Vietnam Environment Administration of Ministry of Natural Resources and Environment	Interaction with NDE, CTCN and TA implementer to provide relevant country data to allow a smooth work by the implementer. Administrative support to provide necessary considerations to promulgate the technology criteria along with the revised Law on Environment Protection 2020.
<i>Department of Natural Resources and Environment of a selected local municipality People’s Committee</i>	<i>To participate in the training conducted in the TA, and to provide feedbacks against the draft handbook as a manual for practical WtE technology evaluation</i>
<i>Urban Environmental Company of a selected local municipality (if applicable)</i>	<i>To participate in the training conducted in the TA, and to provide feedbacks against the draft handbook as a manual for practical WtE technology evaluation</i>
<i>Ministry of Construction</i>	<i>To support information on past waste management policies and static data.</i>
<i>Ministry of Science and Technology</i>	<i>To support information of technological data including statistics</i>

11. SDG Contributions:

Instructions: Please complete the grey section below for a maximum of three SDGs that will be advanced through this TA. A complete list of SDGs and their target is available here:

<https://sustainabledevelopment.un.org/partnership/register/>.

Goal	Sustainable Development Goal	Direct contribution from CTCN TA (1 sentence for top 1-3 SDGs)
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 (consider adding targets for 3)	
	3.1 – By 2030, reduce the global maternal mortality ratio to less than 70 per 100,000 live	

	births	
	3.2 – By 2030, end preventable deaths of newborns and children under 5 years of age, with all countries aiming to reduce neonatal mortality to at least as low as 12 per 1,000 live births and under-5 mortality to at least as low as 25 per 1,000 live births	
	3.3 – By 2030, end the epidemics of AIDS, tuberculosis, malaria and neglected tropical diseases and combat hepatitis, water-borne diseases and other communicable diseases	
	3.4 – By 2030, reduce by one third premature mortality from non-communicable diseases through prevention and treatment and promote mental health and wellbeing	
	3.5 – Strengthen the prevention and treatment of substance abuse, including narcotic drug abuse and harmful use of alcohol	
	3.6 – By 2020, halve the number of global deaths and injuries from road traffic accidents	
	3.7 – By 2030, ensure universal access to sexual and reproductive health-care services, including for family planning, information and education, and the integration of reproductive health into national strategies and programmes	
	3.8 – Achieve universal health coverage, including financial risk protection, access to quality essential health-care services and access to safe, effective, quality and affordable essential medicines and vaccines for all	
	3.9 – By 2030, substantially reduce the number of deaths and illnesses from hazardous chemicals and air, water and soil pollution and contamination	The TA will contribute to the improvement of air, water and soil pollution and contamination through promoting the installation and the appropriate operation of environmentally sound WtE technology, which also address hazardous chemical pollution through its managed incineration process within WtE plants.
	3.a – Strengthen the implementation of the World Health Organization Framework Convention on Tobacco Control in all countries, as appropriate	

	3.b – Support the research and development of vaccines and medicines for the communicable and non-communicable diseases that primarily affect developing countries, provide access to affordable essential medicines and vaccines, in accordance with the Doha Declaration on the TRIPS Agreement and Public Health, which affirms the right of developing countries to use to the full the provisions in the Agreement on Trade-Related Aspects of Intellectual Property Rights regarding flexibilities to protect public health, and, in particular, provide access to medicines for all	
	3.c – Substantially increase health financing and the recruitment, development, training and retention of the health workforce in developing countries, especially in least developed countries and small island developing States	
	3.d – Strengthen the capacity of all countries, in particular developing countries, for early warning, risk reduction and management of national and global health risks	
4	Ensure inclusive and equitable quality education and promote life-long 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	The TA will promote additional energy plant constructions of WtE facilities which generate energy (electricity) from solid waste, to contribute to circular economy.
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	The TA fosters innovation through the WtE technology transfer and technological evaluation, and WtE plants are considered as resilient infrastructure to address solid waste necessarily emitted from all human kind activities.
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	
13	Take urgent action to combat climate change and its impacts	<i>All TAs should indicate relevance to Goal 13 and at least one target below (13.1 to 13.b)</i>
	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	The technological criteria to be prepared by the TA will be a part of the Law on Environmental Protection revised in 2020, and will contribute to disseminating GHG mitigation technology, i.e. WtE.
	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	1
17	Strengthen the means of implementation and revitalize the global partnership for sustainable	

	development	
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12. Classification of technical assistance:

Please indicate primary type of technical assistance. Optional: If desired, indicate secondary type of technical assistance.

Please tick off the relevant boxes below	Primary	Secondary
<input type="checkbox"/> 1. Decision-making tools and/or information provision	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 2. Sectoral roadmaps and strategies	<input type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 3. Recommendations for law, policy and regulations	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 4. Financing facilitation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 5. Private sector engagement and market creation	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 6. Research and development of technologies	<input checked="" type="checkbox"/>	<input type="checkbox"/>
<input type="checkbox"/> 7. Feasibility of technology options	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 8. Piloting and deployment of technologies in local conditions	<input type="checkbox"/>	<input checked="" type="checkbox"/>
<input type="checkbox"/> 9. Technology identification and prioritization	<input checked="" type="checkbox"/>	<input type="checkbox"/>

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

13. Monitoring and Evaluation process

Upon contracting of the implementing partners to implement this Response Plan, the lead implementer will produce a monitoring and evaluation plan for the technical assistance. The 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 the (i) NDE about overall satisfaction level with the technical assistance service provided; (ii) the Lead Implementer about the knowledge and learning gained through delivery of technical assistance; and (iii) the CTCN Director about timeliness and appropriateness of the delivery of the activities and outputs.

Annex 1: Guidance note for designing a Response Plan (to be deleted when submitting the Response Plan)