

**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.

<b>Requesting country or countries:</b>	Viet Nam
<b>Request title:</b>	Technical Capability Enhancement to Promote Waste-to-Energy Technology in Viet Nam
<b>NDE</b>	Mr. Pham Van Tan, Deputy Director, Department of Climate Change, Ministry of Natural Resources and Environment of Vietnam No. 10 Ton That Thuyet, Hanoi, Viet Nam Email: pvtan11@gmail.com / pvtan@monre.gov.vn
<b>Request Applicant:</b>	Mr. Nguyen Thanh Yen, Deputy of Waste Management Department (WAMA) Vietnam Environment Administration (VEA), Ministry of Natural Resources and Environment (MONRE) of Viet Nam No. 10 Ton That Thuyet, Hanoi, Viet Nam Email: ngthanhyen@gmail.com Phone: +84 911 680 086

**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 summarize the problem related to climate change and/or the negative impacts of climate change in the country that the request aims to address.

**Waste management in Vietnam**

- The current situation of domestic solid waste (DSW), based on the MONRE’s presentation at Vietnam-Japan Joint Committee on Waste Management and 3R held on 18 February 2020, are:
  - DSW generation amount is about 61,000 ton/day, in which urban DSW amount is 37,000 ton/day and rural DSW amount is 24,000 ton/day.

- Source classification has been specified, implemented in several provinces. However, the implementation depends on the socio-economic conditions of each province.
- Average DSW collection rate is 85.5% in inner city of urban areas and 60% in suburban of urban areas
- Treatment method situation: Mainly are landfill (71%), composting (16%), and incineration (13%).
- There are more than 900 landfills. Many landfills are unsanitary or dumping sites at communal level, which causes ground and surface water pollution, air pollution (smell), or attracts flies, cockroaches, rats and affects surrounding community.
- There are more than 380 incinerators, in which there are 294 incinerators (77%) with the capacity of more than 300kg/hour. Currently, there are 37 plants applying this treatment method in whole country. Some households in communes self-dispose their waste by landfilling, composting and burning in their gardens.
- 35 cities/provinces assign Department of Construction (DOC) to manage solid waste including DSW, 20 cities/provinces assign Department of Natural Resources and Environment (DONRE) to manage solid waste, and 8 cities/provinces assign both departments.
- After the Government issued the Resolution No. 09/NQ-CP on 03/02/2019, some cities/provinces started direction to assign DONRE to be the agency in charge of solid waste management in the provinces.
- According to the “National Environmental Status Report 2019 – SWM subject”, it is estimated that the amount of urban DSW in Viet Nam increases to 35,624 t/day in 2019, compared to 32,000 t/day in 2014.
- In Vietnam, the amount of solid waste has increased sharply. Therefore, it is imperative to minimize waste amount by source separation, recycling and intermediate treatment.<sup>1</sup>
- In 2019, the Government of Viet Nam issued Resolution No. 09/NQ-CP, to assign:
  - (i) The Ministry of Natural Resources and Environment is to act as a focal point for the unified State management of solid waste (with daily-life solid waste); and
  - (ii) Chairman of the Provincial People's Committee has comprehensive responsibility for the issue of waste and waste treatment in the locality.
- In 2018, the Prime Minister approved the adjustments to the National Strategy for general management of solid waste to 2025 with vision towards 2050 (Decision No. 491/QD-TTg), set specific goals to 2025:
  - The Decision No. 491/QD-TTg sets the specific targets by 2025 for urban domestic solid waste, as follows:
    - + 90% of total generated DSW in urban areas will be collected and treated, meeting environmental protection requirements; enhancing the capability of recycling, reuse, combined treatment with energy recovery or organic fertilizer production; striving for the rate of domestic solid waste treated by direct landfilling method to reach the rate of below 30% compared with the collected waste volume;
- Article 19 of the Decree 38/2015/ND-CP on Waste and Scrap Management provides a list of technologies for DSW treatment: (a) Composting technology, (b) Incineration technology, (c) Sanitary landfill technology, (d) Technology for recycling, energy recovery, production of products from the useful components of DSW, and (e) Other environmentally friendly technologies.
- Article 20 Clause 1 of Circular 25/2019/TT-BTNMT stipulates the criteria for selection of technologies for DSW treatment works, in terms of technological aspects, environmental and social aspects, and economic aspects-
- Article 78 Clause 5 of the Law on Environmental Protection 2020 regulates that the Minister of MONRE promulgates the criteria for technology of DSW treatment, and guides the model of urban

<sup>1</sup>Japan International Cooperation Agency (JICA), Sustainable System Design Institute, and Kokusai Kogyo Co., Ltd., “Project for Capacity Development on Integrated Management of Municipal Solid Waste in Vietnam – Final Report”, (February 2017), available at: [https://openjicareport.jica.go.jp/pdf/12304358\\_01.pdf](https://openjicareport.jica.go.jp/pdf/12304358_01.pdf) (JICA 2017).

and rural DSW treatment”.

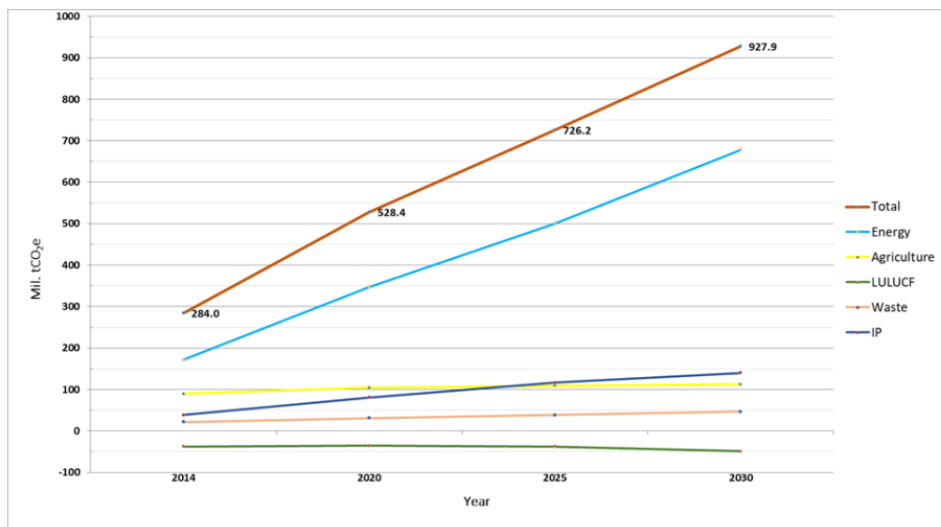
**Climate change**

- The Vietnamese national GHG inventory in 2014, described in the 3<sup>rd</sup> National Communication of Viet Nam, shows that the total emission of Viet Nam in 2014 was 283,965.53 ktCO<sub>2</sub>e from LULUCF sector and 321,505.71 ktCO<sub>2</sub>e from outside the LULUCF sector. The waste sector was accounted for 6.7% of the national GHG emission in 2014. Note that Viet Nam’s base year is 2014, which is the year with the latest GHG inventory results since Viet Nam approved the Paris Agreement.
- The Updated National Determined Contribution (NDC)<sup>2</sup> of Viet Nam issued in July 2020 shows the estimated GHG emissions of Business-as-Usual (BAU) scenario to 2030, as following.

**Table 1. GHG Inventory in 2014 and BAU Scenario to 2030**

*Unit: Mil. tCO<sub>2</sub>e<sub>q</sub>*

Year	Energy	Agriculture	LULUCF	Waste	IP	Total
<b>2014</b>	171.6	89.8	-37.5	21.5	38.6	<b>284.0</b>
<b>2020</b>	347.5	104.5	-35.4	31.3	80.5	<b>528.4</b>
<b>2025</b>	500.7	109.2	-37.9	38.1	116.1	<b>726.2</b>
<b>2030</b>	678.4	112.1	-49.2	46.3	140.3	<b>927.9</b>



**Figure 1. GHG emissions under the BAU Scenario**

- Total emissions of the waste sector in 2014 were 21,513 ktCO<sub>2</sub>e. Among sub-sectors, domestic wastewater accounts for the most with 44.67% while incinerated waste accounts for the least with 1.38%.

<sup>2</sup>Available at UNFCCC website – NDC registry page.

<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/VIETNAM'S%20INDC.pdf>

*Unit: Kt CO<sub>2</sub>e*

Greenhouse gas source	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> e
6.A. - CH <sub>4</sub> emission from solid waste disposal sites	NE	321.475		8,037
6.B.1. - CH <sub>4</sub> emission from industrial wastewater		62.901		1,573
6.B.2. - CH <sub>4</sub> emission from domestic wastewater		384.358		9,609
6.B.2.b. - N <sub>2</sub> O emission from human sewage			6.707	1,999
6.C. - CO <sub>2</sub> emission from waste incineration	296		NE	296
<b>Total</b>	<b>296</b>	<b>768.734</b>	<b>6.707</b>	<b>21,513</b>

(Source: 'Table 2.10. The 2014 GHG emissions of the Waste sector', P.40, "3<sup>rd</sup> National Communication of Viet Nam")

- According to the Updated NDC, the estimated GHG emissions from the waste sector on the BAU scenario will increase to 31.3 million tCO<sub>2</sub>e (2020), 38.1 million tCO<sub>2</sub>e (2025), and 46.3 million tCO<sub>2</sub>e (2030).
- While climate change is one of the most stressful issues for Viet Nam, the current dominant method of solid waste management is landfilling at final disposal sites, which leads to emissions of methane gas from decay of solid waste (organic portion), accounting for 37.4% in the emissions in the waste sector. In terms of GHG emissions related to solid waste management, landfilling is the source of the most emissions, and waste incineration produces the least emissions.
- Electricity generation in Viet Nam depends on the thermal generation using fossil fuel such as coal, which leads to the release of carbon (CO<sub>2</sub>) into the atmosphere. In place of fossil fuel-based electricity generation, waste-to-energy (WtE) technology could be one of the potential solutions.
  - WtE technology: 1. Municipal solid waste is incinerated, 2. Exhaust heat from waste incineration process is used to produce steam, 3. Steam is fed into steam turbine power generator to generate electricity, 4. Organic components in waste are converted to CO<sub>2</sub> by oxidation reaction through incineration process.
- Addressing climate change requires a significant shift to carbon neutral energy to reduce CO<sub>2</sub> emissions.

#### **Possible way forward to tackle both waste and climate change issues**

- Among various options, WtE technology has been considered as one of suitable solutions globally, including in Viet Nam.
- WtE technology will contribute to climate change mitigation by avoiding methane gas emissions from organic waste decay, and by shifting to carbon neutral electricity, as well as to appropriate waste management by minimizing waste amount to be landfilled.
- However, the deployment of WtE technology is not accelerated due to the existing barriers (see 'Specific technological barriers' below).

#### **Past and on-going efforts to address the problem**

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.

- Viet Nam formulated their Nationally Determined Contribution (NDC), which states that "With domestic resources GHG emissions will be reduced by 8% by 2030 compared to the BaU scenario", and the international support could increase the contribution up to 25%.
- The NDC as well as the Plan for implementation of the Paris Agreement identifies the measures to achieve the GHG emission mitigation targets, one of which for waste management sector is the utilization of solid waste incineration for power generation and the research and application of advanced waste treatment technologies.
- The National Strategy on Integrated Management of Solid Wastes up to 2025, with a Vision

toward 2050 (approved in 2009, and adjusted by Decision 491/QĐ-TTg on 7 May 2018) sets out quantitative targets, one of which is: “90% of total daily-life solid waste generated in urban centers will be collected and treated, meeting the requirements of environmental protection”. It also prescribes:

- To enhance recycling, reuse, combined treatment with energy recovery or organic fertilizer production;
- To strive for the rate of open dumping of daily-life solid waste to reach the rate of less than 30% compared with the collected waste volume; and
- The investment in new construction of daily-life solid waste treatment facilities ensures the post-treatment landfilling rate does not exceed 20%.
- The Government of Viet Nam promulgated the "Decree No. 38/2015/ND-CP" on management of wastes and scraps, in accordance with the fundamental amendments of the Law on Environmental Protection in 2014. This Decree is the basic regulation on waste management in Viet Nam, and it stipulates the general principles of waste management. It also specifies the responsibilities of ministers and/or ministries, provincial/district-level/commune-level People's Committees, waste treaters and so forth. The decree also provides guidance on how the service fees are decided.
- The Ministry of Natural Resources and Environment of Viet Nam (MONRE) and the Ministry of the Environment of Japan (MOEJ) periodically hold bilateral environmental policy dialogues, which cover important topics such as “solid waste management”. The 4<sup>th</sup> Vietnam - Japan environmental policy dialogue held in March 2018 agreed to establish a joint committee on solid waste management, where relevant ministries, agencies and municipal governments participate to formulate waste management projects.
- Japan International Cooperation Agency (JICA) supported the implementation of the “Project for Capacity Development on Integrated Management of Municipal Solid Waste in Vietnam” (2014-2018), to develop an integrated management system of municipal solid waste based on the national strategy for integrated solid waste management, and to comprehensively strengthen the capacity of the central and local government officials to manage municipal solid waste.

### Specific technology<sup>3</sup> barriers

This section should answer the questions “what are the technology barriers that hinder national efforts 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 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).

- According to the presentation made by the Ministry of Construction of Viet Nam (MOC)<sup>4</sup>, Viet Nam is facing with difficulties in solid waste management, as follows:
  - Not enough budget for waste management and not enough management personnel;
  - Deployment of master plan is slow, difficulties in finding investors, while the landfills are already overloaded;
  - In areas where there are composting sites, there are many businesses that cannot sell their compost;
  - Lack of technical information, so local authorities don't have any choice, but to believe in the investor's knowledge while investing in constructions;
  - The current treatment fee is proving to be difficult for businesses to cover their investment,

<sup>3</sup>“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)

<sup>4</sup>MA. Dang Anh Thu, Bureau of Technical Infrastructure, MOE, “GENERAL OVERVIEW ON SOLID WASTE MANAGEMENT IN VIETNAM”, 24/Feb/2016, Hanoi. Available at: [https://www.env.go.jp/recycle/circul/venous\\_industry/pdf/env/h27/11\\_2.pdf](https://www.env.go.jp/recycle/circul/venous_industry/pdf/env/h27/11_2.pdf).

construction costs as well and operation and management.

- In order to address waste management problems, in particular to reduce the amount of wastes to be sent to landfill sites, the government of Vietnam considers that one of suitable solution technologies should be waste incineration. Therefore, Viet Nam wishes the introduction and the dissemination of WtE technology in the country.
- However, one of the major challenges is a lack of capacity to evaluate and select WtE facility equipment suitable to Viet Nam and its local conditions, which requires the consideration of a wide range of facts including project bankability.
- This could result in the adoption of inappropriate or insufficient waste management technologies and/or practices.
- In addition, this could result in the development of insufficient technological guidelines (too lax or too stringent). Such guidelines, which would be referred to by municipalities (People's Committees) in charge of the selection of waste treatment facilities in their provinces, could cause negative impacts in their waste management practices and/or in their surrounding environment. The technological guidelines should be based on the rational science-based justifications.
- Regarding WtE projects, the application of such an advanced technology requires significant initial costs in addition to operation and maintenance costs, which brings good effects, including the minimization of waste amount and the prolonged lifetime of landfills. However, it is difficult for Viet Nam to develop practical science-based guidelines for the evaluation of WtE technologies, due to a lack of experiences and knowledge.
- In addition, a lack of reasonable evaluation methods could lead to inadequate financial structures, due to miscalculation of estimated project profits and costs, which can hold the facility construction and operation.
- Hence, Viet Nam has barriers to introduce the suitable WtE technology and to promote the construction of WtE facilities, due to a lack of capacities for technological and financial evaluation in order to attract the private sector investments even under the public-private partnership (PPP) or the private finance initiative (PFI) schemes.

**Sectors:**

Please indicate the main sectors related to the request:

- |   |   |                                       |  |
|---|---|---------------------------------------|--|
| <input type="checkbox"/> Coastal zones        | <input type="checkbox"/> Early Warning and Environmental Assessment | <input type="checkbox"/> Human Health | <input type="checkbox"/> Infrastructure and Urban planning |
| <input type="checkbox"/> Marine and Fisheries | <input type="checkbox"/> Water                                      | <input type="checkbox"/> Agriculture  | <input type="checkbox"/> Carbon fixation                   |
| <input type="checkbox"/> Energy Efficiency    | <input type="checkbox"/> Forestry                                   | <input type="checkbox"/> Industry     | <input type="checkbox"/> Renewable energy                  |
| <input type="checkbox"/> Transport            | <input checked="" type="checkbox"/> Waste management                |                                       |  |

Please add other relevant sectors:

**Cross-sectoral enablers and approaches:**

Please indicate the main cross-sectoral enablers and approaches

- |  |   |   |  |
|--|---|---|--|
| <input type="checkbox"/> Communication and awareness | <input checked="" type="checkbox"/> Economics and financial decision-making | <input checked="" type="checkbox"/> Governance and planning | <input type="checkbox"/> Community based |
| <input type="checkbox"/> Disaster risk reduction     | <input type="checkbox"/> Ecosystems and biodiversity                        | <input type="checkbox"/> Gender                             |  |

**Technical assistance requested:**

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.

Within a clearly defined scope, the description of technical assistance should be structured into the following:

- Overall objective
- Anticipated groups of activities to be performed by the technical assistance
- Anticipated products to be delivered by the technical assistance.

Please note that the CTCN facilitates technical assistance and is not a project financing mechanism.

[Overall objective]

The CTCN technical assistance will enhance the relevant stakeholders' capacities to evaluate WtE technology for its reliability and suitability as well as the project profitability. It will also help them increase their abilities to identify the financial structure appropriate to the relevant stakeholders such as the Ministry of Natural Resources and Environment (MONRE) (Waste Management Department (WAMA) of Vietnam Environment Administration (VEA)) and municipalities such as Hanoi city's Department of Natural Resources and Environment (DONRE), to promote appropriate waste management practices in Viet Nam.

[Anticipated groups of activities to be performed by the technical assistance]

Referring to the Guiding References of Solid Waste Management, the outcome of the JICA project for Capacity Development on Integrated Management of Municipal Solid Waste in Vietnam, the activities performed by the technical assistance will focus on the capacity enhancement for Waste-to-Energy (WtE) technology evaluation, including the formulation of WtE technology evaluation criteria considering different types of waste management technologies such as plasma incinerators, fluidized bed furnaces, and syngas technology.

1. Establishment of WtE technology evaluation criteria (with MONRE-VEA-WAMA)

Through the survey of the existing similar criteria available in other countries, important components and requirements may be drawn if applicable to Viet Nam in terms of expected effects and avoidance of negative impacts. Then, draft criteria for WtE technology evaluation applicable to the Vietnamese context are developed.

2. Development of the handbook for WtE technology evaluation practice (with People's Committee of a selected city/province, as a model)

The technology evaluation criteria drafted through #1 above should be made available to municipalities in Viet Nam, who are responsible for solid waste management including developing and implementing annual plans for waste collection, transportation and treatment and allocating budget for implementation. As a model case, a draft handbook for the practice of reviewing and evaluating the technology will be prepared in collaboration with the People's Committee of a selected city/province (possibly also with the Department of Natural Resources and Environment (DONRE) and/or with the Department of Construction (DOC)), taking into account the specific local circumstances of the city/province to accommodate the local context, including possible negative impacts and solutions. The draft handbook will be then revised accordingly.

3. Learning/training in classrooms and on field (for relevant stakeholders, including ministries and/or municipalities)

Site visit(s) of successfully operated WtE plant(s) will be conducted to learn operation processes (in Vietnam and/or abroad). In addition, lectures on how to operate WtE projects successfully from technological and financial perspectives will be delivered to the relevant stakeholders.

[Anticipated products to be delivered by the technical assistance]

1. Draft WtE technology evaluation criteria.

The draft criteria are to be provided to MONRE-VEA-WAMA for proposing the Minister of MONRE to

issue and promulgate the guidance documents on criteria of WtE technology for DSW treatment.  
 2. Handbook for WtE technology evaluation practice (for Vietnamese municipalities).  
 The handbook should be tested and reviewed through the technical assistance activities.  
 The handbook will be approved by Vietnamese authority (national government) if necessary.

[Expected effectiveness of GHG reduction]

The CTCN technical assistance will lead to the accelerated promotion of the WtE technology introduction and the WtE plant construction in Viet Nam, to contribute to the GHG emission mitigation in Viet Nam.

For example, one model case (in Hanoi) estimated the average annual GHG emission reduction of 119,871tCO<sub>2</sub>e (total reduction of 1,798,067tCO<sub>2</sub>e for 15 years of the project lifetime). For this model case, municipal solid waste of 1,000 tons/day would be fed into the incinerator, and electricity of 96,516MWh/year would be generated.

Therefore, when 70% of current DSW generation of 61,000 ton/day would be treated by the method of WtE technology application, GHG of around 5 million tCO<sub>2</sub>e in annual average would be reduced in Viet Nam.

**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.

2021.4 – 2022.3

**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.

For more information you can find guidelines on the CTCN's website here:

<https://www.ctc-n.org/technologies/ctcn-gender-mainstreaming-tool-response-plan-development>

Further reading on gender can be found on the CTCN website here:

<https://www.ctc-n.org/technology-sectors/gender>

The technical assistance will lead to the promotion of WtE plants in Viet Nam, in turn, will reduce the amount of waste sent to the final landfill sites, improve the environmental problems such as odors and leachate water pollution.

In social aspects, the lifetime of existing landfill sites will be prolonged, preventing new landfill site constructions, which may cause resettlements in some instances.

For gender benefits, women would be safeguarded against the health risks. Currently many women work for sorting domestic waste at home, which might cause the women's risk to be exposed to pollution. When an appropriate waste management system including effective and efficient waste collection and intermediate treatment is put in place, the risk of women being exposed to toxic and/or hazardous pollution derived from waste will be reduced, to improve women's health.

In addition, the employment opportunities for women will increase as the result of more WtE plant constructions. WtE plants can provide the educational opportunities, particularly for students. Such educational activities made at WtE project sites will be directed by female staffs to discuss WtE technology and general waste management issues to students. Such educational activities cannot be conducted at open landfill sites, but can in WtE facility premises (possible construction of such educational facility within the premises).

**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: Department of Climate Change, Ministry of Natural Resources and Environment of Vietnam(MONRE)	Supervising the implementation of the CTCN technical assistance (TA) project; Providing advisory information for contribution to Viet Nam's mitigation efforts in terms of climate change measures.
Request Applicant: Waste Management Department (WAMA), Vietnam Environment Administration (VEA), MONRE	Providing information to develop WtE technology evaluation criteria, in terms of Vietnamese conditions and existing Vietnamese regulations and/or decrees; Considering the applicability of the criteria; considering to propose the Minister of MONRE to issue and promulgate the guidance documents on criteria of technology for DSW treatment; Providing cooperative supports and directions to the Department of Natural Resources and Environment (DONRE) of a selected city/province (for example, Hanoi) and other relevant stakeholders; Administering and managing the CTCN TA project implementation and its progress.
Department of Natural Resources and Environment (DONRE) of a model case city/province (such as Hanoi)	Providing their comments to the draft WtE evaluation criteria, in terms of municipality-level missions, as a model city/province in the TA project; Assessing the applicability (whether the draft criteria will suitable to current practices, and how to revise the criteria, or how to modify current practices and workflows); Learning how to evaluate the profitability of the WtE project and the soundness of the financial plan, including how to set an appropriate tipping fee; Providing feedbacks to revise the draft criteria and to develop the handbook for WtE technology evaluation practice; Providing opportunities for other municipalities to learn the experiences made through the TA project.
Overseas waste management entity	Accepting the site visit from Viet Nam at their WtE plant(s), to provide opportunities to learn about successful experiences. Making lectures about WtE technology evaluation practice, financial evaluation methodology, and other relevant tasks, on the occasion of this abroad tour.

**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.

Currently, in major cities in Viet Nam (such as Hanoi, Ho Chi Minh and Da Nang), thousands of tonnes of municipal solid waste (MSW) are disposed every day, most of which are dumped at landfill sites without any intermediate treatments. At landfill sites, MSW undergoes anaerobic digestion to release methane (CH<sub>4</sub>) gas.

One possible solution is to introduce a method of MSW incineration treatment to reduce the amount of organic waste to be landfilled. Incineration treatment generates thermal heat which can be recovered and utilized for electricity generation with steam turbine equipment. Such electricity can replace fossil fuel-based grid electricity to reduce CO<sub>2</sub> emissions.

Thus, Waste-to-Energy (WtE) technology is considered as one of the desirable solutions in the context of solid waste management and climate change in Viet Nam.

Reference document (please include date of document)	Extract (please include chapter, page number, etc.).
<p>Nationally Determined Contribution (NDC) (1<sup>st</sup> submission in November 2016, and updated in July 2020)</p>	<p>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.).</p> <p>Vietnamese 1<sup>st</sup> NDC<sup>5</sup> state that “Viet Nam will exert efforts in implementing the following measures” in order to achieve their mitigation targets:</p> <ul style="list-style-type: none"> <li>• Waste management and capacity building for waste reduction, reuse and recycling;</li> <li>• Research and apply advanced waste treatment technologies; deploy modern waste treatment technology in urban and rural areas; strengthen the management and treatment of industrial and household wastewater;</li> <li>• Utilise landfill gas and solid waste combustion for power generation. (1<sup>st</sup>NDC, Chapter 2.5 'Measures to achieve GHG emission reduction targets on the INDC', 7) Waste management, p.7)</li> </ul> <p>In 2020, Viet Nam issued the updated 1<sup>st</sup> NDC.<sup>6</sup>The updated 1st NDC states that “In the waste sector, many solid waste treatment plants have been built and put into operation with new and advanced technologies combined with compost production, contributing to reducing landfill amounts and limiting environmental impacts”, as well as that “Although significant efforts have been made in implementing mitigation actions, there are still difficulties and challenges in certain areas”. (p.11)</p> <p>The updated 1<sup>st</sup> NDC ‘2.4. Measures to achieve GHG reductions in different sectors – 2.4.4. Waste’ shows the possible mitigation measures in the waste sector, as follows:</p> <p>“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.”</p> <p>Its ‘5.2. Implementation of updated NDC – 5.2.1. Measures to promote implementation of updated NDC – a) Developing and improving policies and institutions’ also lists “Amending and supplementing a number of tax policies, such as natural resources tax, environmental protection tax... to encourage the reuse, recycling and treatment of waste and the recovery of energy from waste; applying environmentally friendly waste treatment technologies; exploiting and use natural resources appropriately and</p>

<sup>5</sup>Available at UNFCCC website – NDC registry page.

<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/VIETNAM'S%20INDC.pdf>

<sup>6</sup>Available at UNFCCC website – NDC registry page.

[https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/Viet%20Nam\\_NDC\\_2020\\_Eng.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/Viet%20Nam_NDC_2020_Eng.pdf)

efficiently”, which indicates Viet Nam is interested in the WtE technologies.

**Technology Needs Assessment (June 2012)**

The “Viet Nam Technology Needs Assessment (TNA)<sup>7</sup> for climate change mitigation 2012 – Synthesis Report” prioritizes the sector of GHG emission sources. The prioritized sectors are energy sector, agriculture sector and land use, land-use change and forestry sector, but waste sector is also considered in the prioritization process.

For waste sector, "Total GHG emission amount from the waste sector in 2000 was estimated at 331.48 thousand tonnes CH<sub>4</sub> and 3.11 thousand tonnes of N<sub>2</sub>O, equating 7,925.18 thousand tCO<sub>2</sub>e GHG emission from the waste sector is shown in Table and Figure 6.”

(TNA for climate change mitigation 2012 – Synthesis Report)

Table 8 - Waste GHG emissions by source, 2000

Unit: thousand tonnes

Sub-sector	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> equivalent	Percentage
Solid waste	266.52		5,596.92	70.6
Waste water	1.35		28.35	0.4
Industrial wastewater	63.61		1,335.81	16.8
Human waste		3.11	964.10	12.2
<b>Total</b>	<b>331.48</b>	<b>3.11</b>	<b>7,925.18</b>	<b>100</b>

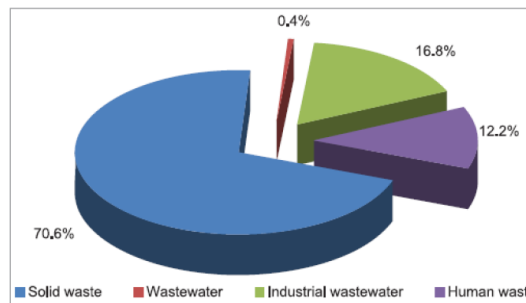


Figure 6 - Waste GHG emissions by source, 2000

However, the entire prioritization consideration did not select waste sector as the prioritized sector.

"In total, 2000 GHG emissions in Vietnam stood at 150.9 million tCO<sub>2</sub>e, with the following sectoral shares: Agriculture: 65.1 million tCO<sub>2</sub>e, Energy: 52.8 million tCO<sub>2</sub>e; LULUCF: 15.1 million tCO<sub>2</sub>e; Industrial processes: 10.0 million tCO<sub>2</sub>e; and Waste: 7.9 million tCO<sub>2</sub>e. (See Table and Figure 7)"

<sup>7</sup>Available at UNFCCC TT:Clear webpage. <https://unfccc.int/ttclear/tna/reports.html>

Table 9 – The year 2000 National GHG Inventory results by sectors

Unit: thousand tonnes

Sectors	CO <sub>2</sub>	CH <sub>4</sub>	N <sub>2</sub> O	CO <sub>2</sub> equivalent	Percentage
Energy	45,900.00	308.56	1.27	52,773.46	35.0
Industrial process	10,005.72	0	0	10,005.72	6.6
Agriculture	0	2,383.75	48.49	65,090.65	43.1
LULUCF	11,860.19	140.33	0.96	15,104.72	10.0
Waste	0	331.48	3.11	7,925.18	5.3
<b>Total</b>	<b>67,765.91</b>	<b>3,164.12</b>	<b>53.83</b>	<b>150,899.73</b>	<b>100</b>

Source: (SNC, 2010)

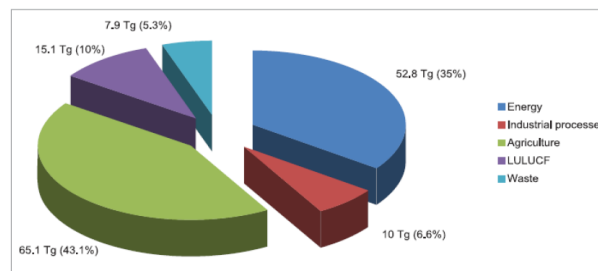


Figure 7 - GHG emissions by sector in 2000 in CO<sub>2</sub>e

National Adaptation Plans	N/A
Nationally Appropriate Mitigation Actions	<p>Viet Nam has not presented the information on NAMAs at UNFCCC. Although Viet Nam has submitted following 4 NAMAs seeking international supports to the NAMA Registry, no waste-related NAMAs are formulated so far:</p> <ul style="list-style-type: none"> <li>Promoting Up-scaled Use of Energy efficient Air-Conditioning (ACs) and Solar Water Heating Systems (SWHs) in Residential and Commercial Buildings in Viet Nam;</li> <li>Low-carbon Bus NAMA Viet Nam</li> <li>Supporting Program for Wind Power Development in Viet Nam</li> <li>Biogas for onsite power generation for medium/large pig Farms</li> </ul>
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.

In February 2019, the Government's Resolution No. 09/NQ-CP was issued, by which the Government assigned the Ministry of Natural Resources and Environment (MONRE) as the focal point for the unified State management of solid waste with daily-life solid waste and Chairmans of provincial People's Committees had the comprehensive responsibilities for the problems of waste and waste treatment in the locality.

In May 2019, the Prime Minister of Viet Nam approved Decree No. 40/2019/ND-CP stipulating that the Ministry of Natural Resources and Environment (MONRE) should have primary responsibility for waste management in Viet Nam.

Regarding waste management technologies, waste incineration treatment with electric power generation is becoming more important in order to address the increasing municipal solid waste in Viet

Nam. To respond to this requirement, one large-scale WtE plant was constructed in Can Tho, and many proposed projects are under consideration.

MONRE's Waste Management Department (WAMA) has received a request from an overseas private company regarding the need to establish WtE technology assessment criteria appropriate to the Vietnamese context and private investment, capacity building and environmental integrity assurance. The Joint Committee on Solid Waste Management under the Vietnam-Japan environmental policy dialogue also recognizes the necessity of WtE technology applications to address waste management challenges, and suggests establishing criteria for WtE technology.

In parallel, MONRE's Waste Management Department (WAMA) under the Vietnam Environment Administration (VEA) received a proposal from a private company located overseas about the necessity to establish the appropriate WtE technology evaluation criteria suitable to Vietnamese context and to private investment, with securing the environmental integrity and enhancing the capacities, to ensure the waste management solution through appropriate WtE technology and to promote the deployment of WtE plants and the successful operations.

Based on these backgrounds, MONRE-VEA-WAMA recognizes the necessity to establish the evaluation process for WtE technology application and WtE plant bankability, to call more private investment to promote appropriate waste management. In addition, the amended Law on Environmental Protection 2020 assigns the Minister of MONRE to develop the criteria for technology of waste treatment. Then MONRE-VEA-WAMA approached to the Vietnamese CTCN NDE (Department of Climate Change (DCC) of MONRE) to apply to the CTCN scheme so that WAMA fulfilled such tasks.

**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.
- Vietnamese 1<sup>st</sup> Nationally Determined Contribution (NDC)  
(<https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/VIETNAM'S%20INDC.pdf>)
- Vietnamese updated 1<sup>st</sup> Nationally Determined Contribution  
([https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/Viet%20Nam\\_NDC\\_2020\\_Eng.pdf](https://www4.unfccc.int/sites/ndcstaging/PublishedDocuments/Viet%20Nam%20First/Viet%20Nam_NDC_2020_Eng.pdf))
- Viet Nam Technology Needs Assessment for Climate Change(Mitigation) – Synthesis Report  
([https://unfccc.int/tclear/misc\\_/StaticFiles/gnwoerk\\_static/TNR\\_CRE/e9067c6e3b97459989b2196f12155ad5/dcbfb9116c5e43ff8879fe320075d7d5.pdf](https://unfccc.int/tclear/misc_/StaticFiles/gnwoerk_static/TNR_CRE/e9067c6e3b97459989b2196f12155ad5/dcbfb9116c5e43ff8879fe320075d7d5.pdf))
- 3<sup>rd</sup> National Communication of Viet Nam  
([https://unfccc.int/sites/default/files/resource/Viet%20Nam%20-%20NC3%20resubmission%2020%2004%202019\\_0.pdf](https://unfccc.int/sites/default/files/resource/Viet%20Nam%20-%20NC3%20resubmission%2020%2004%202019_0.pdf))
- National Strategy on Integrated Management of Solid Wastes up to 2025, with a Vision toward 2050 (approved in 2009, and adjusted by Decision 491/QĐ-TTg on 7 May 2018)

**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<sup>8</sup>. 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 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. Phan Van Tan  
 Deputy Director, Department of Climate Change (DCC)  
 Ministry of Natural Resources and Environment (MONRE)

Date: 11/3/2021

Signature:

**THE COMPLETED FORM SHALL BE SENT TO THE [CTCN@UNEP.ORG](mailto:CTCN@UNEP.ORG)**

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

<sup>8</sup> Please see: [https://unfccc.int/files/meetings/marrakech\\_nov\\_2016/application/pdf/auv\\_cop22\\_i8b\\_tm\\_fm.pdf](https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf)