

Guidelines:

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

Requesting country or countries:	VIET NAM
Request title:	Development of energy audit and reporting guidelines for calculation of the emission factors (EF) for fossil fuel power plants
NDE	<p>Name of organization: Ministry of Natural Resources and Environment of Vietnam/ Focal point: Mr. Pham Van Tan Position: Deputy Director General, Department of Meteorology, Hydrology and Climate Change Phone: +84-4-37955116, +84-4-37759770, Emails: pvtan11@gmail.com</p>
Request Applicant:	<p>Energy Efficiency and Sustainable Development Department, MOIT Mr. Hoang Van Tam Phone number: +84913599409 E-mail: tamhv@moit.gov.vn Add: 54 Hai Ba Trung Str., Hoan Kiem, Hanoi, Vietnam</p>

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):

Earth's climate is now changing faster than at any point in the history of modern civilization, primarily as a result of human activities. Global climate change has already resulted in a wide range of impacts across every region of the country and many sectors of the economy that are expected to grow in the coming decades.

Viet Nam committed to working with the international community to mitigation and adaption to climate change. Viet Nam signed the UNFCCC in 1992 and ratified it in 1994; signed the Kyoto Protocol (KP) in 1998 and ratified it in 2002; and signed the PA on Climate Change on April 22nd, 2016 and ratified the PA on November 3rd, 2016. In addition, the Government of Vietnam (GoV) submitted its Nationally Determined Contributions (NDC) under the Paris Agreement in 2015, which is committed to reducing greenhouse gas (GHG) emissions by 8 percent compared to the Business-As-Usual Case (BAU) by 2030 with domestic resources and 25 percent with international financial support.

In 2014, total GHG emissions in Vietnam were 283,965.53 Gg carbon dioxide (CO₂) equivalent. The energy sector contributed 53.4% of total GHG emissions. (=171,621.08 Gg CO₂e). Of which, CO₂ emission from fuel combustion associated to electricity generation accounted for 31%.

By 2018, installed power generation capacity was of 49 GW, coal thermal (38%). The total electricity generation was 220 TWh in 2018, coal thermal power (91.6 TWh) contributes with the largest share (42%).

The energy sector in general and power generation in particular plays an important role for achievement the target of reducing greenhouse gas emissions under the NDC.

GHG Inventory is required for setting up the roadmap, assessment and monitoring the CO₂ reduction activities in the power sector. Setting up CO₂ Emission Factors for each country for a good quality GHG Inventory is highly recommended by IPCC.

Developing the emission factors (EF) of the greenhouse gas (GHG) from thermal power plants will support to implement the GHG inventory in the power sector, then setting up the roadmap, assessment and monitoring the CO₂ reduction activities in the each thermal power plant as well as a whole power sector.

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

Regular GHG Inventory is required to monitor and evaluate the implementation of the objectives of the Convention through the implementation of legal documents such as Protocols, Agreements, etc. The UNFCCC Secretariat has guided all countries in terms of methodology and practical guidance for calculation of GHG emissions at the national, regional and project level. In addition, the guidelines for calculation, assessment and monitoring the contribution to reducing the GHG emission are provided for energy sector, industrial processes, transportation, agriculture, land use change and reforestation, waste ...

Up to now, the UNFCCC Secretariat has published 32 tools to support calculations, methods of determining emissions and reducing emissions of all greenhouse gases as a basis for measurement, monitoring and evaluation of contributions to reducing emissions and GHG absorption at the sector and project level. At the sector-level scale, there are currently 90 methodologies and 25 guidelines that

support calculation of emissions scenarios, emission reduction alternatives, and measurement, reporting and evaluation of contribution of emissions reduction for several sectors. 35 of which are for power industry. At the project level, UNFCCC Secretariat has provided 98 methodologies for 98 different projects of different sectors. 22 of which are for power industry.

In all methodologies applied at sectoral or project level, GHGs emissions is based on CO₂ equivalent from burning or converting fossil fuels such as coal, oil, gas, biomass.... CO₂ emission factor of each type of fuel depend on its values of calorific value, carbon content, and other fuel characteristics; Reduction of GHGs emissions from mitigation activities from directly or indirectly reducing the consumption of fossil fuels, they will be converted to the original form of fossil fuels to calculate the reduced emission. In many cases, the conversion of an activity contributes to the reduction of indirect use of fossil fuels, through the use of alternative renewable energy, and the reduction of the need for secondary energy (electricity) in the energy demand ... The conversion to original form of fossil fuels to be replaced is so complicated, especially for countries where electricity is produced from a combination of sources such as hydropower, coal power, gas power, electricity from renewable energy and imported electricity. Therefore, the UNFCCC has provided methodological guidance on the construction and application of an emission factors for an electricity system for each country in accordance with the national conditions. Currently, according to the guidance of the UNFCCC, the emission factor of Vietnam grid electricity is calculated based on the TOOL07 from the year 2010.

Specific technology¹ barriers (up to one page):

Vietnam is one of the countries that actively participate in the Convention and is a member of the many contributors to the implementation of the Kyoto Protocol, especially the implementation of clean development mechanism (CDM) projects in Vietnam.

And to create a basis for calculating, developing proposals, registering, verifying and granting carbon credits to reduce greenhouse gas emissions for CDM projects in Vietnam, the Ministry of Natural Resources and Environment of Viet Nam has using the UNFCCC's tool which names TOOL07 (Tool to calculate the emission factor for an electricity system - Version 07.0) to calculate and publish EF for Vietnam's power grid for CDM activities and other related studies for every year. However, according to the TOOL07 Tool's guidance and the selection of calculation methodology for Vietnam, the experts chose the safety calculation method with the weights for 2 variables Operating margin (OM) and Build margin (BM) are equal to 0.5. Meanwhile, the structure of energy sources in Vietnam's grid is quite diverse and highly specific (electricity output in 2015 is about 164 TWh, including: 30.4% hydroelectricity, 34.4% of private electricity coal, 30% of electricity, gas, oil, 3.7% of renewable energy and 1.5% of imports).

According to calculations and published data of the Ministry of Natural Resources and Environment of Viet Nam on EF from 2010 to 2017, the EF calculated and published as in the table above has been calculated to estimate the total emission factor of the source structure contributing to Vietnam's electricity grid. This is entirely appropriate in the context of small-scale CDM projects; the corresponding contribution of CO₂ emission reduction will have small errors. But in the case of countries implementing the NDC on a larger scale, the form of contribution is much larger, but not fully

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

calculated to ensure the suitability and fairness of each country.

Implementing the National Target Program to respond to climate change in the period of 2012-2015, the Ministry of Industry and Trade of the Socialist republic of Viet Nam assigned the Institute of Energy to carry out the task of researching and developing a roadmap to reduce greenhouse gas emissions of coal-fired power industry. Vietnam, in which the study has identified that coal thermal power plants in operation in 2014 have an average greenhouse gas emissions of about 1.12 Kg CO₂/KWh electricity that is higher than the published EF figure of 0.6612 Kg CO₂/KWh electricity. Also in this study, the task also made a preliminary assessment of combustion efficiency and showed that the ratio of the remaining carbon content in ash and slag of factories was about 14% on average (2014), so if calculating sufficiently, the CO₂ emissions into the atmosphere from the operation of burning 1 ton of coal also need to calculate more specifically and more accurately.

Besides, the Vietnam Forest and Delta Project - Research report, proposing a pilot payment for forest environmental services for forest carbon sequestration and storage (C-PFES) in Thanh Hoa and Quang Ninh is used as input for the development of the Prime Minister's Decision on C-PFES piloting. Accordingly, the research results in 2017 also showed that the average greenhouse gas emissions of coal thermal power plants participating in the study also reached about 1.0 Kg CO₂/ KWh electricity and applied and the calculation of the total CO₂ emissions of coal power plants, thereby responsible for reducing emissions and the need to reduce CO₂ emissions through afforestation to absorb, this is also the main is a measure and report to determine the CO₂ emission level of the plant based on the power output of the plant. However, this study did not mention the coal burning efficiency of thermal power plants and then has not determined exactly the proportion of carbon still in the ash, slag of the plant, and when If this is mandatory, the demand for fossil-fuel power plants needs to determine its own coefficient, which is very urgent and directly affects the interests of enterprises.

In conclusion, the study and calculation of emission factor of coal thermal power plants serving the calculation of the potential to reduce greenhouse gas emissions in the energy sector is very important. The Ministry of Industry and Trade (MOIT) requested the Climate Technology Centre and Network (CTCN) support to calculate the emission factors of Vietnam's thermal power plants as a basis for calculating and determining the contribution to reduce greenhouse gas emissions from two activities including economical and efficient use of energy and developing new energy, renewable energy in Vietnam.

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 checked="" type="checkbox"/> Energy Efficiency | <input type="checkbox"/> Forestry | <input checked="" type="checkbox"/> Industry | <input type="checkbox"/> Renewable energy |
| <input type="checkbox"/> Transport | <input type="checkbox"/> Waste | | |

management

Cross-sectoral enablers and approaches:

Please indicate the main cross-sectoral enablers and approaches

- | | | | |
|--|--|---|--|
| <input type="checkbox"/> Communication and awareness | <input 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 (up to one page):

Overall objective

- To develop a guideline for audit and Calculation of the emission factors (EF) of fossil fuel thermal power plants to enhance quality of GHG inventory activities in energy sector.

The technical assistance will delivery following Activities

- Activity 1: Desk-study on database, methodology to define EF and prepare recommendations of methodology to develop GHG inventory and EF for fossil fuel thermal power sector in Vietnam. The TA team should have knowledge in power sector in Vietnam, specially the power development planning process.
- Activity 2: Conduct the data collection at all fossil fuel thermal plant, walking through energy audit and full energy audit in 02 plants for guideline development and validation of methodology. The TA team should visit all fossil fuel plants to collect and consolidate data. For the audit, the team should have certified auditors whose are experienced with power plant energy auditing to be allowed to visit power plants.
- Activity 3: Consultation workshops. The TA should have networking and working experiences with stakeholders in Vietnam, particularly the energy sector to demonstrate their works and recommendations.
- Activity 4: Capacity building to the stakeholders. The TA team shall design and conduct capacity program for fossil plants and relevant government agencies with a focus on MOIT and MONRE.

Anticipated Output of the technical assistance:

- Technical report about EF methodology calculation through 02 piloting fossil fuel power plants.
- Full energy audit reports for 02 fossil fuel plants.
- Technical report about GHG inventory and EF development for fossil fuel thermal power plants

Expected timeframe:

The technical assistance will conduct with in 12 months

Activity 1: 2nd month

Activity 2: 06th month

Activity 3: 08th month

Activity 4: 12th month

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

1. The Anticipated co-benefits:

- Environmental responsibility of thermal power plants can determine through calculating the GHGs emission or the polluted emissions.
- Directly support to the MRV implementation of facility and sector level for NDC implementation.
- Providing the tool to be served in the future carbon pricing mechanism that is proposed in the new environment policy.

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	Power plants, GHG managers at local and ministerial levels, local energy experts, ESCOs, Institute
National Designated Entity	The NDE will support in providing the professional advice within the process and also in exchanging of best practices in similar situation.
Energy Efficiency and Sustainable Development Department, MOIT	Implementing agency
Department of industry and trade (DOIT) at province	The Agency is responsible for energy management at provincial level.
Thermal Power Plants	
Energy experts, ESCOs, Institute	They will involve in data collection, capacity building, and consultation workshops and to be the in-house resource to the Government for the implantation phase.

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

According to the technical report's NDC, GHG emission from energy sector is about 85% of 787 million tones of CO₂ by 2030 and with 8% GHG reduction committed by the country efforts and up to 25% reduction if having international support. The energy sector will be the important role of the mitigation targets.

Regarding the Decision of Prime Minister for national inventory of GHG approved in 2012, MOIT has been requested to implement the GHG inventory for energy sector and annually making the report of GHG emission to MONRE. The report will become a part of national communication and Bien Update report to UNFCCC.

In the Decision of Prime Minister to national plan to implement Paris Agreement, MOIT was assigned to implement GHG mitigation and setup MRV system for emission reduction from energy sector.

In the context of new social economic development national plan and its strategy for next decade is under preparation phase and will be submitted to the National Assembly in the first's meeting of new NA election by early 2021, the EF will be sufficiently establishing the macro indicator related to GHG/GDP/people.

In conclusion, the EF for power sector of the country will be most important of GHG emission control. That is not only to monitor the big emitters sources, but also to help tracking the mitigation efforts of the country in the energy sector and to be served the potentially study on carbon pricing mechanism applying in the new development plan.

Reference document (please include date of document)	Extract (please include chapter, page number, etc.).
Intended Nationally Determined Contribution (INDC)	Technical report for INDC that submitted to UNFCCC in 2015
National GHG inventory	Prime Minister Decision 2359/QD-TTg in 2013 for national GHG inventory establishment
VIETNAM PLAN FOR IMPLEMENTING PARIS AGREEMENT ON CLIMATE CHANGE	Prime Minister Decision 2053/QD-TTg in 2016 national plan to implement Paris Agreement

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

Since 2002 when Vietnam ratified Kyoto Protocol and with engagement of CDM development, the requirement of EF for grid needed and Vietnam has been EF for grid since 2010 and annually update so far, the last one was 2018.

But under the Paris Agreement implementation, Vietnam has recognised that the EF for power sector is necessary for quantifying the GHG reductions of the country efforts. In some technical meetings and workshops, participants identified that EF for grid is not enough for the requirement of new GHG reduction mechanism, especially some proposal programs related to carbon pricing instrument development. When designing carbon crediting program at sector level, the EF of the sector is very important to see where and when the players can make a credit and how much GHG mitigation crediting will be generated.

The NDE agreed that power sector played important role of mitigation efforts to the NDC implementation and the EF for this sector will be significantly for the GHG inventory at national level and sector level as well. It is more meaningful for the MRV system that will be implemented in the near future.

Background documents and other information relevant for the request:

- Research reports on emission factor (EF) of the Vietnam's power grid from 2010 - 2017.
- Report on the results of research on the mission: "Developing measures to control greenhouse gas (GHG) in the field of Coal Thermal Power and proposing the roadmap to apply control measures" of the Institute of Energy in 2014.
- Research report and proposing a pilot payment for forest environmental services for forest carbon sequestration and storage (C-PFES) in Thanh Hoa and Quang Ninh provinces.
- Report of measurement the Viet Nam's greenhouse gas (GHG) emissions in 2014.
- The Vietnam's NDC technical report in 2015.

- Methodologies and calculation tools guided by UNFCCC at: <https://cdm.unfccc.int>
- Information on the methodology approved under the JCM Mechanism between Vietnam and Japan at: <http://vie.icmvietnam.vn>.
- Vietnam energy outlook report 2019.
- Policy documents on energy development, renewable energy development, Vietnam's electricity development planning.

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 Mechanisms².

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.

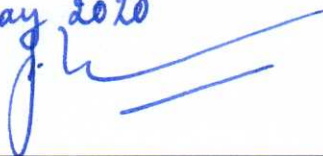
Advanced engagement (preferred): The GCF NDA of the requesting country has been directly involved in the design of this request and is a co-signer of this request, the signature indicating provisional agreement to use readiness national funds to support the implementation of the technical assistance.

NDA name:

Date:

13 May 2020

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, verify the outputs/deliverables of consultants who deliver the TA for the country and effects of the support provided, including its short, medium and long-term impacts in the country.

² Please see:

https://unfccc.int/files/meetings/marrakech_nov_2016/application/pdf/auv_cop22_i8b_tm_fm.pdf

Signature:
NDE name: *Pham Van Tan*
Date: *13 May 2020*
Signature: 

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

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