

**Report on
The national accounting
system for
Internationally
Transferred Mitigation
Outcomes**

Initiative for Climate Action Transparency – ICAT

Report on the national accounting system for internationally transferred mitigation outcomes

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LIST OF ACRONYMS

NDC	Nationally Determined Contribution
GHG	Greenhouse gas
ITMO	Internationally transferred mitigation outcomes
ETF	Enhanced Transparency Framework
SBSTA	Subsidiary Body for Scientific and Technological Advice
MPG	Modalities, procedures, and guidelines
CDM	Clean Development Mechanism
APA	Ad Hoc Working Group on the Paris Agreement
TER	Technical Expert Review
CTF	Common tabular format
BTR	Biennial Transparency Report
NIR	National Inventory Report
MONRE	Ministry of Natural Resources and Environment

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Introduction

The Paris Agreement sets the mitigation scenario with a highly ambitious pledges from Parties to comply with their Nationally Determined Contributions (NDCs). At the same time, the Article 6 of the Paris Agreement foresees cooperation among countries as a strategy to contribute to the implementation of their NDCs. Under Article 6, two countries can enter into an agreement whereby one of them reduces carbon emissions and transfers those reductions, also called International Transferred Mitigation Outcomes (ITMOs) to the other one which can use them to achieve its NDCs goals. Such cooperative approaches can thus promote the enhanced deployment of low-carbon technologies, achieve emissions reductions in a cost-effective manner, accelerate the implementation of projects and programs and ultimately could enable Parties to increase the ambition of their NDCs.

With the goal of strengthening the global response to the threat of climate change and building trust and confidence among Parties, the Article 13 of the Paris Agreement foresees an Enhanced Transparency Framework (ETF) that establishes how Parties must report on progress in climate change mitigation, adaptation measures and support provided or received. As the efforts from Parties to implement ETF advance, questions are raised on how ITMOs accounting will be integrated into the national tracking system of the implementation progress of NDC.

This paper discusses the accounting system for ITMOs in NDC, based on the Common Tabular Format (CTF) for the reporting of the information necessary to track progress towards NDC.

The first chapter of this paper discusses the ITMO concept and its potential contribution to Vietnam's NDC. In the second chapter mitigation measures included in Vietnam's NDC are reviewed, the existing inventory of mitigation measures is described and prospective mitigation options for carbon trading under Article 6 are proposed. The latter also includes a study case for ITMO accounting in a Solar PV project.

1. Internationally transferred mitigation outcomes

1.1. ITMO under the Paris Agreement

1.1.1. Scope of the ITMO

Internationally Transferred Mitigation Outcomes (ITMO) are one of the approaches for voluntary cooperation in implementing NDC according to Article 6.2 of the Paris Agreement. The scope for the use of ITMOs comprehends the type of activities, mitigation actions, and transfers covered by the Article 6.2(OECD & IEA, 2021). This includes the extent to which each Party will use ITMOs and what ITMOs will and will not cover. ITMOs definition would of course imply some limitations to Article 6.2 scope.

1.1.1.1. Definition of the mitigation outcome

The first limitation to the scope of implementation of Article 6 of the Paris Agreement is the definition of the ITMOs itself. This is based on criteria that relates to their date of creation and institutional origin (Michaelowa et al., 2020):

- ITMOs represent mitigation from 2021 onwards.
- ITMOs are mitigation outcomes produced in the context of a cooperative approach.
- ITMOs are mitigation outcomes authorized by a participating Party for their use for international mitigation purposes other than the achievement of its own NDC (for instance, under the Carbon Offsetting and Reduction Scheme for International Aviation, or CORSIA) or for other purposes (for instance, voluntary carbon markets).
- ITMOs are emission reductions generated by the Article 6.4 mechanism (A6.4 mechanism) when they are internationally transferred. This clarifies the link between the Article 6.2 guidance and the A6.4 mechanism.

Besides, Article 6.2 includes what could be called explicit and implicit limitations to the kind of cooperative approaches Parties may engage in:

- **Explicit limitations:** Whenever Parties use ITMOs towards their NDCs in the framework of the Cooperative Approaches, they shall promote sustainable development, ensure environmental integrity and transparency, and apply robust accounting. These requirements have of course an impact on the extension of the implementation of ITMOs. Another explicit limitation to the scope of ITMOs application is the Article 6.3 requirement for these to be “*voluntary and authorized by participating Parties*”. Finally, Article 6.4, also introduces certain conditions, according to which each host Party using ITMOs shall ensure. These conditions are discussed in 1.1.1.2 section below

- **Implicit limitations:** Implicit limitations could emerge from interpreting Article 6.2 of the Paris Agreement. These limitations establish ITMOs shall be (UNFCCC, 2021f):

- Real, verified, and additional.

- Result from emission reductions and removals, including mitigation co-benefits resulting from adaptation actions and/or economic diversification plans or the means to achieve them.
- Measured in metric tons of carbon dioxide equivalent (t CO₂ eq) (see 1.1.1.2 for a definition of the unit of transfer).
- Mitigation outcomes authorized by a participating Party for use for international mitigation purposes other than achievement of an NDC (hereinafter referred to as *international mitigation purposes*) or authorized for other purposes as determined by the first transferring participating Party (hereinafter referred to as *other purposes*) (*international mitigation purposes* and *other purposes* are hereinafter referred to together as *other international mitigation purposes*);
- Emission reductions issued under Article 6.4 mechanism, when they are authorized for use towards achievement of NDCs and/or authorized for use for *other international mitigation purposes*.

1.1.1.2. The subject of the transfer

The scope of the ITMOs is also limited by the subject of the transfer, which is eligible criteria referring to who can transfer ITMOs. These eligible criteria support determining Parties that will engage in transfers under Article 6.2. The subject of the transfer of ITMOs needs to meet the following conditions (UNFCCC, 2021f):

- It is a Party to the Paris Agreement
- It has prepared, has communicated and is maintaining a NDC in accordance with Article 4, paragraph 2
- It has designated a national authority for the mechanism and has communicated that designation to the secretariat;
- It has indicated publicly to the Supervisory Body how its participation in the mechanism contributes to sustainable development, while acknowledging that the consideration of sustainable development is a national prerogative;
- It has indicated publicly to the Supervisory Body the types of Article 6, paragraph 4, activity that it would consider approving pursuant to chapter V.C below (Approval and authorization), and how such types of activity and any associated emission reductions would contribute to the achievement of its NDC, if applicable, to its long-term low greenhouse gas (GHG) emissions development strategy, if it has submitted one, and to the long term goals of the Paris Agreement.

1.1.1.3. The units of the transfer

Parties' NDC expresses interest in transferring GHG units through current or future carbon market mechanisms or direct transfers. Each unit of ITMOs is Measured in metric tons of carbon dioxide equivalent (tCO₂eq) in accordance with the methodologies and metrics assessed by the Intergovernmental Panel on Climate Change and adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement (CMA) or in other non-greenhouse gas (GHG)

metrics determined by the participating Parties that are consistent with the NDCs of the participating Parties (UNFCCC, 2021c):

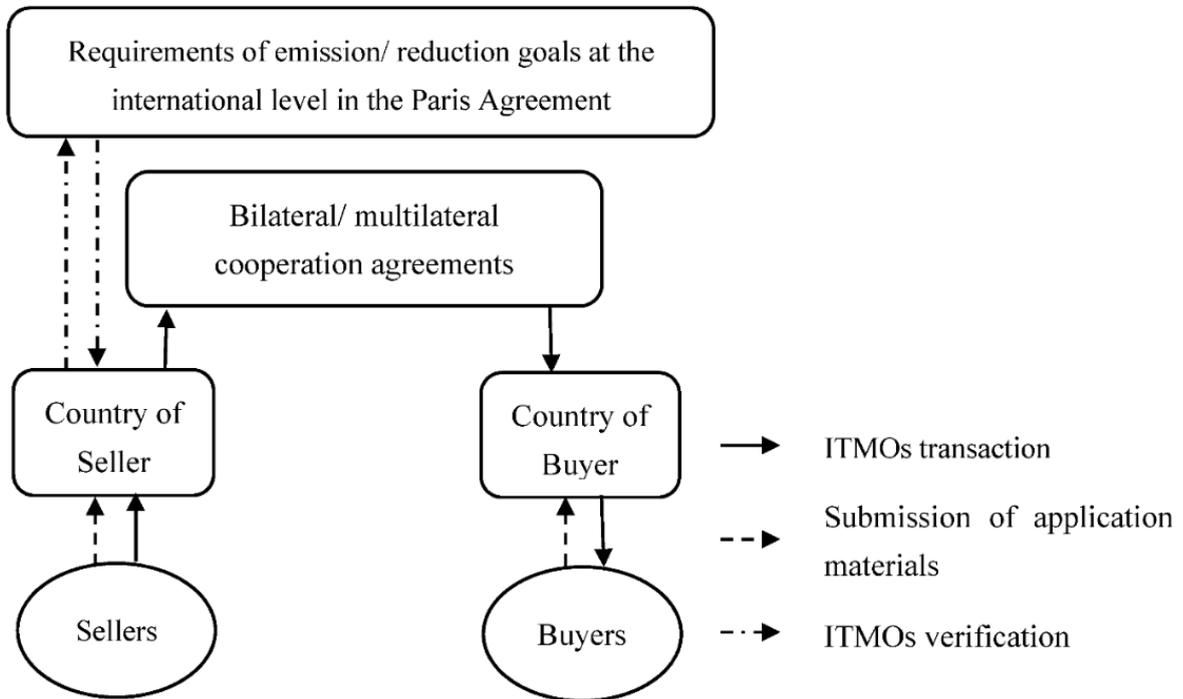


Figure 1: The operational framework of ITMOs (with bilateral/multilateral cooperation agreements)

Source: (Deng et al., 2022)

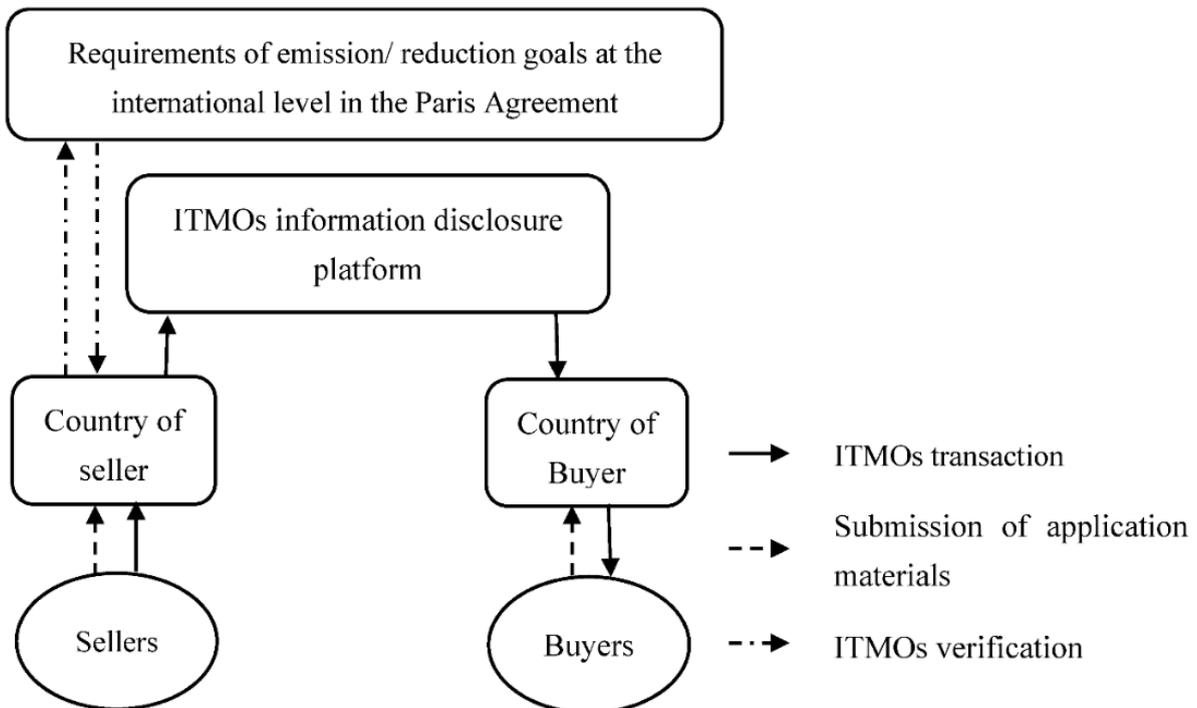


Figure 2: The operational framework of ITMOs (without bilateral/multilateral cooperation agreements)

Source: (Deng et al., 2022)

Figure 1 and Figure 2 show the operational frameworks of ITMOs with and without bilateral cooperation agreements. The transfer of approved mitigation outcomes can be operated between selling and buying enterprises. The resulting modifications in the emissions inventories shall be reflected in the NDCs of each country. The operational framework should contain the identification of transaction objects and transaction of emissions reductions towards countries' NDC.

1.1.2. Corresponding adjustment

The Article 6.2 of the Paris Agreement requires each Party engaging in cooperative approaches to reflect any transference or use of ITMOS in its NDC. In the case of the seller for instance, this requirement would consist in subtracting the transferred mitigation outcomes out of the NDC target record. The present section deals with the definition of corresponding adjustment and its main features.

1.1.2.1. Definition of a corresponding adjustment

Each Party that participates in cooperative approaches that involve the use of internationally transferred mitigation outcomes towards an NDC under Article 4, or authorizes the use of mitigation outcomes for international mitigation purposes other than achievement of its NDC needs to apply corresponding adjustments (UNFCCC, 2021c). Corresponding adjustments are indicated through an emissions balance reflecting the level of anthropogenic emissions by sources and removals by sinks covered by its NDC adjusted on the basis of corresponding adjustments undertaken by effecting an addition for internationally transferred mitigation outcomes first-transferred/transferred and a subtraction for internationally transferred mitigation outcomes used/acquired, consistent with decisions adopted by the CMA on Article 6 (UNFCCC, 2019).

Each participating Party with an NDC measured in t CO₂ eq, for each year, applies corresponding adjustments in the following manner to the anthropogenic emissions by sources and removals by sinks from the sectors and GHGs covered by its NDC (UNFCCC, 2021c):

- Adding the quantity of ITMOs authorized and first transferred, for the calendar year in which the mitigation outcomes occurred
- Subtracting the quantity of ITMOs used for the calendar year in which the mitigation outcomes are used towards the implementation and achievement of the NDC, ensuring that the mitigation outcomes are used within the same NDC implementation period as when they occurred.

Each participating Party with an NDC containing non-GHG metrics determined by the participating Parties engaging in a cooperative approach involving ITMOs traded in non-GHG metrics applies corresponding adjustments to the annual level of the relevant non-GHG indicator. This non-GHG indicator is being used by the Party to track progress towards the implementation and achievement of its NDC in the following manner:

- Subtracting the quantity of ITMOs authorized and first transferred, for the calendar year in which the mitigation outcomes occurred

- Adding the quantity of ITMOs used for the calendar year in which the mitigation outcomes are used towards the implementation and achievement of the NDC, ensuring that the mitigation outcomes are used within the same NDC implementation period as when they occurred.

Each participating Party shall ensure that the use of cooperative approaches does not lead to a net increase in emissions of participating Parties within and between NDC implementation periods or across participating Parties and shall ensure transparency, accuracy, consistency, completeness and comparability in tracking progress in implementation and achievement of its NDC by applying safeguards and (UNFCCC, 2021c).

1.1.2.2. Reporting and timing of corresponding adjustments

It usually takes years for Parties to go from the generation of mitigation outcomes to transfer them internationally (Figure 3, Figure 4, and Figure 5). Until the validity period of an ITMO is established, a time lag from acquiring to using an ITMO is unavoidable. The time gap causes the difference between a country's actual yearly emissions balance and the national GHG emissions towards the NDC. This issue is addressed through the transparency requirement of reporting ITMOs use toward the NDC in time series (OECD & IEA, 2021).

The time gap between the moment the ITMOs are transferred and the moment they are used may also cause a credit issue (OECD & IEA, 2021). The interval may occur between commitment periods. This issue also affects NDCs target. The prospective delay at different stages of the ITMO cycle is shown in Figure 4 and Figure 5. Any changes of the emissions balance after the release of greenhouse gas inventory needs to be reported.

Because of the delay between reporting and review, the GHG inventory needs to be consistently adjusted based on the Party's emissions balance in time series. For example, the recalculation of emissions balance for year X is only available in year X+2, then information for years X, X+1, X+2 is all reported and reviewed in year X+3 (as Figure 5). Besides, expiry dates for ITMOs could be set to foster the ambition raising of NDC targets rather than use the ITMOs for following NDC periods. For example, an ITMO could be applicable for the duration of a single NDC implementation period or up to 5 years from the time of the first transfer. In case ITMOs are valid for more than one NDC implementation period, it is possible that a variety of ITMOs will be transferred or used in a year. Furthermore, if the ITMO is assigned a validity period, an ITMO acquired in the implementation period of NDC 1 could be applied in following NDC implementation periods. For example, ITMOs issued in 2026, 2027, and 2028 and acquired in 2026, 2028, and 2029 respectively, can be used in 2031 which is 5 years from the first transfer.

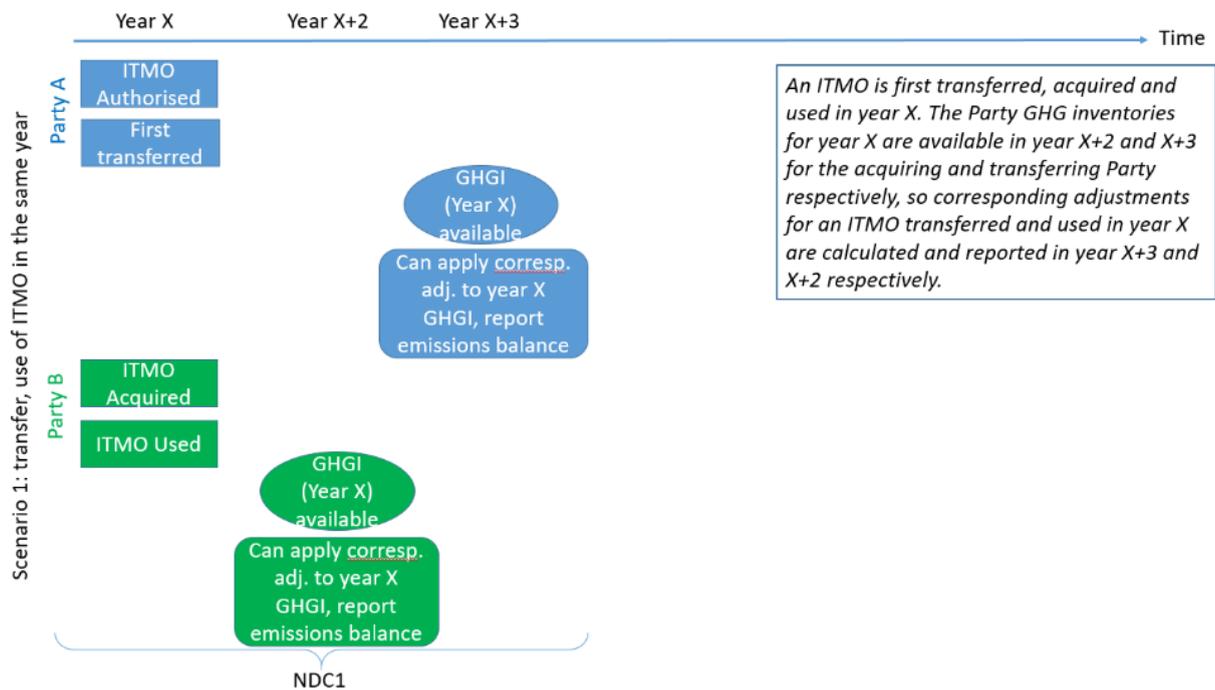


Figure 3: Potential time lags with transfer and use of ITMO in the same year

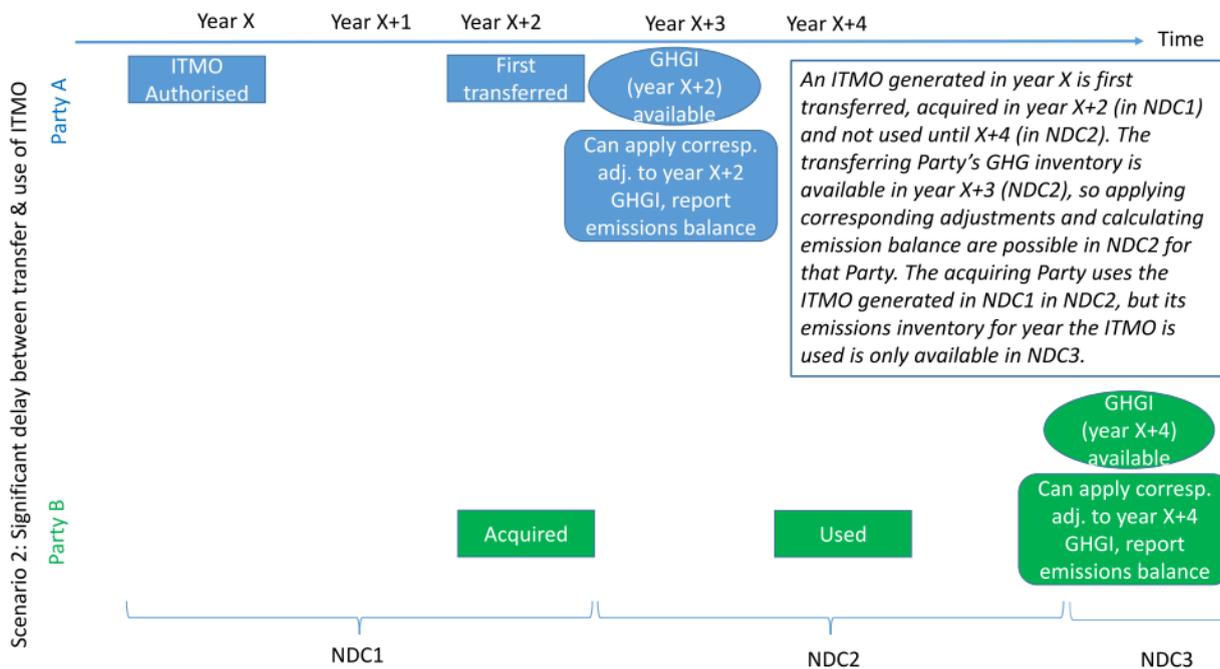


Figure 4: Potential time lags with significant delay between transfer and use of ITMO

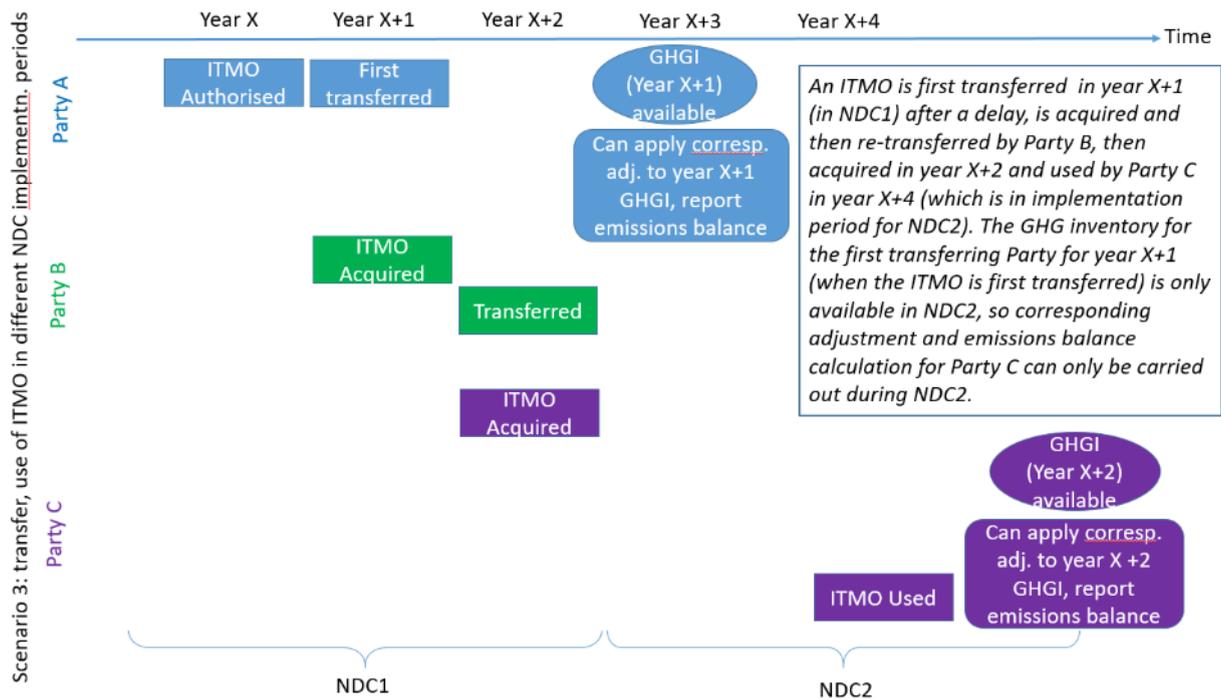


Figure 5: Potential time lags between the authorization, first transfer, and use of ITMOs

Source: (OECD & IEA, 2021)

The delay from the application of corresponding adjustment to the calculation of GHG inventory is the remaining issue of the A6.2 guidance (OECD & IEA, 2021). It may not be capable to apply corresponding adjustment for ITMOs transferred in year X and calculate the emissions balance for year X until the year in which the GHG inventory is released. This delay is due to the different capacity of developed and developing countries. According to UNFCCC, Parties must submit the National Inventory Document including CTF and the National Inventory Report every two years, together with the Biennial Transparency Report. Under the Paris Agreement, Annex I Parties are required to continue the annual submission of the GHG inventory. The flexibility provisions included in the MPGs, which are timing and scope of national GHG inventory report, are applied for developing country Parties.

In terms of inventory reporting, while the MPGs require all Parties to submit a Biennial Transparency Report (BTR) and a National Inventory Report (NIR) every two years, Annex I Parties under the Convention need to submit inventories annually. Therefore, while updated information on GHG inventories of Annex I Parties will be available every year, for all other Parties, it will be available every two years.

Regarding flexibility, according to the draft A6.2 guidance, NIRs prepared in accordance with the MPGs contemplate the use of flexibility by those developing country Parties that need it in the light of their capacities. For all Parties, the latest available inventory year in Parties' NIRs will present, at a minimum, a time lag of two years with the year in which the NIR is reported (UNFCCC, 2019). Developing country Parties that need flexibility in the light of their capacities have the flexibility to instead have their latest reporting year as three years before submitting their NIR.



Figure 6: Time lags in GHG inventory

Source: Adapted from (OECD & IEA, 2021)

The draft Article 6 rulebook has not indicated the duration between reporting and review or the expiry date of ITMOs. However, the rulebook suggests the guidance of the application of corresponding adjustment annually for both single-year NDC and the multi-year NDC (UNFCCC, 2021c). The proposed guidance on the corresponding adjustment related to ITMOs are that:

- With a single-year NDC, Parties need to update the multi-year emissions trajectories or budget for the NDC implementation period. The revision needs to be done annually for the total amount of ITMOs first transferred and used for each year in the NDC implementation period. The average annual amount of ITMOs first transferred and used over the NDC implementation period is calculated by taking the cumulative amount of ITMOs and dividing by the number of elapsed years in the NDC implementation and applying corresponding adjustment annually for the average amount of annual NDC target.
- With a multi-year NDC, the multi-year emissions trajectories or budget for the NDC implementation period is applied annually corresponding adjustment for the total amount of ITMOs first transferred and used each year in the NDC implementation period and cumulatively at the end of the NDC implementation period.

Any corresponding adjustment needs the clarification of specific delay duration between performing a corresponding adjustment and reporting this corresponding adjustment. Recommendations for the timing of any corresponding adjustment are given by OECD & IEA (2021) including:

- The transferring Party to apply the corresponding adjustment in the same calendar year that the ITMO is first transferred (see scenario 5, Figure 7). However, this may lead to a misleading picture of a country's progress towards or achievement of its NDC, as it would involve using a GHG inventory and ITMO transfers from different years (which may or may not be in a different NDC implementation period).
- Wait until the GHG inventory for the year in which the ITMO was transferred is available, and then apply the corresponding adjustment within a specified time delay from this date. Until this time, record the level of ITMOs first transferred into a registry (e.g., domestic "holding" account of its national registry, or a holding account of the Article 6 database). This option would have the advantage of matching the ITMO transfer year with the inventory year.
- Allow the transferring Party and acquiring Party to apply the corresponding adjustment in different years (e.g., reflecting the year of ITMO transfer, the year of ITMO use), as reflected in scenarios 1, 2 and 3 of Figure 5).

- Record the level of ITMOs first transferred into a registry (e.g., “holding” registry, or the Article 6 database) the year that they are transferred, and only apply the corresponding adjustment when the ITMOs are used (or cancelled). This option would have the advantage of being clearer on whether a NDC has been achieved and may lead to a more consistent demand for ITMOs over time – but would lead to a mismatch in when the transferring and acquiring Parties apply a corresponding adjustment and would also essentially allow for a carry-over of ITMOs into successive implementation periods. Such “banking” of ITMOs can impact overall ambition, e.g. by reducing or delaying the need for the acquiring Party to implement domestic mitigation actions.

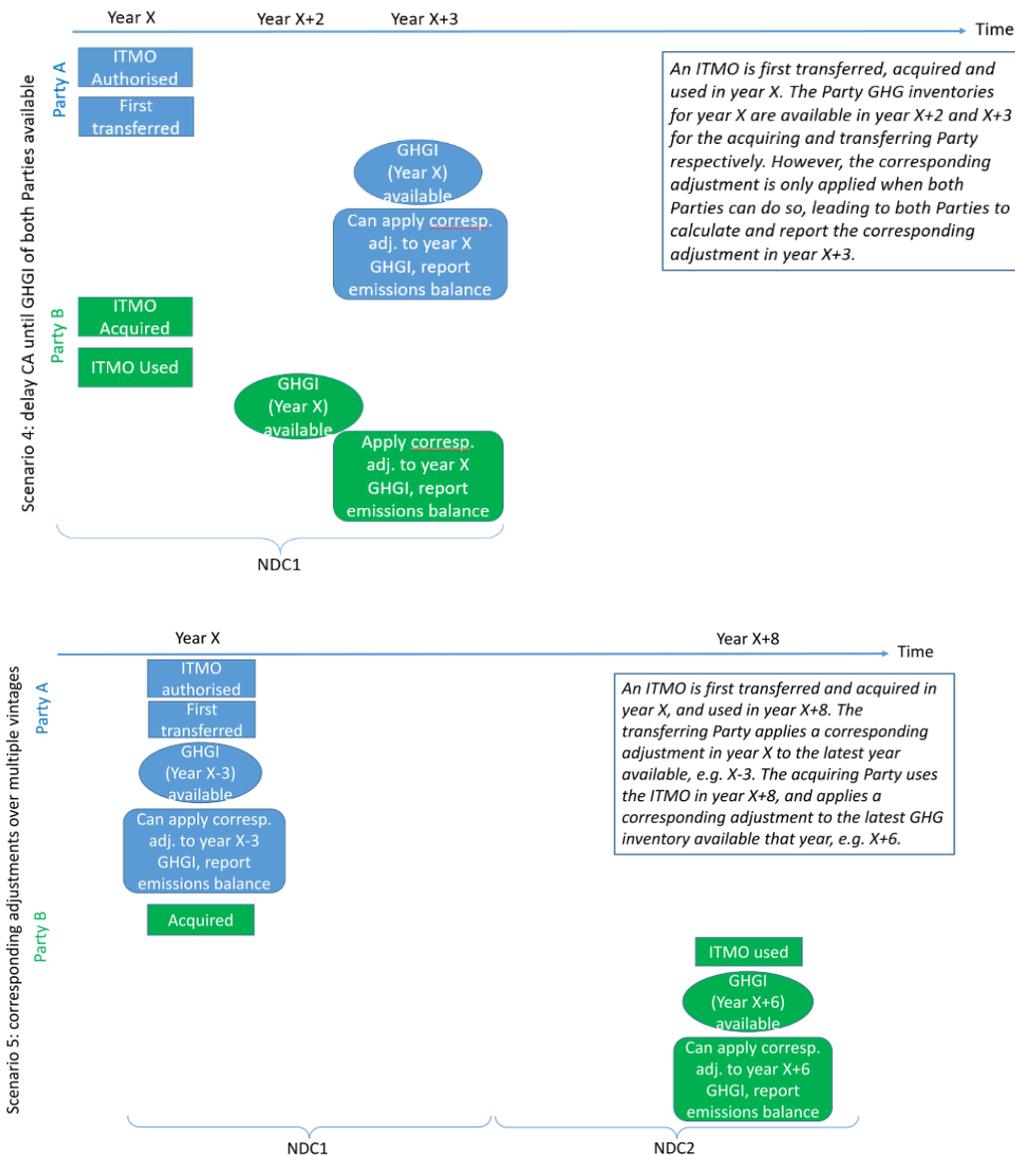


Figure 7: Possible timings of applying corresponding adjustments

Source: (OECD & IEA, 2021)

According to the draft 6.2 texts from COP25, Parties are to include information on ITMO holdings in their annual information. This text also highlights that information on ITMOs held is to be included in

the Article 6 database, to be implemented by the UNFCCC secretariat, and that participating Parties shall track transfer, acquisition, cancellation and use of ITMOs.

In addition to this, it may also be useful for Parties to establish a holding account to track (i.e., enter and store) information on ITMOs used but where corresponding adjustments have not yet been applied. Indeed, because of the time lag associated with calculating a Party's GHG emissions inventory, it is possible that some ITMOs are used for a year or more before corresponding adjustments can be applied (see e.g. scenario 3 of Figure 6 and scenario 4 of Figure 7). In order to facilitate tracking of progress, it may be helpful for Parties to keep a separate record of ITMOs used but where corresponding adjustments have not yet been applied (as information to do so is not yet available), and on ITMOs not yet used.

1.1.3. Reporting provisions related to Article 6 of the Paris Agreement

According to the draft CMA decision on guidance on cooperative approaches referred to in Article 6, paragraph 4, of the Paris Agreement, each participating Party to Article 6 needs to submit 3 main pieces of information including an Initial report, an Annual information, and a Regular information (UNFCCC, 2021a). The specific details of each report are described as below:

- Initial report

An initial report shall be submitted no later than the authorization of ITMOs from a cooperative approach or in conjunction with the next BTR for the NDC implementation period. A number of details are needed to include in an initial report (UNFCCC, 2021a):

- Summary of a Party's NDC
- The unit of ITMOs and principles for the application of the corresponding adjustments for NDCs
- Party's NDC mitigation information including quantity in tCO₂ eq, sectors, sources, type of GHGs and time period covered by the NDC, the reference level of emissions and removals for the relevant year or period, the target level of its NDC, and the quantification methodology of the NDC in t CO₂ eq.
- The portion in the relevant non-GHG indicator, in a non-GHG metric
- The emission level in the updated NDC including the outcomes from the cooperative and mitigation activities for the categories of anthropogenic emissions by sources and removals by sinks as identified by the host Party.
- A copy of the authorization of ITMO, its duration, the annual mitigation, and involved Parties and authorized entities

- Annual information

Annual information shall be submitted in common format to the Article 6 Database by no later than 15 April of the following year after the authorization of ITMO (UNFCCC, 2021a). This shall include:

- Annual information of ITMOs towards achievement of NDCs, and toward other international mitigation purposes such as first transfer, transfer, acquisition, holdings,

cancellation, voluntary cancellation of mitigation outcomes towards overall mitigation in global emissions, and towards NDCs;

- The cooperative approach, the other international mitigation purpose authorized by the Party, the first transferring participating Party, the using participating Party or authorized entity or entities, as soon as it is known, the year in which the mitigation occurred, the sector(s) and activity type(s), and the unique identifiers.

- Regular information

The following information in relation with cooperative approaches shall be compiled as an annex to the BTRs (UNFCCC, 2021a):

- Update of the information in the initial report.
- Authorized ITMOs towards NDCs implementation or other international mitigation purposes with changes to earlier authorization
- How corresponding adjustments undertaken in the latest reporting period, ensure that double counting is avoided in accordance with paragraph 36 of decision 1/CP.21 and are representative of progress towards implementation and achievement of its NDC, and how those corresponding adjustments ensure that participation in cooperative approaches does not lead to a net increase in emissions across participating Parties within and between NDC implementation periods;
- How it has ensured that ITMOs that have been used towards achievement of its NDC or mitigation outcome(s) authorized for use and that have been used for other international mitigation purposes will not be further transferred, further cancelled or otherwise used.

Following annual information and updates to submitted information of previous years in the NDC implementation period shall be included in the structured summary (UNFCCC, 2021a):

- Annual emissions balance by sources and removals by sinks towards NDC
- Annual amount of first transferred ITMOs
- Annual quantity of mitigation outcomes authorized for use for other international mitigation purposes and entities authorized to use such mitigation outcomes, as appropriate
- Annual quantity of ITMOs used towards achievement of its NDC
- Net annual quantity of ITMOs
- Total quantitative corresponding adjustments used to calculate the emissions balance and/or annual adjusted indicator in accordance with the Party's method for applying corresponding adjustments consistent
- The cumulative information of the net annual quantity of ITMOs
- The annual level of the relevant non-GHG indicator that is being used by the Party to track progress towards the implementation and achievement of its NDC
- The amounts per the cooperative approach, sector, transferring Party, using Party and vintage of the ITMO for each cooperative approach
- In BTRs that contain information on the end year of the NDC implementation period, in its assessment of whether it has achieved the target(s) for its NDC, the application of the necessary corresponding adjustments.

1.2. Projection of the contribution of ITMOs to Vietnam's NDC

1.2.1. The ambition of mitigation outcomes

Article 6 of the Paris Agreement may encourage Parties to update their NDCs (Michaelowa, Espelage, et al., 2021). Good market-based cooperation through Article 6 allows more ambitious NDC targets with a reduced mitigation cost and a diminished political opposition to stringent mitigation targets (Fuessler et al., 2019; Michaelowa et al., 2019). An ambitious enough NDC may contribute to attract potential acquiring Parties for issuing Parties. If the NDC includes deliberations on the conservativeness of and assumptions behind its baseline, it will send a message regarding the high environmental integrity of potential mitigation outcomes (The World Bank, 2020). In the context of buyer countries or countries with a mixed strategy, NDCs can signal the interest in specific types of international cooperation and investments. The NDC could, for example, specify a target volume for acquisitions, as is the case in the Swiss NDC and its underlying CO₂ Act.

However, the NDC target of a transferring country can negatively affect the global GHG emissions through transferring units that lack quality (La Hoz Theuer et al., 2017). Assume a country that issues a unit that lacks quality for emission reductions that fall within the scope of the country's NDC target and transfers the unit to another country. The countries involved in the transfer agree to account for the unit transfer as ITMOs. If the transferring country has an ambitious NDC target, it would have to compensate for the transfer to achieve its NDC target, either by further reducing emissions or purchasing ITMOs. The country has thus an incentive to ensure that units generated by mechanisms have quality. However, the same may not be accurate for countries with NDC targets less stringent than BAU or for units issued for emissions or emission reductions that fall outside the scope of the NDC target.

Initially, Article 6 supports the excellent and efficient implementation of NDCs in the long run for both seller country and buyer country, in the context of carbon neutrality commitments. However, stating interest in Article 6 cooperation in a country NDC alone is not sufficient to promote serious cooperation. For more credibility and higher attractiveness, specific information on the country's Article 6 strategy and, for the seller countries, methodological background information on additionality and baselines are needed in the NDC or other complementary policy documents. Conversely, in buyer countries, stating interest in Article 6 cooperation requires, first and foremost, a clear view regarding the share of ITMOs and domestic emission reductions in achieving the NDC.

The modalities of Article 6 cooperation can influence the NDC formulation, especially if seller (or buyer) governments have experience with market-based collaboration. The influence may be the case if interest groups favor specific approaches, including experiences under the CDM, results-based financing instruments (RBCF), Non-market approach (NMA), or the explicit rejection of carbon markets. The reporting requirements for Article 6 needs to be compatible with Article 13 (OECD & IEA, 2021). The interplay between reporting provisions under Article 6 and Article 13 could help improve the flow of information to be reported and establish a reporting infrastructure that help Parties avoid double counting and enhance the efficiency of the corresponding review.

Lastly, cooperation under Article 6 can become more concrete for NDC implementation plans. One must, however, note the diverse frameworks under which NDCs can be implemented (Riva et al., 2020), including a standalone implementation plan, detailed Annexes to an NDC, and climate-specific laws or regulations.

Due to Viet Nam's particular circumstances, the updated NDC indicates more aspiring targets in mitigating GHG emission (Viet Nam's Updated NDC, 2020). Compared to the INDC, GHG reductions in the updated NDC unconditional contributions are increased in both amount and ratio compared to BAU by 2030. More specifically, the reductions are increased by 21.2 million tons of CO₂eq (from 62.7 million tons in the INDC to 83.9 million tons in the updated NDC) equivalent to 1% of total emissions in 2030 according to the BAU scenario (from 8% in the INDC to 9% in the updated NDC). With international support (conditional goals), the contribution would increase from 25% to 27%, increasing the reduction amount by 52.6 million tons of CO₂eq (from 198.2 million tons in the INDC to 250.8 million tons in the updated NDC). The international support includes the cooperative approaches under Article 6 of the Paris Agreement. The specific emissions reduction by sectors are demonstrated on Table 1.

Table 1: Reduction contribution by sectors

Sector	Contribution with domestic resources		Contribution with international support		Total contribution with both domestic resources and international support	
	Compared to BAU scenario (%)	Reduction amount (mil. Tons of CO ₂ eq)	Compared to BAU scenario (%)	Reduction amount (mil. Tons of CO ₂ eq)	Compared to BAU scenario (%)	Reduction amount (mil. Tons of CO ₂ eq)
Energy	5.5	51.5	11.1	104.3	16.7	155.8
Agriculture	0.7	6.8	2.8	25.8	3.5	32.6
LULUCF	1.0	9.3	1.3	11.9	2.3	21.2
Waste	1.0	9.1	2.6	24.0	3.6	33.1
IP	0.8	7.2	0.1	0.8	0.9	8.0
Total	9.0	83.9	18.0	166.8	27.0	250.8

Source: (The Socialist Republic of Viet Nam, 2020)

1.2.2. Potential of financial mobilization for sustainable development

The implementation of climate change response actions will contribute to achieving Viet Nam’s sustainable development goals (The Socialist Republic of Viet Nam, 2020). Climate change adaptation actions in the updated NDC have the highest contribution to Goal 13: “Timely and efficiently respond to climate change and natural disasters” and Goal 11: “Make cities and human settlements sustainable and resilient, ensure safe living and working environments, allocate residents and workers by region reasonably”. Mitigation actions in the updated NDC have the most significant contribution to Goal 12: “Ensure sustainable production and consumption models”. There is a considerable opportunity for the allocation of the financial benefit from ITMO mechanism to achieve the sustainable development goals. Sustainable development requires “rapid and far reaching transitions” that are unprecedented in terms of scale and imply a “significant upscaling of investments” in a wide portfolio of mitigation options (Michaelowa et al., 2019).

According to Viet Nam’s Updated NDC, mitigation actions with international support can reduce total GHG emissions up to 166.8 million ton of CO₂eq by 2030. (Viet Nam’s Updated NDC, 2020). Estimated to 2030, financial need for responding to climate change in Viet Nam is about 3% to 5% of GDP. However, state budget only covers 30% of the financial need (Ministry of Natural Resources and Environment of Viet Nam, 2020). Given that public climate finance can cover only an insignificant share of the

financial need for responding to climate change, mobilization of private sector finance towards low-carbon and climate-resilient investments is key.

In this regard, Article 6 provides a framework under which market-and non-market mechanisms can trigger private sector activities and involved governments or private sector entities can generate revenues from the sale of ITMOs. Enhancing private sector participation in the implementation of climate action is clearly stated as an objective of “integrated, holistic and balanced non-market approaches” (United Nations, 2015), and for example could be triggered by public climate finance.

Experience with the Clean Development Mechanism (CDM under the Kyoto Protocol) shows that private sector engagement in mitigation investments can be triggered through international market mechanisms very quickly. The World Bank considers that The International ITMO purchase program would have the potential to mobilize annual resource flows of CHF 500–1000 million (USD 530–1060 million) over 10 years (The World Bank, 2021). In an ideal world, Article 6 would help the emergence of an international carbon market with a unified “currency” that would reduce regulatory costs, market volatility and increases market linkages, diversity and efficiency, all key parameters for funding mobilization.

2. ITMO accounting under the Modalities, Procedures, and Guidelines for the transparency framework (MPG)

2.1. Principles of ITMO accounting

ITMOs accounting shall be done in infrastructure for registries, the international registry, the Article 6 database, the centralized accounting and reporting platform (UNFCCC, 2021c). Each participating Party shall have access to registry records with unique identifier for the purpose of tracking: authorization, first transfer, transfer, acquisition, use towards NDCs, authorization for use towards other international mitigation purposes, and voluntary cancellation.

The international registry will be set up by the Secretariat as a part of the centralized accounting and reporting platform for participating Parties that do not have a registry or access to one. The international registry shall be able to perform the functions similarly to national registries. Any Party may request an account in the international registry.

2.1.1. Article 6 database

The transparency of cooperative approaches can be ensured by an Article 6 database with records and compiled information of participating Parties. The Article 6 database needs to include information on corresponding adjustments, emissions balances and information on first transferred, transferred, acquired, held and cancelled ITMOs and on any inconsistencies between participating Parties (UNFCCC, 2021a). The consistency of the information reported by the participating Parties will be checked by the Secretariat. The Secretariat has the responsibility to notify any inconsistencies in the reported information and publish non-confidential information on the consistency check on the centralized accounting and reporting platform. The participating Party has to submit any

amendments to the information recorded in the Article 6 database, including replying to any inconsistencies or carry out recommendation raised by the secretariat through the consistency check.

2.1.2. Centralized accounting and reporting platform

The Secretariat shall establish and maintain a centralized accounting and reporting platform to support review and thus guarantee the transparency of cooperative approaches. The secretariat will maintain the platform which includes the compilation of public non-confidential information on cooperative approaches and ITMOs, keeping linkages to the publicly available information submitted by the Parties, and delivering an annual report to the CMA on emissions balances, corresponding adjustments and recorded ITMOs (UNFCCC, 2021a).

2.2. Prospective mitigation measures for ITMO mechanism in the energy sector

The effects of the mitigation measures in Viet Nam's energy sector will be assessed taking as a reference or baseline the *Business As Usual* (BAU) scenario estimated based on both top-down and bottom-up approaches. According to Technical report of the updated NDC, there are 39 GHG mitigation measures reviewed and assessed within the energy sector, 29 for the consumption side and 10 for the supply side (MONRE, 2020):

- **For the energy consumption side:** there are 6 measures on energy efficiency and renewable energy for households; 10 measures on energy efficiency in the industrial sector; 12 measures on energy efficiency, transport mode change, and natural use change in transportation; 1 energy efficiency measure for service trade.

- **For the energy supply side:** there are 2 wind power measures; 2 solar power measures; 1 measure of biomass electricity; 2 measures of electricity from garbage; 1 bioelectricity measure; 1 small hydropower measure; and 1 supercritical coal thermal power.

The selected GHG emissions mitigation measures are classified into two groups: 25 measures based on domestic effort; and 14 requiring international support.

GHG emission mitigation measures based on domestic effort in the energy sector could reduce 409.2 million tons of CO₂e between 2015 and 2030 of which 51.5 million tons of CO₂e only in 2030 (MONRE, 2020). Financial needs and emission reduction potential of each of these 25 mitigation measures in the period 2015 – 2030 are presented in Table 2.

Table 2: Financial needs, cost, and emission reduction potential of mitigation measures with domestic effort in the energy sector

Measure	Emission reduction potential (mil. tons CO ₂ e)		Cost of emission reduction (USD/tCO ₂ e)	Financial needs (2015 – 2030) (mil. USD)
	2015-2030	2030		
E1. Using high power efficiency air conditioner for households	23.9	4.6	7.4	4,150.5
E2. Using high power efficiency refrigerator	11.3	1.6	2.2	3,334.7
E3. Using energy-saving lights	47.0	6.4	-16.3	891.4
E4. Using solar power boilers	5.1	1.0	21.3	345.9
E5. Using biogas instead of coal for cooking in rural areas	9.5	1.1	0.1	129.4
E6. Optimize clinker production performance	3.1	0.4	-6.4	22.9
E7. Using vertical grinder for cement production	6.8	0.9	29.8	368.2
E8. Reducing heat loss in cement production	4.3	0.6	-11.5	3.3
E9. Recovering heat from cement production	15.0	1.8	-6.8	354.8
E10. Application of innovative technology in brick production	10.8	1.4	-11.8	36.8
E11. Spraying powder anthracite into furnace	2.7	0.7	-10.8	11.8
E12. Scrap preheating before inserting to Electric Arc Furnace	4.1	0.6	-19.9	18.5
E13. Heating in steel mills	4.9	0.7	-15.1	46.2
E14. Heat recovery from BOF	4.3	0.9	0.3	56.7

Measure	Emission reduction potential (mil. tons CO ₂ e)		Cost of emission reduction (USD/tCO ₂ e)	Financial needs (2015 – 2030) (mil. USD)
	2015-2030	2030		
E15. Fuel consumption limit for Newly manufactured, assembled, and imported motor vehicles	15.8	5.1	-65.5	0.4
E16. Transitioning from private vehicles to public transport (bus, BRT, urban railway)	4.6	0.4	-9.7	411.5
E17. The transition from road transport to inland and coastal waterways	16.0	1.6	-78.3	282.7
E18. Using electricity motorcycle	4.6	0.6	-67.2	251.2
E19. Promoting the biofuel consumption	3.1	0.3	43.8	93.0
E20. Using CNG buses	0.03	0.01	34.1	6.5
E21. Using high energy efficiency devices for commercial services	23.3	3.8	-16.9	134.4
E22. Developing small scale hydropower	100.7	9.1	3.1	3,592.9
E23. Developing solar power	60.8	5.0	27.3	3,891.0
E24. Developing wind power	18.2	1.5	46.5	1,088.4
E25. Developing electricity generation from a garbage incinerator	9.1	1.4	25.1	364.6
Total	409.0	51.5		19,887.7

Source: (MONRE, 2020)

Among these 25 measures, the E23 measure on Solar power is one of the most ambitious measures with an emission reduction potential of 60.8 million tons of CO₂e in 2015-2030 cumulatively.

Therefore, it is considered relevant to conduct a case study for ITMO accounting based on the E23 measure (see Section 2.4.3).

2.3. Common tabular formats (CTF) for tracking the NDC implementation progress under the MPGs

2.3.1. Indicators

The MPGs state that Parties “shall identify the indicator(s) that it has selected to track progress towards the implementation and achievement of its NDC” and “shall provide the most recent information for each selected indicator identified for each reporting year during the implementation period of the NDC” (UNFCCC, 2021d). The selected indicators to track progress of Parties’ NDC are listed below (UNFCCC, 2021b):

- Information for the reference point(s), level(s), baseline(s), base year(s), or starting point(s), as appropriate
- Updates in accordance with any recalculation of the GHG inventory, as appropriate
- Relation to NDC

Each Party shall report this in a Common Tabular Format (CTF). A Party may amend the reporting format to remove specific rows if the information to be provided in those rows is not applicable to the Party’s NDC. Similarly, a Party could add rows for each additional selected indicator and related information (UNFCCC, 2021b).

Currently, Viet Nam has only proposed the following criteria, which are mostly qualitative criteria with completeness status of each target, to track the progress of implementing NDC (Viet Nam’s NDC, 2020):

- Completion of a policy system in response to climate change; completion of the technical standards and regulations on emission reduction and GHG inventory; strengthening of the MRV system for mitigation activities, and the M&E system for adaptation activities; completion of 100% of the reviews of the technical standards and regulations for designing constructions and infrastructure that require adjustments in the context of climate change adaptation; completion of at least 90% of the socio-economic development plans and master plans integrated with natural disaster risks management and climate change adaptation.
- Achievement of the mitigation objectives. Ensuring the economic and environmental efficiency of mitigation measures. Completion of 100% of the climate change impact and vulnerability assessments across sectors and regions.
- Reduction of the national rate of poor households by 1%-1.5%/year on average (for poor districts and communes the reduction is 4%/year; for poor ethnic minority households, 3%-4%/year); increase of average incomes of ethnic minorities to half of the national average; 70% of communes in ethnic minorities living in mountainous areas reaching the new rural standard.

- Completion and implementation of the National Water Resource Master Plan for the 2021–2030 period, with a vision to 2050 and the Integrated River Basin and Interprovincial Water Master Plan for the 2021–2030 period with a vision to 2050.
- Improvement of fishing port systems towards an industrial and modern direction; improvement of information systems for managing fishing ports as well as storm shelters for fishing boats; connection of information between fishing ports, storm shelters and fishing boats; improvement of the system of fishing ports and typhoon shelters for fishing boats on islands, especially forefront islands.
- Increase of forest coverage to 42%–42.5%; increase of the area of coastal protection forests, including the extension of mangroves plantation; preservation and sustenance of the ecosystems.
- Achievement of 95%–100% of the population with access to clean and hygienic water; 100% of the population with access to health care services.
- Gradual reduction of human loss caused by natural disasters during the 2018–2030 period to lower than during the 2005–2017 period; reduction of the economic damage caused by natural disasters to not more than 1.2% of the average GDP during the period 2018–2030; resettlement for 100% of the households living in areas at high risk of flash floods and landslides to safe areas; ensuring that 100% of the households in densely populated areas frequently hit by natural disasters can move to safer areas; for areas that cannot yet be relocated, the completion of 100% of the installation of monitoring and warning systems for floods, flash floods and landslides; ensuring that 100% of the critical high-risk areas have the systems for monitoring and controlling natural disaster risks; ensuring that 100% of the frequently flooded areas have warning devices installed.

2.3.2. Methodologies and accounting approaches

Description of each methodology and/or accounting approach used, as applicable for (UNFCCC, 2021e):

- For the first NDC under Article 4
 - Accounting approach, including how it is consistent with Article 4, paragraphs 13–14, of the Paris Agreement
- For the second and subsequent NDC under Article 4, and optionally for the first NDC under Article 4
 - Information on the accounting approach used is consistent with paragraph 72 of the MPGs
 - Target(s) and description, including target type(s) (e.g. economy-wide absolute emission reduction, emission intensity reduction, emission reduction below a projected baseline, mitigation co-benefits of adaptation actions or economic diversification plans, policies and measures, and other)
 - Target year(s) or period(s), and whether they are single-year or multi-year target(s)

- Reference point(s), level(s), baseline(s), base year(s) or starting point(s), and their respective value(s)
 - Time frame(s) and/or periods for implementation
 - Scope and coverage, including, as relevant, sectors, categories, activities, sources and sinks, pools and gases
 - Intention to use cooperative approaches that involve the use of internationally transferred mitigation outcomes under Article 6 towards NDCs under Article 4 of the Paris Agreement
 - Any updates or clarifications of previously reported information (e.g., recalculation of previously reported inventory data, or greater detail on methodologies or use of cooperative approaches).
- Explain how the accounting for anthropogenic emissions and removals is in accordance with methodologies and common metrics assessed by the IPCC and in accordance with decision 18/CMA.1
 - Explain how consistency has been maintained between any GHG data and estimation methodologies used for accounting and the Party's GHG inventory, pursuant to Article 13, paragraph 7(a), of the Paris Agreement, if applicable
 - Explain how overestimation or underestimation has been avoided for any projected emissions and removals used for accounting
- For each NDC under Article 4
 - Accounting for anthropogenic emissions and removals in accordance with methodologies and common metrics assessed by the IPCC and adopted by the Conference of the Parties serving as the meeting of the Parties to the Paris Agreement
 - Each methodology and/or accounting approach used to assess the implementation and achievement of the target(s), as applicable (para. 74(a) of the MPGs)
 - Each methodology and/or accounting approach used for the construction of any baseline, to the extent possible (para. 74(b) of the MPGs)
 - If the methodology or accounting approach used for the indicator(s) in Table 1 differ from those used to assess the implementation and achievement the target, describe each methodology or accounting approach used to generate the information generated for each indicator (para. 74(c) of the MPGs)
 - Any conditions and assumptions relevant to the achievement of the NDC under Article 4, as applicable and available (para. 75(i) of the MPGs)
 - Key parameters, assumptions, definitions, data sources and models used, as applicable and available (para. 75(a) of the MPGs)
 - IPCC Guidelines used, as applicable and available (para. 75(b) of the MPGs)
 - Report the metrics used, as applicable and available (para. 75(c) of the MPGs) For Parties whose NDC cannot be accounted for using methodologies covered by IPCC

- guidelines, provide information on their own methodology used, including for NDCs, pursuant to Article 4, paragraph 6, of the Paris Agreement, if applicable
- Provide information on methodologies used to track progress arising from the implementation of policies and measures, as appropriate
 - Where applicable to its NDC, any sector-, category- or activity-specific assumptions, methodologies and approaches consistent with IPCC guidance, taking into account any relevant decision under the Convention, as applicable (para. 75(d) of the MPGs)
 - For Parties that address emissions and subsequent removals from natural disturbances on managed lands, provide detailed information on the approach used and how it is consistent with relevant IPCC guidance, as appropriate, or indicate the relevant section of the national GHG inventory report containing that information (para. 75(d)(i) of the MPGs)
 - For Parties that account for emissions and removals from harvested wood products, provide detailed information on which IPCC approach has been used to estimate emissions and removals (para. 1(f) of annex II to decision 4/CMA.1, para. 75(d)(ii) of the MPGs)
 - For Parties that address the effects of age-class structure in forests, provide detailed information on the approach used and how this is consistent with relevant IPCC guidance, as appropriate (para. 75(d)(iii) of the MPGs)
 - How the Party has drawn on existing methods and guidance established under the Convention and its related legal instruments, as appropriate, if applicable
 - Any methodologies used to account for mitigation co- benefits of adaptation actions and/or economic diversification plans (para. 75(e) of the MPGs)
 - Describe how double counting of net GHG emission reductions has been avoided, including in accordance with guidance developed related to Article 6 if relevant (para. 76(d) of the MPGs)
 - Any other methodologies related to the NDC under Article 4 (para. 75(h) of the MPGs)
- Ensuring methodological consistency, including on baselines, between the communication and implementation of NDCs
 - Explain how consistency has been maintained in scope and coverage, definitions, data sources, metrics, assumptions and methodological approaches including on baselines, between the communication and implementation of NDCs
 - Explain how consistency has been maintained between any GHG data and estimation methodologies used for accounting and the Party's GHG inventory, pursuant to Article 13, paragraph 7(a), of the Paris Agreement, if applicable and explain methodological inconsistencies with the Party's most recent NIR, if applicable (para. 76(c) of the MPGs)

- For Parties that apply technical changes to update reference points, reference levels or projections, the changes should reflect either of the following:
 - Technical changes related to technical corrections to the Party's inventory
 - Technical changes related to improvements in accuracy that maintain methodological consistency
 - Explain how any methodological changes and technical updates made during the implementation of their NDC were transparently reported
- Striving to include all categories of anthropogenic emissions or removals in the NDC and, once a source, sink or activity is included, continuing to include it:
 - Explain how all categories of anthropogenic emissions and removals corresponding to their NDC were accounted for
 - Explain how Party is striving to include all categories of anthropogenic emissions and removals in its NDC, and, once a source, sink or activity is included, continue to include it
 - Provide an explanation of why any categories of anthropogenic emissions or removals are excluded
- Each Party that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4, or authorizes the use of mitigation outcomes for international mitigation purposes other than achievement of its NDC
 - Provide information on any methodologies associated with any cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 (para. 75(f) of the MPGs)
 - Provide information on how each cooperative approach promotes sustainable development, consistent with decisions adopted by the CMA on Article 6 (para. 77(d)(iv) of the MPGs)
 - Provide information on how each cooperative approach ensures environmental integrity consistent with decisions adopted by the CMA on Article 6 (para. 77(d)(iv) of the MPGs)
 - Provide information on how each cooperative approach ensures transparency, including in governance, consistent with decisions adopted by the CMA on Article 6 (para. 77(d)(iv) of the MPGs)
 - Provide information on how each cooperative approach applies robust accounting to ensure, inter alia, the avoidance of double counting, consistent with decisions adopted by the CMA on Article 6 (para. 77(d)(iv) of the MPGs)
 - Any other information consistent with decisions adopted by the CMA on reporting under Article 6 (para. 77(d)(iii) of the MPGs)

2.3.3. Structured summary

Regarding the information necessary to track progress made in implementing and achieving NDCs under Article 4 of the Paris Agreement (section III.C of the MPGs), draft guidance of UNFCCC proposes a Structured Summary to track progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement (UNFCCC, 2021e) including information on mitigation outcomes used for international mitigation purposes under Article 6. Structured summary for Parties that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 of the Paris Agreement is referred in the Annex.

3. Case study: the Solar PV panel ITMOs

3.1. Emissions trajectories for the target Net-Zero

2050 Net-Zero scenario emissions are estimated assuming the maximum emission reduction potential of each sector. GHG emission reduction targets of each sector for the period 2021 – 2030 are based on the updated NDC. The GHG emissions reductions targets for the period 2031 – 2050 are based on the National Strategy on Climate Change (Prime minister of Vietnam, 2022).

It can be seen that the energy sector has the greatest potential to reduce GHG emissions with more than 1.2 billion tons of CO₂eq by 2050 (see Table 4). GHG emissions from the Energy sector under the BAU scenario also account for the largest share with nearly 80%.

In Table 4, it can also be appreciated that in the foreseen emissions pathway to reach net-zero by 2050, emissions will still continue growing in the coming years, although at a lower rate than under the BAU. The total emissions are assumed to peak by 2035 and decrease afterwards. Besides, most of the measures in the National Strategy on Climate Change will be implemented significantly only after 2035, that is why the GHG emissions will only start decreasing after that date. Moreover, please note that, since the policies to achieve Net-Zero by 2050 have not been yet applied, it is impossible to calculate the exact rate of policy execution. The assumption for this scenario may consequently lead to overestimate GHG emissions reductions in the whole 2021-2050 period.

Table 4. GHG emissions under the Net-Zero scenario for the period 2014-2050

Unit: million tons of CO₂eq.

Scenario	2014	2020	2025	2030	2035	2040	2045	2050
BAU	284.0	513.3	716.5	927.9	1096.1	1252.5	1396.7	1519.3
- Energy	171.6	347.5	500.7	678.4	833.8	972.7	1102.4	1210.3
+ Energy industry ¹	75.4	214.8	296.3	290.6	355.2	386.8	413.0	403.8
- Agriculture	89.8	90.1	99.4	112.2	119.6	132.1	142.6	152.9

¹ This subsector covers only electricity generation.

- LULUCF	-37.5	-35.4	-37.9	-49.2	-52.2	-55.5	-58.1	-60.2
- Waste	21.5	30.6	38.1	46.3	55.8	65.2	74.7	84.2
- IP	38.6	80.5	116.1	140.3	139.2	138	135.1	132.1
Net-Zero	284.0	387.3	518.6	530.5	539.1	419.3	233.8	0.0
- Energy	171.6	247.0	394.1	457.2	495.3	408.2	261.3	101.0
+ Energy industry	75.4	207.8	279.1	272.8	315.8	312.4	294.6	264.0
- Agriculture	89.8	88.3	75.3	63.9	62.2	63.8	61.5	56.4
- LULUCF	-37.5	-45.9	-65.6	-95.3	-112.4	-134.0	-149.6	-185.2
- Waste	21.5	30.6	22.91	18.2	15.9	13.3	10.64	7.8
- IP	38.6	67.3	91.9	86.5	78.1	68.0	50.0	20.0

Since the implementation period of the NDC goes from 2021 to 2030, the emissions trajectories for the target Net-Zero need to be interpolated² for each of the years of the period. The results of the interpolation are below.

Table 5. Emissions trajectories for the target Net-Zero

Unit: million tons of CO₂eq.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Emissions trajectories consistent with the Net Zero target	387.3	413.6	439.8	466.1	492.3	518.6	521.0	523.4	525.7	528.1	530.5

3.2. Annual mitigation outcomes towards NDC

In order to implement the GHG emission reduction activities with national effort in the period 2021-2030 and achieve the goal set in the updated NDC i.e., total GHG emissions will be reduced by 9% compared to BAU by 2030, the implementation roadmap estimated for each year of the sectors for the period 2021-2030 are presented as below.

² $y = y_0 \frac{x_1 - x}{x_1 - x_0} + y_1 \frac{x - x_0}{x_1 - x_0}$, in which y is unknown value at x , (x_1, y_1) and (x_0, y_0) is 2 known points

Table 6. Annual mitigation outcomes by sectors towards NDC

Unit: million tons of CO₂eq.

	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Annual mitigation outcomes towards NDC	32.2	36.7	41.6	47.1	52.9	58.6	63.9	69.9	76.3	83.9
<i>-Energy</i>	22.4	24.8	27.1	29.8	32.3	35.7	38.6	42.3	46	51.5
<i>+Energy Industry³</i>	7.4	8.2	8.9	9.8	10.7	11.8	12.7	14.0	15.2	17.0
<i>-Agriculture</i>	1.4	1.6	2.3	3.2	4.6	5.1	5.5	5.8	6.5	6.8
<i>-LULUCF</i>	6.1	6.6	7.1	7.5	7.9	8.2	8.5	8.8	9.1	9.3
<i>-Waste</i>	1.7	2.5	3.3	4.1	5	5.7	6.6	7.4	8.3	9.1
<i>-Industrial processes</i>	0.6	1.2	1.8	2.5	3.1	3.9	4.7	5.6	6.4	7.2

Source: MONRE, 2020

3.3. The mitigation outcomes from Solar PV

At COP26 under the UNFCCC in Glasgow, Viet Nam committed to reach the net zero emissions by 2050. This target triggers more ambitious mitigation efforts in all sectors especially in, the most intensive emission sector, the energy sector. Among mitigation measures in the energy sector, the solar power development plays an important role in reducing the emissions. The solar power development measures have been set towards Vietnam’s Updated NDC 2020 and will be maximized to achieve the Net-Zero target by 2050, i.e., the mitigation measures listed in Table 8 are also included in the NDC measures of solar power development. Besides, solar power is also balanced with other energy sources such as wind power, biomass power, and nuclear power. Assumptions about solar energy development are shown in the following table.

³ Including the following measures listed in Table 2: E.22, E.23, E.24, E.25. Technical Report of Updated NDC (MONRE, 2020).

Table 7. The goal of solar power development to 2050 according to the Net-Zero scenario

Measures	Assumption – implementation period	
	2021-2030	2031-2050
Developing concentrated solar power	Increasing the capacity of concentrated solar power plants from 4,086 MW in 2019 to 8,736 MW in 2030	Reach 25,034 MW in 2035, 75,987 in 2045 and 94,760 MW in 2050
Developing rooftop solar power	Increasing the capacity of rooftop solar power plants from 1,607 MW in 2020 to 7,755 MW in 2030	Reach 20,679 MW in 2045 and 28020 MW in 2050

Source: (Technical report on national climate change strategy, MONRE, 2022)

The GHG emissions reduction from solar power is calculated by multiplying the grid’s emission factor by total electricity generated from solar power. It is estimated that the potential to reduce GHG emissions comes mainly from concentrated solar power development solutions and is about 81%. The potential for GHG emission reduction of the rooftop solar power solution is only about 19% (MONRE, 2022) (Table 8).

Table 8. Potential for mitigation of solar power under the Net-Zero scenario

Unit: million tons of CO₂eq.

Measures	2020	2025	2030	2035	2040	2045	2050
Concentrated solar power	5.55	10.14	10.44	31.62	60.30	97.50	113.33
Rooftop solar power	1.45	7.12	7.33	7.83	14.14	20.93	26.52
Total	7.00	17.26	17.77	39.45	74.44	118.43	139.85

Since the implementation period of the NDC is from 2021 to 2030, the mitigation outcomes of solar power for each year within that period will need to be calculated with the linear interpolation method⁴. The results of this interpolation of the mitigation outcomes of solar power are below.

Table 9. Interpolation of mitigation outcomes from Solar PV

Unit: million tons of CO₂eq.

Interpolation of mitigation	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030

⁴ $y = y_0 \frac{x_1 - x}{x_1 - x_0} + y_1 \frac{x - x_0}{x_1 - x_0}$, in which y is unknown value at x, (x₁, y₁) and (x₀, y₀) is 2 known points

outcomes from Solar PV												
Concentrated solar power	5.55	6.47	7.39	8.30	9.22	10.14	10.20	10.26	10.32	10.38	10.44	
Rooftop solar power	1.45	2.58	3.72	4.85	5.99	7.12	7.16	7.20	7.25	7.29	7.33	

3.4. The dynamic baseline for ITMOs estimation

Regardless, whether they are part of Article 6.2 cooperative approaches or Article 6.4 mechanism, the estimation of the ITMOs produced by a given activity requires the establishment of a baseline against which the mitigation outcomes of the project can be measured. The Article 6 rulebook agreed at COP 26 in Glasgow sets the requirements such baselines must fulfil so that they can be used to estimate ITMOs under Article 6.2 or 6.4.

In the case of Article 6.2, the Article 6 rulebook establishes that, for a cooperative approach to ensure environmental integrity, it must, among other things, guarantee the quality of the mitigation outcomes it will produce through a baseline set in a conservative way and below BAU projections. It is also established that the Party shall report on the setting of the baseline in the Initial Report and the Annexes to the BTRs. However, no more guidance is provided on how exactly is the baseline to be estimated.

For Article 6.4 mechanism on the other hand, the Article 6 rulebook establishes a few more conditions for baseline setting. Apart from the requisite to be conservative and below BAU to guarantee environmental integrity like in Article 6.2, under Article 6.4, baselines shall also be set so they are compatible with the Party’s NDC and its long-term low GHG emissions and development strategy (LT-LEDS) in case the Party has submitted one. In addition to this, all the mechanism’s methodologies shall encourage ambition over time and be aligned with Paris Agreement long-term temperature goals.

Previous baseline setting methodologies may not be able to fulfil Article 6.4 baseline requirements. To solve this, Michaelowa, Ahonen, et al. (2021) has proposed an approach based on adjusting the BAU downwards through the application of a so-called *ambition coefficient* which will change over time gradually reducing the baseline emission intensity downwards from BAU levels towards the country long-term emissions plans emissions targets. The so-calculated baseline is referred as *dynamic baseline* and may be below the NDC scenario if this is not aligned with PA long-term goals or the country LT-LEDS.

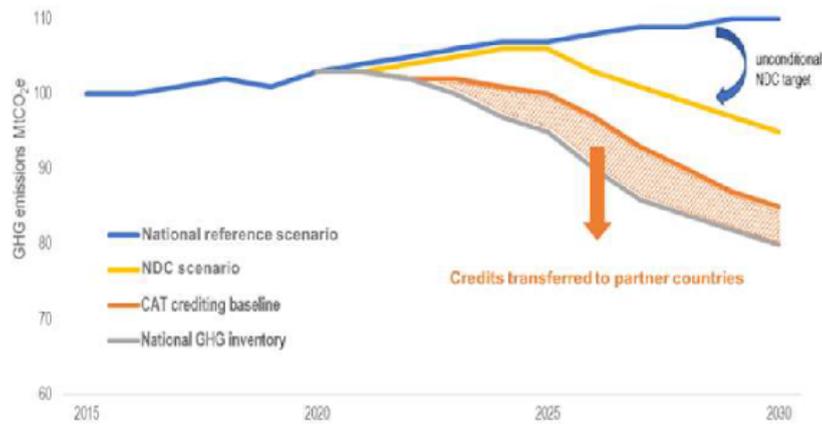


Figure 8: Baseline setting referred as dynamic baseline

Source: (Michaelowa et al., 2022)

As for the determination of *ambition coefficient*, no detailed methodology has been established yet, however it is assumed it will have to reflect the countries different circumstances (e.g., GDP, GNI, technical capacity etc.) as well as their different historical responsibilities. In this regard, it is expected the ambition coefficient will fall faster for high-income than for low-income countries so that the latter can produce emission credits for a longer period of time.

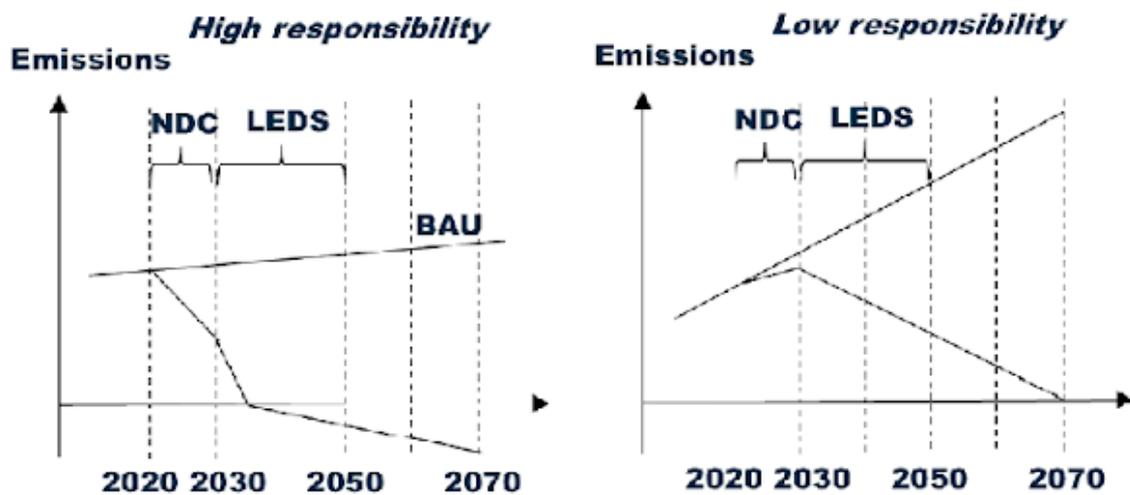


Figure 9: Different realistic emission pathways depending on country responsibilities and capacities

Source: (Michaelowa, Ahonen, et al., 2021)

Based on this approach, and since Solar PV falls within the energy industry subsector (i.e. electricity production), a dynamic baseline for the energy industry in Vietnam has been developed (for more information see CCOZONE (2022)). In case it is decided the mitigation outcomes of the Solar PV activities planned under the Draft Power Development Plan VIII and the Draft “National Energy Master Plan for the period 2021-2030, with a vision to 2050” will be traded internationally under Article 6.4, this dynamic baseline could be used to assess the amount of ITMOs the Solar PV activities could produce.

Table 10. Energy industry dynamic baseline.

Unit: mil tCO₂e_q

Dynamic Baseline _{ener} energy industry	2020	2022	2024	2026	2028	2030	2032	2034
	214.9	245.0	275.7	289.3	285.6	281.8	303.9	327.0
	2036	2038	2040	2042	2044	2046	2048	2050
	343.3	353.8	359.5	353.7	346.7	328.7	305.5	264.0

Source: (CCOZONE, 2022)

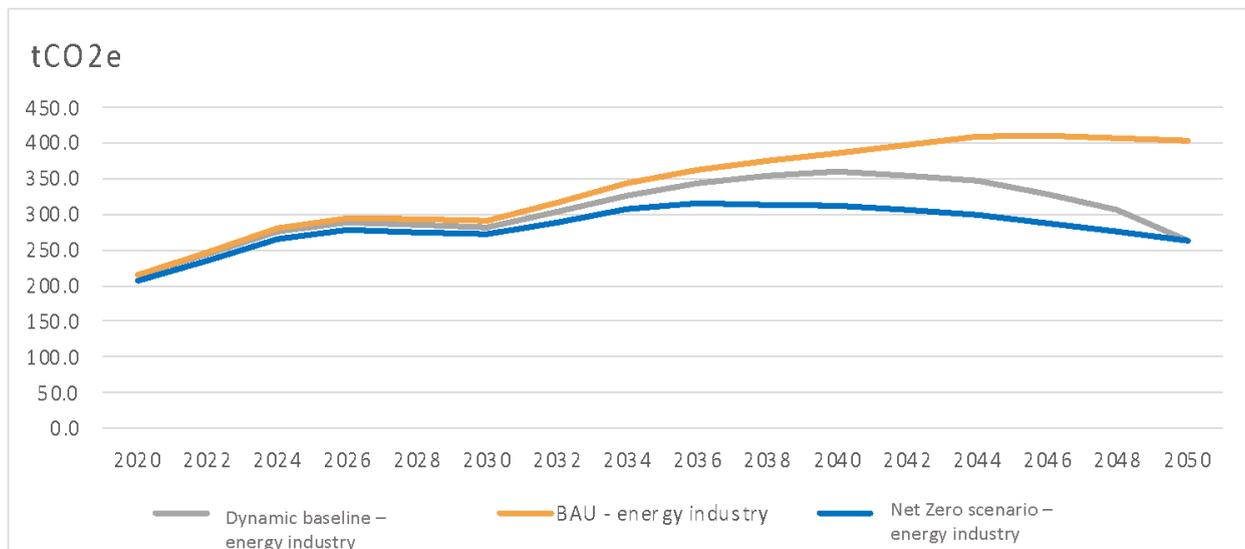


Figure 10: Energy industry dynamic baseline

Source: (CCOZONE, 2022)

However, if the Solar PV activities are used for cooperative approaches under Article 6.2 then, a baseline that follows Article 6 rulebook guidance for this case must be chosen for the calculation of the ITMOs.

3.5. ITMOs accounting towards NDC

To fill up the structured summary for tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement including the ITMOs issued or acquired under Article 6 cooperative approaches, the following indicators will need to be calculated based on national data.

- Reduction rate compared with the baseline (%)
- Mitigation outcomes of energy sector towards updated NDC
- Mitigation outcomes of 2 options solar PV towards updated NDC
- Energy emissions balance according to updated NDC
- Energy emissions balance according to the Draft Power Master Plan VIII

- **Establishing a baseline**
- **ITMOs from Solar PV**

Table 11. ITMOs accounting towards NDC

Unit: million tons of CO₂eq.

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
BAU emissions trajectory	513.30	553.90	594.60	635.20	675.90	716.50	758.80	801.10	843.40	885.70	928.00
<i>-Energy</i>	347.50	378.10	408.80	439.40	470.10	500.70	536.20	571.80	607.30	642.90	678.40
<i>+Energy industry</i>	214.80	231.10	247.40	263.70	280.00	296.30	295.20	294.00	292.90	291.70	290.60
<i>-Agriculture</i>	90.10	92.00	93.80	95.70	97.50	99.40	102.00	104.50	107.10	109.60	112.20
<i>-LULUCF</i>	-35.40	-35.90	-36.40	-36.90	-37.40	-37.90	-40.20	-42.40	-44.70	-46.90	-49.20
<i>-Waste</i>	30.60	32.10	33.60	35.10	36.60	38.10	39.70	41.40	43.00	44.70	46.30
<i>-Industrial processes</i>	80.50	87.60	94.70	101.90	109.00	116.10	120.90	125.80	130.60	135.50	140.30
Emissions trajectories consistent with the target 2050 Net-Zero	387.30	413.60	439.80	466.10	492.30	518.60	521.00	523.40	525.70	528.10	530.50
<i>-Energy</i>	247.0	276.40	305.80	335.30	364.70	394.10	406.70	419.30	432.00	444.60	457.20
<i>+Energy Industry</i>	207.80	221.10	236.30	250.60	264.80	279.10	277.80	276.60	275.30	274.10	272.8

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<i>-Agriculture</i>	88.30	85.70	83.10	80.50	77.90	75.30	73.00	70.70	68.50	66.20	63.90
<i>-LULUCF</i>	-45.90	-49.80	-53.80	-57.70	-61.70	-65.60	-71.50	-77.50	-83.40	-89.40	-95.30
<i>-Waste</i>	30.60	29.06	27.52	25.99	24.45	22.91	21.97	21.03	20.08	19.14	18.20
<i>-Industrial processes</i>	67.30	72.20	77.10	82.10	87.00	91.90	90.80	89.70	88.70	87.60	86.50
Energy industry subsector dynamic baseline (million ton CO ₂ eq)	214.90	229.95	245.00	260.35	275.70	282.50	289.30	287.45	285.60	283.70	281.80
Annual mitigation outcomes towards NDC		32.20	36.70	41.60	47.10	52.90	58.60	63.90	69.90	76.30	83.90
<i>-Energy</i>		22.40	24.80	27.10	29.80	32.30	35.70	38.60	42.30	46.00	51.50
<i>+Energy industry</i>		7.40	8.20	8.90	9.80	10.70	11.80	12.70	14.00	15.20	17.00
<i>-Agriculture</i>		1.40	1.60	2.30	3.20	4.60	5.10	5.50	5.80	6.50	6.80
<i>-LULUCF</i>		6.10	6.60	7.10	7.50	7.90	8.20	8.50	8.80	9.10	9.30

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
<i>-Waste</i>		1.70	2.50	3.30	4.10	5.00	5.70	6.60	7.40	8.30	9.10
<i>Industrial processes</i>		0.60	1.20	1.80	2.50	3.10	3.90	4.70	5.60	6.40	7.20
Reduction rate compared with the BAU baseline (%)		5.81	6.17	6.55	6.97	7.38	7.72	7.98	8.29	8.61	9.04
Mitigation outcomes from Solar PV towards NDC		2.20	2.40	2.60	2.90	3.10	3.50	3.70	4.10	4.50	5.00
Mitigation outcomes of Concentrated Solar PV according to Draft Power Master Plan VIII		6.47	7.39	8.30	9.22	10.14	10.20	10.26	10.32	10.38	10.44
Mitigation outcomes of		2.58	3.72	4.85	5.99	7.12	7.16	7.20	7.25	7.29	7.33

	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Rooftop Solar PV according to Draft Power Master Plan VIII											
Energy industry emissions balance according to NDC		223.70	384.00	412.30	440.30	468.40	500.50	533.20	565.00	596.90	626.90
Energy emissions balance for the energy sector according to the Draft Power Master Plan VIII		216.85	230.49	244.25	257.89	271.44	269.54	267.54	265.43	263.33	260.83
ITMOs from Solar PV		13.10	14.51	16.10	17.81	11.06	19.76	19.91	20.17	20.37	20.97

Table 12. Structured summary: Tracking progress made in implementing and achieving the NDC under Article 4 of the Paris Agreement

	Unit, as applicable	Reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate	Implementation period of the NDC covering information for previous reporting years, as applicable, and the most recent year, including the end year or end of period											Target level	Target year or period	Progress made toward the NDC ⁵
			2021	2022	2023	2024	2025	2026	2027	2028	2029	2030				
Indicator selected to track progress of the NDC or portion of NDC under Article 4 of the Paris Agreement																
Total GHG emissions and removals consistent with the coverage of the NDC	mil.CO2e q tonnes	7,393.1												6,830.0	2030	
If applicable, multi-year emissions trajectory, trajectories or budget for its NDC implementation period that is consistent with the NDC	mil.CO2e q tonnes		553.9	594.6	635.2	675.9	716.5	758.8	801.1	843.4	885.7	928.0				

⁵ As determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s)

Annual anthropogenic emissions by sources and removals by sinks covered by its NDC, or, where applicable, from the portion of its NDC	mil.CO2e q tonnes														
<i>Energy</i>	mil.CO2e q tonnes		378.1	408.8	439.4	470.1	500.7	536.2	571.8	607.3	642.9	678.4			
<i>Energy industry</i>	mil.CO2e q tonnes		231.1	247.4	263.7	280.0	296.3	295.2	294.0	292.9	291.7	290.6			
<i>Agriculture</i>	mil.CO2e q tonnes		92.0	93.8	95.7	97.5	99.4	102.0	104.5	107.1	109.6	112.2			
<i>LULUCF</i>	mil.CO2e q tonnes		-35.9	-36.4	-36.9	-37.4	-37.9	-40.2	-42.4	-44.7	-46.9	-49.2			
<i>Waste</i>	mil.CO2e q tonnes		32.1	33.6	35.1	36.6	38.1	39.7	41.4	43.0	44.7	46.3			
<i>Industrial processes</i>	mil.CO2e q tonnes		87.6	94.7	101.9	109.0	116.1	120.9	125.8	130.6	135.5	140.3			
Energy industry emissions balance according to NDC	mil.CO2e q tonnes		223.7	384.0	412.3	440.3	468.4	500.5	533.2	565.0	596.9	626.9			
Mitigation outcomes towards NDC	mil.CO2e q tonnes		32.2	36.7	41.6	47.1	52.9	58.6	63.9	69.9	76.3	83.9			

Mitigation outcomes of energy industry towards NDC	mil.CO2e q tonnes		7.4	8.2	8.9	9.8	10.7	11.8	12.7	14.0	15.2	17.0			
Annual quantity of ITMOs transferred	mil.CO2e q tonnes		13.0	14.0	16.0	17.0	11.0	19.0	19.0	20.0	20.0	20.0			
Annual quantity of mitigation outcomes authorized for use for other international mitigation purposes and entities authorized to use such mitigation outcomes, appropriate	mil.CO2e q tonnes		13.1	14.5	16.1	17.8	11.1	19.8	19.9	20.2	20.4	21.0			
Annual quantity of ITMOs used towards achievement of the NDC	mil.CO2e q tonnes		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			
Net annual quantity of ITMOs	mil.CO2e q tonnes		13.0	14.0	16.0	17.0	11.0	19.0	19.0	20.0	20.0	20.0			

If applicable, the cumulative amount of ITMOs, divided by the number of elapsed years in the NDC implementation period	mil.CO2e q tonnes		13.0	27.0	43.0	60.0	71.0	90.0	109.0	129.0	149.0	169.0			
Total quantitative corresponding adjustments used to calculate the emissions balance	mil.CO2e q tonnes		-13.0	-14.0	-16.0	-17.0	-11.0	-19.0	-19.0	-20.0	-20.0	-20.0			
The cumulative information in respect of the annual information	mil.CO2e q tonnes		-13.0	-27.0	-43.0	-60.0	-71.0	-90.0	-109.0	-129.0	-149.0	-169.0			
Annual emissions balance with the application of corresponding adjustment	mil.CO2e q tonnes		540.9	580.6	619.2	658.9	705.5	739.8	782.1	823.4	865.7	908.0			

Conclusion

Article 6 cooperative approaches are relevant instruments for developing countries, including Viet Nam to raise their ambition on climate targets and accelerate NDC implementation. Cooperative approaches in their different modalities could contribute to mobilize finance for actions responding to climate change worldwide. They may as well contribute to the transference of innovative technology and the achievement of sustainable development goals. It is for these reasons that more and more Parties express interest in cooperative approaches or even commit to use these instruments to achieve their climate goals.

The 26th UNFCCC COP celebrated in Glasgow in 2021 has brought more detailed guidance for operationalizing the MPG for the ETF, including tracking the progress of NDC implementation. Besides, the Article 6 rulebook has been almost finalized with only a few minor issues remaining. In relation with this, the standard structured summary for the CTF should also serve for ITMO accounting and thus contribute to trigger engagement of Parties in cooperative approaches under Article 6. However, this accounting system still needs to be practiced with some case studies to detect issues in accounting procedures. In this line, the present document presents a study case for ITMOs accounting in Vietnam's Solar PV sector.

In general, the ITMOs accounting needs to follow the following calculation steps as below:

- Estimation of the potential mitigation outcomes from Solar PV
- BAU emissions trajectories
- Mitigation outcomes of energy sector towards updated NDC
- Mitigation outcomes of 2 options solar PV towards updated NDC
- Energy emissions balance according to updated NDC
- Energy emissions balance according to the Draft Power Master Plan VIII
- Establishing a baseline
- ITMOs from Solar PV

From the Solar PV case study, one of the necessary inputs for the CTF is secondary data from the Ministry of industry and Trade for the solar power development orientation and mitigation potentials. This data collection has been an opportunity for intersectoral and interministerial collaboration. Despite this, the calculations have overcome several challenges in data availability. First, some of the GHG emissions data is incoherent because of Vietnam's limited resources for regular inventory. Therefore, GHG trajectories need to be interpolated for missing years. Second, the case study only focuses on energy industry subsector. Hence, we need to estimate the baseline for energy industry subsector from the contribution of the subsector in the whole energy sector.

The results of the study case show that the planned Solar PV developments in Vietnam will be able to produce some ITMOs from Solar PV even if a highly ambitious baseline, based on the new concept of a "dynamic baseline" is applied. These ITMOs will increase over the years if the Net-Zero scenario mitigation goals are achieved. This shows that despite of the challenges, the "dynamic baseline" concept can be operationalized and eventually be used to impel Parties to enhance their mitigation

contribution to the global stocktake and also could play an important role in attracting necessary financial mobilization for mitigation in developing countries.

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Annex 1: Potential mitigation measures in Viet Nam’s energy sector

Measure	Period	Assumption
E1. Using high-efficiency household air conditioners	2015-2030	By 2030, high efficiency air conditioners will increase from 15% in 2014 to 75% of the total number of households using air conditioners in urban areas and similarly from 8% to 55% in rural areas. High efficiency air conditioners with cooling capacity cost about 30% more but save 30% on electricity consumption.
E2. Use a high-efficiency refrigerator	2015-2030	By 2030, high-efficiency refrigerators will increase from 15% in 2014 to 80% of the total number of households using refrigerators in urban areas and similarly from 10% to 65% in rural areas. A high-efficiency refrigerator of the same capacity costs about 15% more but can save 30% of electricity consumption.
E3. Use energy-saving lighting	2015-2030	By 2030, the use of energy-saving lighting lamps (LEDs) will increase from 17% in 2014 to 70% of total lighting in 2030 to replace incandescent lamps (or other similar traditional lamps).
E4. Use a solar water heater	2015-2030	By 2030, solar water heating equipment will increase from 1% in 2014 to 30% of households in urban areas and from 0.3% to 5% in rural areas.
E5. Using biogas instead of coal for household cooking in the countryside	2015-2030	By 2030, biogas equipment will increase from 0.7% in 2014 to 5% of total rural households to replace coal for cooking.
E6. Optimized clinker burning cycle	2015-2030	By 2030, optimizing the combustion cycle will be applied to produce about 50% of clinker output.
E7. Use of vertical mill in cement production	2015-2030	By 2030, vertical mills will be applied to produce about 50% of cement production.
E8. Reduce clinker kiln heat loss	2015-2030	By 2030, reducing clinker kiln heat loss will produce about 40% of clinker output.
E9. Waste heat recovery from cement production	2015-2030	By 2030, measures to recover waste heat from cement production for power generation will be applied to about 50% of cement production.

Measure	Period	Assumption
E10. Applying innovative technology in the production of fired bricks	2015-2030	By 2030, innovative technology measures to replace traditional technology will produce about 70% of conventional fired bricks.
E11. Spray powdered anthracite coal into a blast furnace	2020-2030	By 2030, the method of spraying powdered anthracite coal into blast furnaces will be applied to produce about 50% of cast iron.
E12. Preheating of scrap steel before putting it into an electric arc furnace (EAF)	2015-2030	By 2030, the measure of preheating scrap steel before being put into an electric arc furnace will be applied to produce about 75% of steel output by electric arc furnace technology.
E13. Heating in steel mills	2015-2030	By 2030, a heating method in a steel rolling mill will produce about 75% of steel output by electric arc furnace technology.
E14. Gas heat recovery from a blower oxygen furnace (BOF)	2015-2030	By 2030, the measure of gas heat recovery from BOF will be applied to produce about 75% of steel output by blast furnace technology.
E15. Fuel consumption limit for newly manufactured, assembled, and imported motor vehicles	2022-2030	By 2030, measures to limit fuel consumption will be achieved: 100% of motorbikes sold will reach the norm of 2.3 liters / 100km; 100% of cars sold to meet the following standards: passenger cars (<1400cc) get 4.7 liters/100km, average cars (1400-2000cc) reach 5.3 liters/100km; large cars (>2000cc) reach 6.4 liters / 100km.
E16. Changing the mode of passenger transport from using private vehicles to using public transport	2015-2030	By 2030, the transformation of means of transport from private to public will achieve the following results: Developing a bus system in 05 cities directly under the Central Government (Hanoi, Ho Chi Minh City, Hai Phong, Da Nang, Can Tho); Operate 04 new public passenger transport routes BRT in Hanoi, Da Nang, and Ho Chi Minh City; Operate 03 new public passenger transport routes by urban railway in Hanoi and Ho Chi Minh City.
E17. Changing modes of transport from land to inland waterways and coastal roads	2015-2030	By 2030, the volume of goods transported by inland waterways will increase from 127.8 billion tons-km to 128.8 billion tons-km (up from 20.6% to 20.8% of the total volume); the rate of road transport decreased from 23.4% to 23.0%; The

Measure	Period	Assumption
		volume of goods transported by road converted to the sea is equal to the volume of goods transported from land to inland waterway in the same period.
E18. Using an electric scooter	2015-2030	Newly sold electric motorbikes account for 07% of the total number of new motorbikes sold on the market every year.
E19. Encourage the use of biofuels	2015-2030	The average annual ethanol production is 145,000 m ³ used to produce E5 biofuel for transportation.
E20. Encourage the use of CNG buses	2015-2030	By 2030, CNG buses will be 623, including 423 in Ho Chi Minh City and 200 in Hanoi.
E21. Use of high-performance electrical equipment in commercial service	2015-2030	By 2030, when using high-efficiency devices, electricity demand will be reduced by about 12% compared to BAU (WB-MOIT, 2019).
E22. Small hydropower development	2015-2030	The capacity of small hydroelectric plants can reach 3,800 MW by 2020, 4,700 MW in 2025, and 5,000 MW in 2030 to replace coal-fired power plants.
E23. Solar power development	2019-2030	Increase capacity from 4,464 MW in 2019 to 5,000 MW in 2020 (and maintain until 2030) to replace coal-fired power plants.
E24. Wind power development	2015-2030	Increase capacity from 304.6 MW in 2019 to 1,010 MW in 2020 (and maintain until 2030) to replace coal-fired power plants.
E25. Waste electricity development - incineration	2020-2030	70 MW of garbage power will be installed in 2020, and 210 MW and 350 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E26. Using cleaner fuels for cooking in the countryside	2015-2030	By 2030, the number of households in rural areas using LPG will increase from 30% (in BAU) to 50% to replace coal for cooking.
E27. Improve energy efficiency in sub-industries (except for 03 sub-sectors of brick, cement, and iron and steel production)	2015-2030	By 2030, measures to improve energy efficiency in sub-industries (excluding the 03 sub-sectors of brick, cement, and iron and steel production) by improving boilers, electric motors, and other Electrical equipment can save up to 6.5% of energy needs.

Measure	Period	Assumption
E28. Using electric cars	2021-2030	By 2030, the number of new electric cars sold will account for 30% of the total number sold on the market.
E29. Increase the load factor of trucks	2021-2030	By 2030, the freight factor will improve from 56% to 60%
E30. Converting modes of transport from road to rail	2015-2030	By 2030, freight transport by rail will increase to 12.5% annually.
E31. Biomass thermal power development	2015-2030	110 MW of biomass thermal power will be installed in 2020, 550 MW and 1,200 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E32. Garbage - landfill electricity development	2020-2030	10 MW of landfill power will be installed in 2020, and 30 MW and 50 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E33. Development of bioelectricity	2020-2030	10 MW of biogas power will be installed in 2020, and 30 MW will be installed in 2030 to replace coal-fired power plants.
E34. Development of thermoelectric technology on supercritical	2015-2030	2,400 MW of supercritical thermal power will be installed in 2020, 10,800 MW and 27,600 MW will be installed in 2025 and 2030 to replace coal-fired power plants.
E35. Development of a hybrid gas turbine using LNG	2015-2030	Using LNG hybrid gas turbines will be installed with 750 MW in 2021, 3,000 MW, and 12,750 MW in 2025 and 2030 to replace coal power plants.
E18s. Using an electric scooter	2015-2030	By 2030, electric motorcycle sales will only account for 14% of the total number of new motorcycles sold on the market every year
E19s. Encourage the use of biofuels	2019-2030	E5 gasoline accounts for 40% of total gasoline sales, assuming no supply constraints.
E23s. Solar power development	2021-2030	Increase capacity (more than E21) to reach 9,500 MW in 2025 and 16,600 MW in 2030 to replace coal-fired power plants.

Source: (Ministry of Natural Resources and Environment of Viet Nam, 2020, Updated NDC report)

Annex 2: Structured summary for Parties that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 of the Paris Agreement

<i>Indicator(s) selected to track progress of the NDC or portion of NDC under Article 4 of the Paris Agreement (paras. 65 and 77(a) of the MPGs)</i>	<i>Unit, as applicable</i>	<i>Reference point(s), level(s), baseline(s), base year(s) or starting point(s), as appropriate (paras. 67 and 77(a) of the MPGs)</i>	<i>Implementation period of the NDC covering information for previous reporting years, as applicable, and the most recent year, including the end year or end of period (paras. 68 and 77(a)(ii-iii) of the MPGs)</i>					<i>Target level</i>	<i>Target year or period</i>	<i>Progress made towards the NDC, as determined by comparing the most recent information for each selected indicator, including for the end year or end of period, with the reference point(s), level(s), baseline(s), base year(s) or starting point(s) (paras. 69-70 of the MPGs)</i>
			<i>Year 1</i>	<i>Year 2</i>	<i>...</i>	<i>...</i>	<i>...</i>			
{Indicator}										
(Parties can add rows for each additional indicator and supporting information for each indicator, e.g. baseline values, baseline for the portion of NDC, target values, mitigation effects of policies and measures, etc.)										

Where applicable, total GHG emissions and removals consistent with the coverage of the NDC (paras. 77(b) of the MPGs)

Contribution from the LULUCF sector for each year of the target period or target year, if not included in the inventory time series of total net GHG emissions and removals, as applicable (para. 77(c) of the MPGs)

Each Party that participates in cooperative approaches that involve the use of ITMOs towards an NDC under Article 4 of the Paris Agreement, or authorizes the use of mitigation outcomes for international mitigation purposes other than achievement of the NDC, shall provide (para. 70(d) of the MPGs):

If applicable, an indicative multi-year emissions trajectory, trajectories or budget for its NDC implementation period (para. 7(a)(i), annex to decision XX/CMA.3)

If applicable, multi-year emissions trajectory, trajectories or budget for its NDC implementation period that is consistent with the NDC (para. 7(b), annex to decision XX/CMA.3)

Annual anthropogenic emissions by sources and removals by sinks covered by its NDC or, where applicable, from the emission or sink categories as identified by the host Party pursuant to paragraph 9 of annex to decision XX/CMA.3 (para. 23(a), annex to decision XX/CMA.3) (as part of para. 77(d)(i) information)

Annual anthropogenic emissions by sources and removals by sinks covered by its NDC or, where applicable, from the portion of its NDC in accordance with paragraph 10, annex to decision XX/CMA.3 (para. 23(b), annex to decision XX/CMA.3)

If applicable, annual level of the relevant non-GHG indicator that is being used by the Party to track progress towards the implementation and achievement of its NDC and was selected pursuant to para. 65, annex to decision 18/CMA.1 (para. 23(i), annex, decision XX/CMA.3)

Annual quantity of ITMOs first transferred (para. 23(c), annex to decision XX/CMA.3) (para. 77(d)(ii) of the MPGs)

Annual quantity of mitigation outcomes authorized for use for other international mitigation purposes and entities authorized to use such mitigation outcomes, as appropriate (para 23(d), annex to decision XX/CMA.3) (para. 77(d)(ii) of the MPGs)

Annual quantity of ITMOs used towards achievement of the NDC (para. 23(e), annex to decision XX/CMA.3) (para. 77(d)(ii) of the MPGs)

Net annual quantity of ITMOs resulting from paras. 23(c)-(e), annex to decision XX/CMA.3 (para. 23(f), annex to decision XX/CMA.3)

If applicable, the cumulative amount of ITMOs, divided by the number of elapsed years in the NDC implementation period (para. 7(a)(ii), annex to decision XX/CMA.3)

Total quantitative corresponding adjustments used to calculate the emissions balance referred to in para. 23(k)(i), annex to decision XX/CMA.3, in accordance with the Party's method for applying corresponding adjustments consistent with section III.B, annex to decision XX/CMA.3 (Application of corresponding adjustments) (para. 23(g), annex to decision XX/CMA.3)

The cumulative information in respect of the annual information in para. 23(f), annex to decision XX/CMA.3, as applicable (para. 23(h), annex to decision XX/CMA.3)

For metrics in tonnes of CO₂ eq. or non-GHG, an annual emissions balance consistent with chapter III.B (Application of corresponding adjustment), annex, decision XX/CMA.3 (para. 23(k)(i), annex decision XX/CMA.3) (as part of para. 77(d)(ii) of the MPGs)

For metrics in non-GHG, for each non-GHG metric determined by participating Parties, annual adjustments resulting in an annual adjusted indicator, consistent with para. 10 of chapter III.B (Corresponding adjustments), annex to decision XX/CMA.3, and future guidance to be adopted by the CMA (para. 23(k)(ii), annex to decision XX/CMA.3)

Any other information consistent with decisions adopted by the CMA on reporting under Article 6 (para. 77(d)(iii) of the MPGs)

Assessment of the achievement of the Party's NDC under Article 4 of the Paris Agreement (para. 70 of the MPGs):

**Restate the target of the
Party's NDC:**

**Information for reference
point(s), level(s), baseline(s),
base year(s), or starting
point(s):**

**Final information for the
indicator for the target
year/period, including the
application of the necessary
corresponding adjustments
consistent with chapter III,
annex, decision XX/CMA.3:**

Comparison:

**Achievement of NDC:
{yes/no, explanation}**

Source: (UNFCCC, 2021e)