PROPOSED NEW BASELINE AND MONITORING METHODOLOGY OR METHODOLOGICAL TOOL FORM FOR EMISSION REDUCTIONS ACTIVITIES (Version 02.0)

INFORMATION TO BE COMPLETED BY THE SECRETARIAT AND METHODOLOGIES EXPERT PANEL	
Type of standard	New baseline and monitoring methodology
Unique reference number and title of the proposed new methodology or new methodological tool	>>
Date when this form was received at UNFCCC secretariat:	Click or tap to enter a date.
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INFORMATION TO BE COMPLETED BY THE SUBMITTER

(READ BEFORE FILLING THE FORM)

THIS FORM IS REQUIRED AT THE "SUBMISSION OF PROPOSED NEW METHODOLOGY OR METHODOLOGICAL TOOL" STAGE AND IS SUBMITTED TOGETHER WITH 'NEW BASELINE AND MONITORING METHODOLOGY AND METHODOLOGICAL TOOL PROPOSAL FORM (A6.4-FORM-METH-001).

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- Please format figures, tables and footnotes to update automatically;
- Please note the footnotes have a separate format (Times New Roman - size 10).[1]
- Please clearly distinguish between proper methodology text, tables and equations and explanatory notes, using the following colour coding:
    - Methodology text shall be written in **black** fonts.
    - Guidance from the UNFCCC is provided in **blue** fonts and can be deleted.
    - Explanatory notes shall be written in **grey** fonts. Please note that explanatory notes are solely for the sake of methodology submission and consideration. Do not include guidance to activity participant in explanatory notes. Please note upon methodology approval, explanatory notes will be deleted.

[1] Format for footnotes.

SECTION A. Summary and applicability of the baseline and monitoring methodology or methodological tool

A.1. Title, submission date and version

Title: Fertilizer production with renewables-based ammonia

Submission date: 01 December 2025

Version: 02

A.2. If this methodology or methodological tool is based on a previous submission or an approved Article 6.4 mechanism methodology or methodological tool, please state the reference numbers here. Explain briefly the main differences and their rationale.

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This methodology is partially based on A6.4-PNM001: Production of Ammonia through electrolysis of water, air separation and synthesis of hydrogen and nitrogen (Version 1.0).

The main difference between PNM001 and this proposed methodology is the baseline approach applied and the possibility to use grid electricity. Furthermore, ammonia produced shall be used in the host country for fertilizer production.

PNM001 defines the baseline scenario as the lowest among the three possible baseline approaches (Best Available Technology, ambitious benchmark and existing actual or historical emissions) and limits use of grid electricity in the production to 10%.

This proposed methodology applies the BAT approach (and existing actual or historical emissions approach for brownfield) following with the standard A6.4-STAN-METH-004 and furthermore allows use of grid electricity if the grid emission factor is below the defined threshold and renewable energy sources are expanded within the electricity grid.

The difference will allow a broader application of this methodology and furthermore is fully aligned with the standard A6.4-STAN-METH-004

A.3. Summary description of the methodology or methodological tool, including major baseline and monitoring methodological steps.

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This methodology is globally applicable to project activities that produce fertilizers with renewables-based ammonia, where the ammonia is produced by electrolysis of water and nitrogen produced by air separation. The process shall be using electricity from dedicated renewables or grid electricity under the condition that the share of renewables in the grid is sufficiently high which is assumed if the grid emission factor is below 0.2 tCO_2e/MWh. Further conditions regarding renewables are defined in the methodology and Appendix 1 of this methodology.

The methodology proposes to apply the BAT approach (and existing actual or historical emissions approach for brownfield) following the standard A6.4-STAN-METH-004. All 5 steps of the standard will be applied in order to derive a suitable baseline for the activities using this methodology.

Additionality shall be demonstrated by following the steps as outlined by the standard A6.4-STAN-METH-003 with the investment analysis as essential step. The common practice test shall be done as per the Methodological tool A6.4-AMT-001: Common practice analysis (Methodological tool: Common practice analysis) applying the Approach B.

The methodology defines requirements and procedures to ensure no negative impact is occurring, especially as a result of the water consumption needed to produce hydrogen with electrolysis of water.

All energy consumption of the activity production process will be assessed and monitored in order to determine the activity emissions. Furthermore, leakage will be considered as applicable following the standard A6.4-STAN-METH-005 (Standard: Addressing leakage in mechanism methodologies).

SECTION B.	Proposed new baseline and monitoring methodology or methodological tool

1. Introduction

1. The following table presents a summary of the key elements of a methodology:

Table 1. Methodology key elements

Type of GHG mitigation measure(s)	☒ Fuel/feedstock switch ☒ Technology switch ☐ GHG destruction ☒ GHG formation avoidance ☐ Engineered carbon dioxide removal ☐ Nature based carbon dioxide removal
Types of mitigation outcomes achieved under this methodology	☒ Emission reductions ☐ Removals
Are the mitigation outcomes under this methodology at risk of reversal?	☐ Yes ☒ No
Typical projects eligible under the methodology	Greenfield and brownfield projects that produce fertilizers with renewables-based ammonia where ammonia is produced by the Haber-Bosch-Process from hydrogen produced by electrolysis of water and nitrogen produced from air separation and no fossil fuels are used as feedstock in the production of ammonia.

2. Scope and entry into force

2.1. Scope

2. This methodology prepared by Perspectives Climate Research gGmbH, Freiburg, Germany, is applicable to activities producing renewables-based ammonia for fertilizer production replacing conventional ammonia production that is based on fossil fuel feedstocks to produce the required hydrogen. Accordingly, CO_2 emissions from the fossil fuel feedstock conversion process are avoided and the use of electricity from renewable sources will further decrease GHG emissions of the entire production process.

[The scope defines without ambiguity the extent or ranges covered by the document.]

2.2. Entry into force

[For the UNFCCC secretariat to complete - Leave blank]

2.3. Applicability of sectoral scopes

3. Designated operational entities validating and verifying Article 6.4 activities that use this methodology shall apply sectoral scope(s):

[For the UNFCCC secretariat to complete – leave blank]

3. Definitions

4. In addition to the definitions contained in the 'Article 6.4 mechanism Glossary of Terms', the definitions of the referred standards and methodological tools, the following definitions apply for the purpose of this methodology:

(a) **Term** – Definition;

(b) **Ammonia** – NH_3, chemical molecule formed from nitrogen and hydrogen. In the context of this methodology, ammonia shall be used for fertilizer production only;

(c) **Air Separation** – A plant/process that separates atmospheric air into its primary components, typically nitrogen and oxygen, and sometimes other rare or inert gases;

(d) **Conventional ammonia production** – Ammonia production that uses fossil fuels as feedstock to produce hydrogen typically via a steam reforming process or other thermal or chemical process resulting in significant CO_2 emissions;

(e) **Haber-Bosch-Process** – the well-established industrial process where H_2 and N_2 react at high temperatures (e.g., 400-500°C) and pressures (e.g., 150-300 bar) over a catalyst to synthesize ammonia (NH_3);

(f) **Renewables-based ammonia** – Ammonia that is produced by the Haber-Bosch-Process based on hydrogen, which is produced by electrolysis of water and nitrogen produced by air separation using electricity that fulfils the conditions as defined by this methodology (see also Appendix 1);

(g) **Steam reforming** – A plant/process where fossil fuels (e.g. natural gas) are used as feedstock to produce hydrogen on the basis of the reaction with steam resulting in generation of carbon monoxide and carbon dioxide respectively. Liquid or solid fossil fuels (e.g. coal) will undergo first a gasification process to form syngas;

(h) **Water electrolysis** – A plant/process where water is split by use of electricity into its components hydrogen and oxygen for example using technologies such as Alkaline Water Electrolysis (AWE), Proton Exchange Membrane (PEM) electrolysis, and Solid Oxide Electrolysis Cells (SOEC);

[Provide, in alphabetical order, definitions of key terms and acronyms that are used in the methodology or methodological tool. Ensure all defined terms are used in the methodology or methodological tool.

Do not include terms already defined by the Article 6.4 Mechanism Glossary of Terms.

Please refrain from proposing definitions inconsistent with terms already defined by the Article 6.4 regulatory framework]

4. Normative references

5. This proposed baseline and monitoring methodology is based on the following proposed new methodologies and/or approved or consolidated methodologies:

(a) A6.4-PNM001: Production of Ammonia through electrolysis of water, air separation and synthesis of hydrogen and nitrogen

(b) A6.4-STAN-METH-001 – Application of the requirements of Chapter V.B (Methodologies) for the development and assessment of Article 6.4 mechanism methodologies (ver. 01.1)

(c) A6.4-STAN-METH-003 – Demonstration of additionality in mechanism methodologies (ver. 01.2)

(d) A6.4-STAN-METH-004 – Setting the baseline in mechanism methodologies (ver. 01.0)

(e) A6.4-STAN-METH-005 – Addressing leakage in mechanism methodologies (ver.01.1)

(f) A6.4-AMM-001: Flaring or use of landfill gas

(g) CDM AM0124: Hydrogen production from electrolysis of water (ver. 01.1)

(h) GS4GG A6 M400-01 - GREEN AMMONIA PRODUCTION

[Indicate in the sub-paragraphs the proposed new methodologies or approved and consolidated methodologies from the Article 6.4 mechanism and from other GHG certification schemes upon which the proposed methodology or methodological tool is based. Use one sub-paragraph per methodology and add more sub-paragraphs as needed.]

6. This methodology also refers to the latest approved versions of the following methodological tools:

(a) "A6.4-AMT-001: Common practice analysis" (hereinafter referred as "common practice tool");

(b) "A6.4-AMT-002: Investment analysis" (hereinafter referred as "investment analysis tool").

[Indicate the methodological tools from the Article 6.4 mechanism and from other GHG certification schemes upon which the proposed methodology or methodological tool is based. Use one sub-paragraph per methodological tool and add more sub-paragraphs as needed.]

7. This methodology is based on the following sources of information:

(a) GS4GG A6 M400-01 SI - SUPPLEMENTARY INFORMATION: GREEN AMMONIA PRODUCTION

(b) VCS Tool: VT0010: EMISSIONS FROM ELECTRICITY CONSUMPTION AND GENERATION (ver.1.1)

(c) Annex 3 of FCCC/SBSTA/2003/10/Add.2

(d) VCS Module: VMD0058: CO_2 STORAGE IN SALINE AQUIFERS AND DEPLETED HYDROCARBON RESERVOIRS (ver. 1.0)

(e) WRI Aqueduct global water risk indicators

[List major sources of data or information to substantiate elements of the proposed new methodology. Use one sub-paragraph per source and add more sub-paragraphs as needed.]

5. Applicability

8. The methodology is applicable under the following conditions:

(a) The activity produces renewables-based ammonia for fertilizer production. This shall be verified at validation and at each verification of emission reductions.

(b) No fossil fuels are used as feedstock in the production of hydrogen and ammonia. This shall be verified at the initial validation and at each verification of emission reductions.

(c) Hydrogen under the activity is produced from electrolysis and the entire production of hydrogen is used for the renewables-based ammonia production. This shall be verified at the initial validation and at each verification of emission reductions.

(d) Nitrogen is produced from air separation. This shall be verified at the initial validation and at each verification of emission reductions.

(e) Electricity used to produce hydrogen, nitrogen and ammonia is either sourced from one or a combination of the following sources taking into consideration the provisions as defined in Appendix 1 of the methodology: This shall be verified at the initial validation and at the start of each crediting period:

(i) from dedicated renewable energy sources connected directly to the ammonia production facility;

(ii) from dedicated renewable energy sources connected via the electricity grid to the ammonia production facility;

(iii) from the grid, where the grid emission factor (i.e. the combined margin) is equal or less than 0.2 tCO_2e/MWh and it can be demonstrated that the share in total electricity production was expanded over the last 5 years prior to the start date of the activity. (Only to be assessed once at the initial validation of the PDD or, where the information is not yet available, at the first verification of emission reductions);

(iv) From the grid, where the grid emission factor (i.e. the combined margin) is above 0.2 tCO_2e/MWh and it can be demonstrated that the share in total electricity consumption from the grid is below 15%.

(f) The activity shall demonstrate that the planned use of electricity from the grid will not result in increased grid instability and constraints negatively impacting other consumers of grid electricity. This shall be verified at the initial validation and at the start of each crediting period.

(g) Ammonia is produced by the Haber-Bosch process using the hydrogen and nitrogen produced as per the previously described conditions. This shall be verified at initial validation and at each verification of emission reductions.

(h) Only the share of ammonia used for fertilizer production within the host country of the activity is applicable for generating emission reductions. The produced fertilizer may be used in the host country or exported. This shall be verified at each verification of emission reductions.

(i) The activity shall use no more than 5 % of the drinking water available locally, to ensure that the water used in the electrolysis will not displace other uses. This check shall be made at validation and at each verification of emission reductions

using data from the project activity and from official sources. This shall be verified at initial validation and at each verification of emission reductions

(j) Activities must demonstrate minimal impact on water needed for drinking, agriculture, livelihood and ecosystems as per Appendix II. This shall be verified at initial validation and at each verification of emission reductions

(k) Activities must demonstrate that water utilization will not have an impact on ecosystems resulting in an increase of emissions (e.g. loss in biomass or soil carbon stocks). This shall be verified at initial validation and at each verification of emission reductions.

(l) This methodology is applicable to activities implemented in existing ammonia and fertilizer production facilities replacing fossil-fuel-based hydrogen and ammonia production (brownfield) or to the construction of new hydrogen and ammonia production facilities (greenfield activities). This shall be verified at the initial validation.

(m) For brownfield activities, it must be possible to distinguish all production steps, related energy inputs and emission sources between the existing production pathway and the activity production pathway. This may be demonstrated based on the entire production facility or on the level of entire production lines. This shall be verified at initial validation and at each verification of emission reductions

(n) For brownfield activities, it must be demonstrated that replaced equipment and production facilities are scrapped and not used elsewhere. (Only to be assessed once at the initial validation of the PDD or, where the information is not yet available, at the first verification of emission reductions). This shall be verified at the initial validation. If the required information is not available at validation, it shall be assessed at the first verification of emission reductions.

(o) It can be demonstrated that there is no risk of double counting as per chapter 6 of this methodology. This shall be verified at the initial validation and at the start of each crediting period.

(p) Furthermore, all applicability conditions as per the referred methodological tools apply.

[Provide the conditions to which projects can apply this methodology as per the requirements of the valid version of the "Standard: Setting the baseline in mechanism methodologies" (hereinafter referred to as the baseline standard), including section 1 of its appendix.

Indicate clearly whether when the applicability conditions should be re-assessed in accordance with Appendix 1 section 1 of the baseline standard.

If necessary, explain under which conditions the methodology is not applicable.

Add more paragraphs or sub-paragraphs as needed]

9. The conditions required to be assessed will ensure production of fertilizer with renewables-based ammonia at minimal emissions without any risk of carbon lock-in, will prevent occurrence of some leakage emission sources (e.g., related to competing use of water, see condition "(k)") and furthermore, avoid negative impacts especially due to the use of water for the electrolysis.

[Add explanatory notes]

6. Avoidance of double-counting

10. Activity proponents shall ensure that double-counting is avoided following the requirements of section 8 of the Appendix 1 to the baseline standard. Accordingly, activity proponents shall demonstrate that there is no risk of:

    a) Double counting due to overlapping claims between different crediting mechanism activities;

    b) Double counting due to overlap with mandatory domestic mitigation schemes; and

    c) Double counting due to overlap with other frameworks or environmental markets.

    The following guidance shall be taken into consideration accordingly:

11. Providing evidence, in each monitoring report, that the outcomes from the Article 6.4 activity (e.g., renewable energy consumed, green fertilizer produced) for which they intend to request issuance of A6.4ERs are not also claimed in other environmental markets or accounting frameworks (e.g., renewable energy certificates, guarantees of origin, green hydrogen schemes, low-carbon fuel standards), except for outcomes not related to GHG emissions.

12. Demonstrating that the reported GHG emission reductions for which they intend to request issuance of A6.4ERs do not overlap with mandatory domestic mitigation schemes (e.g., emissions trading systems), or that measures are in place to ensure that any relevant impacts of the activity (e.g., the GHG emission reductions achieved or the kilowatt-hours of renewable electricity used for hydrogen production) are not counted towards the achievement of targets or obligations under the mandatory domestic mitigation scheme (e.g., by cancelling allowances from the emissions trading system before issuing carbon credits) if the overlap exists[2], by:

    i. Declaring and providing evidence in each monitoring report that the Article 6.4 activity and the activities displaced in the baseline scenario (e.g., fossil-fuel-based hydrogen or ammonia production) do not fall within the scope of any mandatory domestic mitigation scheme; or

    ii. Where the Article 6.4 activity or the activities displaced in the baseline scenario fall within the scope of a mandatory domestic mitigation scheme, activity participants may:

        a. Provide evidence in each monitoring report that the mitigation outcomes of the Article 6.4 activity are not counted in the mandatory mitigation scheme to reduce the obligations by the entities covered by the scheme. For example, in the case of an emissions trading system covering electricity generation, a confirmation from the operator of the emissions trading system may be sought that a number of allowances equal to the A6.4 ERs being requested for issuance for the electricity generation component were cancelled before the issuance of the A6.4 ERs; or

        b. Demonstrate that project participants are not requesting the issuance of A6.4ERs for any emission reductions resulting from a component of the Article 6.4 activity that falls within the scope of the mandatory domestic scheme. For example, in the case of an emissions trading system covering

[2] When full or partial impact of the activity is covered under mandatory domestic mitigation scheme and counted towards the achievement of targets and obligations under mandatory domestic mitigation scheme, the relevant share of the impact shall be deducted by the activity participants from the amount requested for issuance.

electricity generation, the activity participant could elect to not include baseline emissions from electricity generation in the calculation of the total emission reductions and thereby demonstrate that no double-counting has occurred.

13. Notwithstanding above-mentioned guidance, where the policy for establishing the framework or environmental market or for establishing the mandatory domestic mitigation scheme refers to or formally integrates the mechanism as an instrument for implementation, participation in such a framework or environmental market or domestic mitigation scheme does not result in double counting.

14. Activities that involve third parties for green fertilizer production shall ensure that A6.4ERs can only be claimed by the activity participants and signed contracts shall be employed ensuring the same. These contracts must explicitly indicate that A6.4ERs can only be claimed by the activity participants and that the third parties involved shall not claim A6.4ERs or carbon credits from any other carbon crediting programme.

[Elaborate how double-counting is avoided as per the requirements of section 8 of the Appendix to the baseline standard.]

15. Activity proponents are required to assess the risk of double-counting as per the information provided by section 8 of the Appendix 1 to the baseline standard and additional guidance on the basis of A6.4-AMM-001 and a related applicability condition excludes projects where this cannot be demonstrated.

[Add explanatory notes]

7. Demonstration of alignment with the policies, options and implementation plans with regard to the NDC and LT-LEDS of the host Party and the long-term temperature goal of the Paris Agreement and long-term goals of the Paris Agreement

16. Activity participants shall provide to the DOE responsible to perform the validation of the Article 6.4 project an assessment, undertaken by the DNA of the host Party, of the activity's consistency with Decision 3/CMA.3 paragraph 40 (c) and paragraph 27 (a) as part of the host Party's approval.

8. Activity Boundary

17. The activity boundary encompasses the production facilities required to produce renewables-based ammonia including:

(a) Production of hydrogen by electrolysis

(b) Production of nitrogen by air separation

(c) Production of renewables-based ammonia (Haber-Bosch process)

(d) Incremental transportation of feedstock within and between the above-mentioned production facilities

(e) The electricity and energy sources which will be used in the above-mentioned production facilities

[Provide a description of the boundary of typical projects applying the proposed new methodology as per the requirements of the baseline standard (Appendix 1, section 2) and the "Standard: Addressing leakage in mechanism methodologies" (hereinafter referred to as the leakage standard).

Please clarify whether the activity boundary is defined at the methodology level or at the activity level.]

Table 2. Emissions sources and sinks included in or excluded from the activity boundary

Source		GHG			Justification / Explanation
BASELINE	Nitrogen production *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	No other GHG are expected from the process
BASELINE	Hydrogen production *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of fossil fuels as feedstock in the process are the main emission source. Furthermore, CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions (upstream) from the use of fossil fuels as feedstock in the process are a significant emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	No other GHG are considered from the process, which is conservative
BASELINE	Ammonia production *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	No other GHG are considered from the process, which is conservative
ACT IVIT	Nitrogen production	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source

Source		GHG			Justification / Explanation
	[Provide a name or description for this item and add rows for each source or sink as necessary]	CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	Other GHG emissions are considered negligible for this emission source
ACTIVITY	Hydrogen production *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		H_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	H_2 emissions are considered as emission source as the switch in H_2 production may increase related emissions.
ACTIVITY	Ammonia production *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	Other GHG emissions are considered negligible for this emission source
ACTIVITY	Transport with the production steps and transport of ammonia to the fertilizer production within the host country *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	Other GHG emissions are considered negligible for this emission source
ACTIVITY	Clearing of land *[Provide a*	CO_2	☒ Included ☐ Not included	☒ Controlled ☐ Related to ☐ Affected by	Main emission source.

Source		GHG			Justification / Explanation
	name or description for this item and add rows for each source or sink as necessary]	CH_4	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☒ Controlled ☐ Related to ☐ Affected by	Other GHG emissions are considered negligible for this emission source
LEAKAGE	Increased international transport *[Provide a name or description for this item and add rows for each source or sink as necessary]*	CO_2	☒ Included ☐ Not included	☐ Controlled ☐ Related to ☒ Affected by	CO_2 emissions from the use of electricity and energy are the main emission source
		CH_4	☐ Included ☒ Not included	☐ Controlled ☐ Related to ☒ Affected by	CH_4 emissions are considered negligible for this emission source
		N_2O	☐ Included ☒ Not included	☐ Controlled ☐ Related to ☒ Affected by	N_2O emissions are considered negligible for this emission source
		-----	☐ Included ☒ Not included	☐ Controlled ☐ Related to ☒ Affected by	Other GHG emissions are considered negligible for this emission source

9. Demonstration of additionality

9.1. Regulatory analysis

18. Activity proponents shall demonstrate that the emission reductions resulting from the activity would not occur as a result of any law or regulation, unless the law or regulation refers to or formally integrates the mechanism as an instrument for implementation. This shall be done once at the initial validation of the PDD and at each renewal of the crediting period following the provisions of chapter 6.1 of the additionality standard. Activities that do not fulfil regulatory surplus are deemed non-additional. All other activities shall continue with demonstrating avoidance of locking-in the level of emissions.

[Elaborate how activity participants shall undertake the regulatory analysis based on the requirements of the "Standard: Demonstration of additionality in mechanism methodologies" (hereinafter referred to as the additionality standard).]

19. The regulatory analysis is required to be done by the activity proponents following the provisions of the additionality standard.

[Add explanatory notes]

9.2. Avoidance of locking-in the level of emissions

20. Activity participants shall demonstrate that the ammonia production included under the activity shall not use any fossil fuel as feedstock. If grid electricity is used for ammonia production, activity participants shall demonstrate that the grid emission factor (i.e. combined margin) is below 0.2 tCO_2e/MWh and that renewable energy sources connected to the electricity grid are expanded over the last 5 years prior to the start of the activity. Furthermore, activity participants shall demonstrate that the activity is consistent with the host country's long-term low-emission development strategy (LT-LEDS), as referred to in Article 4.19 of the Paris Agreement (where the host country has submitted one) following the provisions of chapter 6.2 of the additionality standard. Activities that do not fulfil the

conditions as described are deemed non-additional. All other activities shall continue with the investment analysis as follows.

[Elaborate how activity participants shall demonstrate that typical projects eligible under the methodology activities avoid locking-in the level of emissions based on the requirements of the additionality standard.]

21. Under the condition of fulfilling the applicability conditions, the risk of locking-in of the level of emissions is already minimized as the methodology requires ammonia to be produced from electrolysis of water using dedicated renewable energy sources or clean electricity from the grid. Accordingly, lock-in of fossil fuel based production is excluded. The proposed threshold of the grid emission factor reflects a well renewable energy saturated grid. At the same time the value reflects the top 20% of global countries in terms of lowest grid emission factors from the IFI TWG: Harmonized IFI Default Grid Factors 2021 v3.2.

[Add explanatory notes]

9.3. Investment analysis, Barrier analysis and Common practice analysis

[This section and its subsections can be removed if additionality is demonstrated through performance-based approach]

9.3.1. Investment analysis

22. Activity participants shall demonstrate additionality by applying a comprehensive investment analysis taking into consideration the guidance of the Methodological tool: Investment analysis by selecting either:

    (a) A benchmark analysis: Comparison of the financial attractiveness of an Article 6.4 activity with a financial benchmark; or

    (b) An investment comparison analysis: Comparison of the financial attractiveness of an Article 6.4 activity with alternative options.

    A simple cost analysis is not applicable as the production of renewables-based ammonia and related fertilizers generates revenues.

23. By applying the investment analysis, the following guidance and requirements as provided by the additionality standard shall be considered:

    (a) General requirements for conducting the investment analysis;

    (b) Requirements applicable to benchmark analysis and investment comparison analysis;

    (c) Requirements applicable to benchmark analysis;

    (d) Requirements applicable to investment comparison analysis.

24. Furthermore, the guidance as provided by the “A6.4-AMT-002: Investment analysis” shall be taken into consideration.

25. The activity shall only be considered additional if the analysis demonstrates that the activity would not be financially viable, based on credible data parameters to the investment analysis. Such activities shall continue with the common practice test as follows.

[Elaborate how activity participants shall conduct the investment analysis to demonstrate that the activity is financially additional based on the requirements of the additionality standard.]

26. The investment analysis will be used as key element of the additionality demonstration. To ensure a robust approach, the requirements as defined by the additionality standard are needed to be considered by the activity participants. As the activity generates revenues from the production of renewables-based ammonia and related fertilizers generates, the simple cost analysis is excluded from the possible approaches.

[Add explanatory notes]

9.3.2. Barrier analysis

27. Under this methodology, additionality shall be demonstrated using the investment analysis. In line with the additionality standard, no barrier analysis is applicable.

[Elaborate how activity participants shall conduct the barrier analysis to demonstrate that these barriers would prevent the implementation of the activity based on the requirements of the additionality standard.]

28. The conditions for the barrier analysis as defined by the additionality standard are not fulfilled for the proposed activities and as such a barrier analysis is not applicable.

[Add explanatory notes]

9.3.3. Common practice analysis

29. Activity participants shall apply a common practice analysis following the provisions and steps for Approach B of the "A6.4-AMT-001: Common practice analysis".

30. The market share of the technology as proposed in this methodology (i.e. renewables-based ammonia production) shall be assessed based on the quantity of ammonia production used for fertilizers in the host country.

$$F = \frac{P_{sim}}{P_{all}} \times 100\% \qquad \text{Equation (1)}$$

Where:

F	=	Share of renewables-based ammonia production in the host country
P_{sim}	=	Production of renewables-based ammonia in the host country (tNH_3)
P_{all}	=	Total production of ammonia in the host country (tNH_3)

31. P_{all} shall be calculated as follows:

$$P_{all} = P_{sim} + P_{other} \qquad \text{Equation (2)}$$

Where:

P_{other}	=	Production of non-renewables-based ammonia in the host country (tNH_3)

32. The analysis shall be based on a time-bound approach taking into consideration the most 3 years prior to the start date of the proposed activity considering a value for F_{max} of 10% for all countries. If $F_{shareRE}$ is less than F_{max}, the activity is deemed not to be common practice.

33. For calculation of the market share of renewables-based ammonia production, the provisions as defined in paragraph 23 of the "A6.4-AMT-001: Common practice analysis" shall be followed to allow exclusion Article 6.4 activities.

34. If there is no production of renewables-based ammonia or no ammonia at all in the host country at the start of the project activity, the activity shall be deemed to be not common practice.

[Elaborate how activity participants shall conduct the analysis of common practice based on the requirements of the additionality standard and on the common practice tool.]

35. Given huge differences in plant capacities of ammonia production, a common practice test based on number of installations is not appropriate and a market share-based approach is suggested. The methodology follows approaches as defined by the common practice tool and the proposed common practice threshold value is not larger than 10% for a time-bound approach.

[Add explanatory notes]

10. Baseline scenario

10.1. Selection of the baseline approaches from paragraph 36 of the rules, modalities and procedures

36. Greenfield activities and brownfield activities after the end of the remaining lifetime: The BAT approach is selected from paragraph 36 of the RMPs to set the baseline for activities eligible under this.

37. Brownfield activities until the end of the remaining lifetime: The baseline approach shall be based on existing actual or historical emissions.

[Indicate which approach from paragraph 36 of the RMPs is used to set the baseline for each component of typical projects eligible under this methodology.]

[Choose only one option for each of the emission reduction components[3]]

- ☒ Best available technologies that represent an economically feasible and environmentally sound course of action, where appropriate.
- ☐ An ambitious benchmark approach where the baseline is set at least at the average emission level of the best performing comparable activities providing similar outputs and services in a defined scope in similar social, economic, environmental and technological circumstances.
- ☒ An approach based on existing actual or historical emissions, adjusted downwards to ensure alignment with paragraph 33 of the RMP.

[Justify the choice in according with the baseline standard.]

38. The conditions for the BAT approach as per paragraph 35 and 36 of the baseline standard are fulfilled as ammonia production is characterized by a homogenous output using a single technology (i.e. steam reforming and Haber-Bosch process). Likewise, paragraph 58 of the baseline standard would apply for brownfield activities.

[Add explanatory notes]

[3] As per paragraph 19 of the baseline standard

10.2. Application of the selected approach, prior to implementation of a downward adjustment

10.2.1. Procedure for the identification of the baseline scenario

39. As per the differentiation of greenfield and brownfield activities above, under this methodology a default value for the BAT for the production of ammonia can be used are shown in Table 3 below. This value shall remain valid until 31 December 2030 unless the methodology would be revised before:

Table 3: Default global BAT value

Country or region	Direct emission intensity (tCO_2e/tNH_3)	Upstream emission intensity (tCO_2e/tNH_3)	Default BAT emission intensity (tCO_2e/tNH_3)
Global reference	1.6	0.6	2.16

Source: Based on data from GS4GG A6 M400-01 SI, table 16 and taking into consideration direct and upstream emissions and a conservative factor of 0.98 from Annex 3 of FCCC/SBSTA/2003/10/Add.2 for the default BAT to address uncertainty.

40. Instead of applying the BAT default value as mentioned above, activity participants may derive the BAT from the following sources:

    (a) An approved BAT determined by the Supervisory Body or by host Parties; or

    (b) A BAT determined by the activity participants following taking into consideration the following guidance:

41. When considering whether a technology and/or practice is an economically feasible course of action, activity participants shall consider whether the technology and/or practice is one that will typically provide sufficient returns to cover investment, operations & maintenance costs.

42. When considering whether a technology and/or practice is an environmentally sound course of action, activity participants shall consider whether the technology and/or practice is in line with laws and regulations on environmental protection in the applicable geographical area and seeks to reasonably minimize environmental harm.

43. Activity participants shall specify the appropriate baseline geographic reference area for determining the BAT.

44. The definition of BAT specifies that the technology and/or practice “is available in the baseline geographical area, meaning accessible off the shelf, or via a tendering or direct contracting process, or by direct implementation by an end user within the boundary of potential Article 6.4 activities”. Activity participants shall consider that when the Article 6.4 activity type is greenfield and may displace the implementation of new capacity, then availability relates not just to the specific activity participant, but to any entities that may implement similar technologies and/or practices.

45. When the BAT is specified by the activity participants following the procedure in this mechanism methodology, then the BAT shall be determined by applying the following steps:

    (a) Define the technology(ies) and/or practice(s) used in the Article 6.4 activity, their output(s), users, sector and, where relevant, market penetration;

(b) Identify the available technologies and/or practices (and their combinations) in line with the definitions in this standard for supplying the pool of users in the baseline geographical reference area, at the scale required for implementation at a similar level to the activity;

(c) Identify which of these available technologies are environmentally sound;

(d) Identify which of the environmentally sound technologies are also economically viable;

(e) Define the emissions or removals intensity of each of the remaining technologies identified in step (d) above as tonnes of carbon dioxide equivalent (tCO_2eq) per unit of output, based on the average conditions of the technology in the baseline geographical reference area;

(f) Identify the remaining technology from step (e) above with the best emissions or removals intensity. This technology constitutes the BAT and its emission or removals intensity forms the basis for the baseline.

46. Furthermore, if the approach based on existing actual or historical emissions is applicable, activity participants shall determine the baseline taking into consideration the guidance from the baseline standard:

47. Possible baseline scenarios may include:

(a) The continuation of the pre-activity scenario up to a certain point in time (for example, up to the time at which a retrofit would have occurred);

(b) A dynamic baseline scenario over time (for example, if a gradual shift away from the pre-activity scenario is observed);

(c) The retrofit or replacement of equipment that has been used in the pre-activity scenario;

(d) The implementation of the Article 6.4 activity at a later point in time.

48. Activity participants shall demonstrate the most plausible scenario and determine the related existing actual or historical emissions in line with that scenario.

[Explain how the baseline scenario is identified based on the approach from paragraph 36 of the RMPs and as per guidance from section 5.1.2 of the baseline standard.

For baselines based on approach 36(i) of the RMP (BAT), please refer to sections 6.1.2, 6.1.3 and 6.1.4 of the baseline standard.

For baselines based on approach 36(ii) of the RMP (Ambitious Benchmark), please refer to sections 6.2.2 of the baseline standard.

For baselines based on approach 36(iii) of the RMP (Existing actual or historical emissions approach), please refer to sections 6.3.2 and 6.3.3 of the baseline standard.]

49. The values provided by the Supplementary Information: Green Ammonia Production (GS4GG A6 M400-01 SI) fulfil the requirements as defined for the BAT approach by the baseline standard. To address uncertainty, a conservative factor of 0.98 has been applied from the set of conservative factors provided by Annex 3 of FCCC/SBSTA/2003/10/Add.2. It is proposed to review and update the proposed default values in line with the 5 years review cycle for approved methodologies and methodological tools as per the A6.4-PROC-METH-001 Procedure: Development, revision and clarification of methodologies and methodological tools, Version 01.1. In addition, activity participants can derive the

BAT in line with the provisions of the baseline standard and likewise guidance is defined for the approach based on existing actual or historical emissions.

[Add explanatory notes]

10.2.2. Calculation of baseline emissions prior to downward adjustment

50. Baseline emissions prior to downward adjustment are calculated based on the quantity of production of renewables-based ammonia and the baseline as defined in the previous step as per Equation (3).

$$BE_{prior,y} = P_{NH3,Act,y} \times BE_{Baseline} \quad \text{Equation (3)}$$

Where:

$BE_{prior,y}$ = Baseline emissions in year y prior to downward adjustment (tCO_2e)

$P_{NH3,Act,y}$ = Production of renewables-based ammonia used for fertilizer production in year y (tNH_3)

$BE_{Baseline}$ = Baseline emissions for ammonia production (tCO_2e/tNH_3) based on selected approach from paragraph 36 of the RMPs

[Explain how baseline emissions prior to the downward adjustment is determined. Provide the equations and potential options choices.]

10.3. Calculation of the downward adjusted baseline

51. Downward adjustment in the calendar year of the start date of the first crediting period shall be done for brownfield activities, where the baseline is determined based on existing actual or historical emissions, as follows:

Through the following stepwise procedure:

i. Determine the uncertainty at the lower bound of the uncertainty interval relative to the central estimate of the ex-ante quantified unadjusted net baseline emissions and/or removals at 95% confidence level during the first crediting period ($UNC_{BE\ act/hist,CP1}$). The determination of the uncertainty shall consider all causes of uncertainty as per paragraph 13 of section 4 in Appendix 1 of the baseline standard;

ii. Determine the downward adjusted baseline emissions and/or removals **based on uncertainty** for the calendar year of the start date of the first crediting period (y1) ($BE_{adj,UNC,y1}$), as follows;

$$BE_{adj,UNC,y1} = BE_{Act/Hist,y} \times \left(1 - UNC_{BE\ act/hist,CP1}\right) \quad \text{Equation (4)}$$

Where:

$BE_{adj,UNC,y1}$ = Downward adjusted baseline emissions and/or removals based on uncertainty in year *y1*

$BE_{Act/Hist,y1}$ = Unadjusted existing actual or historical net baseline emissions and/or removals in year *y1*

$UNC_{BE\ act/hist,CP1}$ = Uncertainty at the lower bound of the uncertainty interval relative to the central estimate of the ex-ante quantified unadjusted net

baseline emissions and/or removals during the first crediting period (fraction)

y1 = Calendar year of the start date of the first crediting period

iii. Determine the **minimum downward adjusted baseline emissions and/or removals** for the calendar year of the start date of the first crediting period ($BE_{adj,min,y}$), as follows:

$$BE_{adj,min,y1} = BE_{Act/Hist,y} - \left(BE_{Act/Hist,y1} - AE_{y1}\right) \times 0.1 \quad \text{Equation (5)}$$

Where:

$BE_{adj,min,y1}$ = Minimum downward adjusted baseline emissions and/or removals in year *y1*

AE_{y1} = Ex-ante estimated activity emissions and/or removals in year *y1*

iv. Compare the downward adjusted baseline emissions and/or removals based on uncertainty ($BE_{adj,UNC,y1}$) and the minimum downward adjusted baseline emissions and/or removals ($BE_{adj,min,y1}$) and select the lower as the downward adjusted baseline for the calendar year of the start date of the first crediting period;

$$BE_{adj,y1} = min\left(BE_{adj,min,y1}, BE_{adj,UNC,y1}\right) \quad \text{Equation (6)}$$

Where:

$BE_{adj,y1}$ = Downward adjusted baseline emissions and/or removals in year *y1*

52. For the BAT approach, no downward adjustment in the first year of the crediting period applies.

53. Downward adjustment in subsequent years:

The downward adjustment in subsequent years (Y_2 to Y_n) shall be done applying a downward adjustment factor (DAF) based on the reference and net zero target year as defined by the host country as follows.

$$DAF_{Yn} = 1 - (Y_n - 2021) \times max\left(\frac{1}{\left(Y_{netzero} - Y_{reference}\right)}, 0.01\right) \quad \text{Equation (7)}$$

Where:

DAF_{Yn} = Downward adjustment factor applied in year Y_n

Y_n = Calendar year for which the downward adjustment is applied

$Y_{netzero}$ = Net zero target year of the host country

$Y_{reference}$ = Reference year for the net zero target of the host country (i.e. the year 2025 for the period 2025-2030)

Should the host country did not have defined a net zero target with related information on a target year equation 5 will be applied

$$DAF_{Yn} = 1 - (Y_n - 2021) \times 0.03$$ Equation (8)

54. The downward adjustment baseline shall be calculated as follows:

$$BE_{adj,Yn} = BE_{adj,y1} \times DAF_{Yn}$$ Equation (9)

Where:

$BE_{adj,Yn}$ = Downward adjusted baseline in year Y_n

[Explain how the downward adjustment is determined and applied, including the quantification of the downward adjustment and the quantification of the resulting downward adjusted baseline for each year of the crediting period based on the requirements of the baseline standard. Include relevant equations and choices/assumptions.]

55. The calculation of the downward adjusted baseline fulfils the requirements as defined by the baseline standard. It is calculated as the maximum of an adjustment factor derived from net-zero target years and the 1% specified in Para 71 of the baseline standard. Furthermore, the condition to be applied for countries without a net-zero target year ensures conservativeness in the downward adjustment.

[For baselines determined as per approach 36 (iii) of the RMP (historical emissions adjusted downwards), indicate how the downward adjustment in the calendar year of the start date of the first crediting period is determined and applied in accordance with paragraph 64 of the baseline standard. If another approach is proposed in accordance with paragraph 64, provide an appropriate justification.]

56. The approach proposed is based on the baseline standard. No alternative is approach is suggested for the first year of the crediting period. Furthermore, no exemption from the downward adjustment in subsequent years is proposed.

[For all baseline approaches, either:

(i) Indicate how the downward adjustment in subsequent years is determined and applied in accordance with section 7.2 of the baseline standard, or

(ii) Provide a justification for an exemption of the downward adjustment in subsequent years as per paragraph 65 and 66 of the baseline standard]

57. The approach based on the net zero reference and target year of the host country reflects the considerations as proposed by the baseline standard. No exemption from the downward adjustment in subsequent years is proposed.

[Add explanatory notes]

10.4. Identification of the conservative BAU scenario

58. The identification of the conservative BAU scenario shall follow the provisions and requirements of section 8 of the baseline standard. The activity proponent shall consider the following alternatives for the purpose of determining the BAU scenario and justify the choice, including how it ensures conservativeness:

    (a) Continuation of the historical situation (pre-activity scenario);

    (b) Establishment of an economically viable technology and/or practice;

    (c) A scenario combining (a) for the remaining lifetime of the existing equipment and/or practice, followed afterwards by (b).

    Where several scenarios are plausible, the most conservative scenario shall be chosen as the BAU scenario.

59. The activity proponent shall consider the following approaches for estimating the BAU emissions and/or removals and shall justify the choice:

    (a) Where the activity is not a greenfield activity, the historical emissions intensity prior to the implementation of the activity shall be considered, including any trends toward improving performance, for the remaining lifetime of the existing equipment and/or practice; or

    (b) Where the activity is a greenfield activity, or where it operates beyond the end of the remaining lifetime of the existing equipment and/or practice, the average emissions intensity of new capacity installed in the past three years, in the baseline geographical reference area, and/or in similar social, economic, environmental and technological circumstances and providing similar outputs as the activity shall be considered.

60. In determining the BAU scenario and quantifying the BAU emissions and/or removals pursuant to the provisions above, activity proponents shall identify and incorporate in the BAU:

    (a) Any policies that are active or scheduled to take effect within the crediting period, unless they refer to or formally integrate the mechanism as an instrument for implementation. All legal requirements shall be deemed to be enforced while recognizing that regulatory environments vary; and

    (b) Any specific national or sub-national targets for the sector or the type of activity, as long as these are supported by policy frameworks for implementation, but not general goals that are not specific to the sector or type of activity.

    [Explain how the conservative BAU is determined as per the requirements from section 8 of the baseline standard.]

61. The provisions and requirements of section 8 of the baseline standard are taken as basis for the identification of the conservative BAU scenario..

    [Add explanatory notes]

10.4.1. Calculation of the conservative BAU emissions

62. For this purpose, activity proponents shall identify the conservative BAU baseline as follows:

    (a) Through the following step-wise procedure:

i. Determine the uncertainty at the lower bound of the uncertainty interval relative to the central estimate of the ex-ante quantified BAU net baseline emissions and/or removals during the first crediting period ($UNC_{BAU,CP1,y)}$. The determination of the uncertainty shall consider all causes of uncertainty as per paragraph 13 in Appendix 1 of the baseline standard;

ii. Determine the conservative BAU baseline emissions based on uncertainty for the relevant year or period ($BAU_{cons,UNC,y}$), as follows;

$$BAU_{cons,UNC,y} = BAU_y \times \left(1 - UNC_{BAU,CP1,y}\right) \quad \text{Equation (10)}$$

Where:

$BAU_{cons,UNC,y}$ = Uncertainty at the lower bound of the uncertainty interval relative to the central estimate of the ex-ante quantified most likely net BAU baseline emissions and/or removals during the first crediting period year y (fraction)

$UNC_{BAU,CP1,y}$ = Conservative BAU baseline emissions based on uncertainty in year y. A default value of 0.06 can be applied based on a conservative factor of 0.94 from Annex 3 of FCCC/SBSTA/2003/10/Add.2.

BAU_y = Most likely net BAU baseline emissions in year y

iii. Determine the minimum conservative value of the BAU baseline during the first crediting period as follows:

$$BAU_{cons,min,y} = BAU_y \times \left(BAU_y - AE_y\right) \times 0.1 \quad \text{Equation (11)}$$

Where:

$BAU_{cons,min,y}$ = Minimum conservative BAU baseline emissions in year y

AE_y = Activity emissions in year y

iv. Compare the conservative BAU baseline emissions and/or removals based on uncertainty ($BAU_{cons,UNC,y}$) and the minimum conservative BAU baseline emissions and/or removals ($BAU_{cons,min,y}$) and select the lower as the conservative BAU baseline emissions;

$$BAU_{cons,y} = min\left(BAU_{cons,min,y}, BAU_{cons,UNC,y}\right) \quad \text{Equation (12)}$$

Where:

$BAU_{cons,y}$ = Conservative BAU baseline emissions in year y

63. The BAU scenario and quantification of the BAU emissions and/or removals shall be determined:

(a) Ex ante in the PDD at the start of the first crediting period for the same duration as the crediting period of the proposed Article 6.4 activity, specifying the BAU emissions and/or removals for each calendar year within the crediting period; and

(b) Ex post for each calendar year within the crediting period.

64. The BAU scenario shall be redetermined at each crediting period renewal following the same approach as described above.

[Explain how the conservative BAU emissions are determined based on the requirements in section 8 of the baseline standard. Include relevant equations and choices/assumptions.

In case another approach for ensuring that the crediting baseline is below BAU is chosen, as per paragraph 77(b), please provide a justification.]

65. The provisions and requirements of section 8 of the baseline standard are taken as basis for the identification of the conservative BAU scenario.

[Add explanatory notes]

10.5. Comparison of the downward adjusted baseline and the conservative business-as-usual baseline

66. Activity participants shall compare, ex-ante in the project design document, the following two baselines:

(a) The downward adjusted baseline; and

(b) The conservative BAU baseline.

67. Where the ex-ante conservative BAU baseline emissions and/or removals is lower than the ex-ante downward adjusted baseline for any calendar year or cumulatively over the crediting period, then the activity participant shall return the determination of the downward adjusted baseline and revise the quantitative methods and factors to determine the downward adjustment, to ensure that the downward adjusted baseline is lower than the conservative BAU baseline for each calendar year and cumulatively for the crediting period. This shall be done by increasing the DAF.

68. Activity participants shall compare, ex-post in monitoring reports, for each individual calendar year during the crediting period, the ex-post calculated downward adjusted baseline for the year and the ex-post calculated conservative BAU baseline for the same year and confirm that the downward adjusted baseline is lower than the conservative BAU baseline. If it is not, then the conservative BAU baseline shall be used for that calendar year.

[Explain how the comparison is made as per the requirements from section 9 of the baseline standard and whether further adjustment to the baseline emissions is needed].

69. The provisions and requirements of section 9 of the baseline standard are taken as basis for the identification of the conservative BAU scenario.

[Add explanatory notes]

11. Activity scenario

11.1. Calculation of activity emissions

70. The activity emissions are determined based on the emissions related to the electricity and fossil fuels used in the identified process steps (nitrogen, hydrogen (including any water pre-treatment) and ammonia production), the emissions from transportation and from land clearing activities to allow construction of facilities for the related process steps. Activity emissions shall be calculated as follows:

$$AE_y = AE_{H2,y} + AE_{EC,y} + AE_{FC,y} + AE_{T,y} + AE_{LC}$$ Equation (13)

Where:

AE_y = Activity emissions in year y (tCO_2e)

$AE_{H2,y}$ = Activity emissions as a result of physical leakage of hydrogen in year y

$AE_{EC,y}$ = Activity emissions as a result of electricity consumption in year y (tCO_2e). Where the conditions of Appendix 1 of this methodology are fulfilled, the emission factor for electricity can be assumed to be zero.

$AE_{FC,y}$ = Activity emissions as a result of fossil fuel consumption in year y (tCO_2e).

$AE_{T,y}$ = Activity emissions as a result of transportation of ammonia to the fertilizer production facility (if not integrated with the ammonia production) in year y (tCO_2e).

AE_{LUC} = Activity emissions as a result of land clearing for construction (only applicable in the first year of the crediting period (tCO_2e)

71. Emissions from hydrogen leakage are quantified as follows:

$$AE_{H2,y} = LK_{H2,y} \times GWP_{H2}$$ Equation (14)

Where:

$LK_{H2,y}$ = Quantity of hydrogen leaks in year y (tH_2)

GWP_{H2} = Global warming potential of hydrogen (tCO_2e/tH_2)

72. Activity emissions as a result of electricity consumption in year y (tCO_2e) are calculated as follows:

$$AE_{EC,y} = \left(EC_{grid,y} \times EF_{EC,grid,y} \times F_{TDL,grid}\right)$$ Equation (15)

Where:

$AE_{EC,y}$ = Activity emissions from electricity consumption due to the Article 6.4 activity in year y (t CO2/yr)

$EC_{grid,y}$	=	Quantity of electricity consumed from the electric grid in year y (MWh/yr)
$EF_{EC,grid,y}$	=	Emission factor from the electric grid in year y (t CO_2/MWh)
$F_{TDL,grid}$	=	Factor to account for transmission and distribution losses from the electric grid (unitless)

73. Apply one of the following default values[4] for $EF_{EC,grid,y}$

(a) A default emission factor of 1.3 tCO_2/MWh if the share of renewable and nuclear energy (excluding solar and wind) in the annual electricity generation is 33% or less for the most recent available year, or if this share is uncertain;

(b) A default emission factor of 0.87 tCO_2/MWh if the share of renewable and nuclear energy (excluding solar and wind) in the annual electricity generation is greater than 33% but less than 67% for the most recent available year;

(c) A default emission factor of 0.44 tCO_2/MWh if the share of renewable and nuclear energy (excluding solar and wind) in the annual electricity generation exceeds 67% for the most recent available year.

74. For the parameter $F_{TDL,grid}$, apply a value of 1.25.[4]

75. Activity emissions as a result of fossil fuel consumption in year y (tCO_2e) are calculated as follows[5]:

$$PE_{FC,y} = \sum_{i} \left(FC_{i,y} \times COEF_{i,y} \right) \qquad \text{Equation (16)}$$

Where:

$PE_{FC,y}$	=	Project emissions from fossil fuel consumption due to the Article 6.4 activity for purposes other than electricity generation in year *y* (tCO_2/year)
$FC_{i,y}$	=	Quantity of fuel type *i* combusted in process *j* during the year *y* (mass or volume unit/year)
$COEF_{i,y}$	=	Is the CO_2 emission coefficient of fuel type *i* in year *y* (tCO_2/mass or volume unit)
i	=	Fuel types combusted

[4] The conservative default factors proposed under this sub-section are an interim solution, since the revision of the CDM methodologies "ACM0002: Grid-connected electricity generation from renewable sources," "AMS-I.D.: Grid-connected renewable electricity generation," and "Methodological Tool: Emission factor for an electricity system," and "Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" are yet to be finalized. This mechanism methodology shall be revised accordingly to refer to the related methodologies and tools as soon as the related methodologies and tools and the respective standard(s) are adopted by the Supervisory Body.

[5] The approach proposed under this sub-section is an interim solution, since the revision of the "Methodological Tool: Tool to calculate project or leakage CO_2 emissions from fossil fuel combustion" is yet to be finalized. This mechanism methodology shall be revised accordingly to refer to the related methodologies and tools as soon as the related methodologies and tools and the respective standard(s) are adopted by the Supervisory Body.

76. The CO_2 emission coefficient ($COEF_{i,y}$) can be calculated using one of the following three options, depending on the availability of data on the fossil fuel type *i*, as follows:

(a) Option A.1: Based on the chemical composition of fuel *i* when $FC_{i,y}$is measured in a mass unit:

$$COEF_{i,y} = w_{c,i,y} \times 44/12 \times 1.00 \quad \text{Equation (17)}$$

(b) Option A.2: Based on the chemical composition of fuel *i* when $FC_{i,y}$is measured in a volume unit:

$$COEF_{i,y} = w_{c,i,y} \times \rho_{,i,y} \times 44/12 \times 1.002 \quad \text{Equation (18)}$$

Where:

$w_{c,i,y}$	=	Mass fraction of carbon in fuel type *i* in year *y* (tC/mass unit of the fuel)
$\rho_{,i,y}$	=	Density of fuel type *i* in year *y* (mass unit/volume unit of the fuel)
1.002	=	Factor to account for emissions of N_2O and CH_4 from the combustion of the fossil fuel

(c) Option B: Based on the net calorific value and CO_2 emission factor of fuel *i*:as follows:

$$COEF_{i,y} = NCV_{,i,y} \times EF_{,co2e,i,y} \quad \text{Equation (19)}$$

Where:

$NCV_{i,y}$	=	Net calorific value of the fuel type *i* in year *y* (GJ/mass or volume unit)
$EF_{CO2e,i,y}$	=	CO_2 emission factor of fuel type *i* in year *y* (tCO_2e/GJ)

(d) Activity participants should apply either Option A.1 or A.2. If the required data for these options are not available, participants may instead use Option B, provided they justify the unavailability of the data.

77. Emissions from transportation are quantified as follows[6]:

Project emissions from the transportation shall be quantified using either of Option A or Option B:

Option A – Monitoring fuel consumption:
Monitoring fuel consumption. Activity participants shall apply the equations and requirements provided in section 74 above to determine $AE_{T,y}$ / $LE_{T,y}$ None of the other provisions of this section shall apply

Option B – Using conservative default values:
Alternatively, project or leakage emissions from transportation may be estimated using conservative default values. Activity participants shall apply the rest of the provisions of this section

[6] The approach proposed under this sub-section is an interim solution, since the revision of the "Methodological Tool: Project and leakage emissions from transportation of freight" is yet to be finalized. This mechanism methodology shall be revised accordingly to refer to the related methodologies and tools as soon as the related methodologies and tools and the respective standard(s) are adopted by the Supervisory Body.

For Option B activity participants shall use conservative default emission factors to estimate project or leakage emissions from road transportation of freight. These default values shall be established for two vehicle classes: light vehicles and heavy vehicles. The following data shall be monitored separately for each freight transportation activity f to estimate the emissions.

The default emission factors applied to estimate emissions from road transportation of freight, with 245 g CO_2/tkm for light vehicles and 129 g CO_2/tkm for heavy vehicles. These values provide a conservative basis for calculating project and leakage emissions when detailed fuel consumption data are not available.

Project or leakage emissions are then calculated using as follows:

Equation (20)

$$AE_{T,y} \text{ or } LE_{T,y} = \sum_{f} D_{f,y} \times FR_{f,y} \times EF_{co2,f} \times 10^{-6}$$

Where:

$AE_{T,y}$	=	Project emissions from road transportation of freight in year y (t CO_2/year)
$LE_{T,y}$	=	Leakage emissions from road transportation of freight in year y(t CO_2/year
$D_{f,y}$	=	Round-trip road distance between the origin and destination of freight transportation activity f in year y (km)
$FR_{f,y}$	=	Total mass of freight transported in freight transportation activity f in year y (t/year)
$EF_{co2,f}$	=	Default CO_2 emission factor for freight transportation activity f (gCO_2e/t-km)
f	=	Freight transportation activities conducted in the project activity in the year y

78. Activity participants shall document in the PDD which freight transportation activities f will occur under the activity scenario, including for each transportation activity information on:

(a) The origin and destination of the freight (to the extent that this is known at validation);

(b) The type(s) of freight that are planned to be transported;

(c) The planned number of trips made and/or the planned quantity of freight that should be transported; and

(d) The option selected (A or B) to determine emissions.

For a particular freight transportation activity f, the option selected for determining emissions from freight transportation shall not be changed during the crediting period.

79. Emissions from land clearing are quantified as follows:

$$AE_{LUC} = \Delta C_{LUC}$$ Equation (21)

Where:

ΔC_{LUC} = Total carbon stock change due to land use conversion (tCO_2e)

80. ΔC_{LUC} is calculated as per Equation (22) below:

$$\Delta C_{LUC} = \sum_i \left((C_{BL} - C_{Activity}) \times A_i \times \frac{44}{12} \right)$$ Equation (22)

Where:

C_{BL} = Total carbon stock per unit area before land clearing (tonnes C/ha)

$C_{Activity}$ = Total carbon stock per unit area after land clearing (tonnes C/ha)

A_i = Area i where land clearing was observed (ha)

81. The total carbon stock (C) for a given land type is the sum of carbon in five pools, as defined by the IPCC: Above-Ground Biomass (AGB), Below-Ground Biomass (BGB), Dead Wood (DW), Litter (LI), and Soil Organic Carbon (SOC).

[Explain how the activity emissions are calculated for each year of the crediting period. Include relevant equations, choices and assumptions.]

82. All relevant activity emission sources are covered and related equations for the quantification are defined.

[Add explanatory notes]

12. Leakage

12.1. Identification of leakage emission sources

83. Activity proponents shall consider the provisions of the leakage standard as applicable. As a result of the applicability conditions of this methodology, only emissions from international transport as a result of greenfield activities where fertilizer is exported from the host country needs to be quantified as leakage emission source.

[Explain which are the leakage emissions sources that may be attributable to the Article 6.4 activity based on the requirements as per paragraph 12 of the leakage standard.]

84. As a result of the strict applicability conditions, most leakage sources can be excluded from the assessment (i.e. baseline equipment transfer, competition for resource use such as water and related increases in release of GHGs from the environment). The only remaining source of leakage is deemed to be international transport as a result of greenfield activities where the produced fertilizer is exported from the host country. Reference to the leakage standard is provided.

[Add explanatory notes]

12.2. Avoidance or minimization of leakage

Activity proponents shall consider the provisions of the leakage standard as applicable to minimize leakage.

[Explain how the negative leakage emissions sources identified above shall be avoided or minimized based on the requirements as per paragraph 14 of the leakage standard.]

85. Reference to the leakage standard is provided.

[Add explanatory notes]

12.3. Addressing leakage emissions

86. Leakage from international transport as applicable shall be taken into consideration as follows:

$$LE_y = AE_{T,y}$$ Equation (23)

Where:

LE_y = Leakage emissions in year y (tCO_2e)

$AE_{T,y}$ = Activity emissions as a result of transportation in year y (tCO_2e). Emissions shall be determined as per procedure described in the activity emission section of this methodology

[Explain how negative leakage emissions that cannot be avoided or minimized are discounted from the crediting baseline based on the requirements in section 5.3 of the leakage standard. Include relevant equations, choices and assumptions.]

13. Emission reductions

87. Emission reductions are calculated as the difference of baseline, activity and leakage emissions as follows:

$$ER_y = BE_y - AE_y - LE_y$$ Equation (24)

Where:

ER_y = Emission Reduction in year y (tCO_2e)

[Explain how the emission reductions are calculated for every year of the crediting period. Include relevant equations, choices and assumptions.]

88. The standard approach to quantify emission reductions is followed.

[Add explanatory notes]

14. Data and parameters not monitored

89. In addition to the parameters below, all parameters as per the referred methodologies and tools have to be considered as applicable.

[List all data/parameters which are defined ex-ante and do not need to be monitored under the proposed methodology (or methodological tool).]

(Copy this table for each piece of data or parameter)

Data/parameter	$Y_{netzero}$
Description	Net zero target year of the host country
Data unit	Year
Equations referred	*Equation (4)*
Purpose of data	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions
Value(s) applied	Variable
Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Choice of data or measurement methods and procedures	Sourced from applicable host country regulation.
Treatment of uncertainty	Not applicable
Additional comments	

Data/parameter	$BE_{baseline}$
Description	Baseline emissions for ammonia production, expressed as the combined direct and upstream emission intensity per tonne of ammonia produced following the BAT approach or existing actual or historical emissions approach.
Data unit	tCO_2e/tNH_3
Equations referred	*Equation (3)*
Purpose of data	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions
Value(s) applied	The following values shall be applied:

Country or region	Direct emission intensity (tCO_2e/tNH_3)	Upstream emission intensity (tCO_2e/tNH_3)	Default BAT Emission Intensity (tCO_2e/tNH_3)
Global reference	1.6	0.6	2.16

Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*

Choice of data or measurement methods and procedures	Based on data from GS4GG A6 M400-01 SI, table 16 and taking into consideration direct and upstream emissions and a conservative factor of 0.98 from Annex 3 of FCCC/SBSTA/2003/10/Add.2 for the default BAT to address uncertainty.
Treatment of uncertainty	A conservative factor of 0.98 based on Annex 3 of FCCC/SBSTA/2003/10/Add.2 was applied to the underlying benchmark values to address potential uncertainty in source data, ensuring that the resulting BAT does not overstate baseline emissions. This aligns with paragraphs 14 and 15 of the baseline standards, which require conservative treatment of uncertainty.
Additional comments	

Data/parameter	GWP_{H2}
Description	Global Warming Potential of hydrogen (H_2)
Data unit	tCO_2e/tH_2
Equations referred	*Equation (14)*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	5.8 tCO_2e/tH_2
Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Choice of data or measurement methods and procedures	IPCC AR4 WG1 as under chapter 2.10.3.6
Treatment of uncertainty	Conservative choice of the 100-year GWP value ensures comparability with other greenhouse gases.
Additional comments	

Data/parameter	C_{BL}
Description	Total carbon stock per unit area before land clearing (tC/ha). Includes above-ground biomass, below-ground biomass, dead wood, litter, and soil organic carbon.
Data unit	tC/ha
Equations referred	*Equation (22)*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	Use Tier 1 default values from the 2006 IPCC Guidelines for National GHG Inventories, Volume 4.

Forest Land (Tropical)	~120-250
Grassland:	~88
Cropland	~60-90

	The specific value shall be chosen based on the climate zone and land type and must be justified.
Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Choice of data or measurement methods and procedures	2006 IPCC Guidelines for National GHG Inventories, Volume 4.
Treatment of uncertainty	Conservativeness ensured by applying the upper bound of carbon stock estimates prior to clearing,
Additional comments	Default values are sourced from IPCC (2006) guidance. Project developers must clearly document the land type before conversion using satellite imagery, land use records, or site surveys.

Data/parameter	$C_{Activity}$
Description	Total carbon stock per unit area after land clearing (tC/ha). Includes above-ground biomass, below-ground biomass, dead wood, litter, and soil organic carbon remaining following land conversion.
Data unit	tC/ha
Equations referred	*Equation (22)*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	0 Tc/ha
Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Choice of data or measurement methods and procedures	For conversion to "Settlements" (i.e., an industrial facility like a solar farm or ammonia plant), the IPCC assumes all living biomass is lost. Therefore, a default value of 0 for biomass pools can be used. Soil organic carbon may remain, subject to justification.
Treatment of uncertainty	Not applicable, as value is fixed ex-ante at zero.
Additional comments	

Data/parameter	A_i
Description	Total area of project facilities including dedicated renewable energy facilities as applicable.
Data unit	ha
Equations referred	*Equation (22)*
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions
Value(s) applied	-

Source of data	☐ Measured ☒ Other sources *Tick the applicable box. 'Other sources' include official statistics, expert judgment, proprietary data, IPCC, commercial and scientific literature, etc.*
Choice of data or measurement methods and procedures	Area should be derived from maps showing all related production facilities including dedicated renewable energy facilities as applicable.
Treatment of uncertainty	Not applicable
Additional comments	

15. Data and parameters monitored

90. In addition to the parameters below, all parameters as per the referred methodologies and tools have to be considered as applicable.

[List all data/parameters which need to be monitored under the proposed methodology or methodological tool, including data and parameters that are determined only once for the crediting period of the project activity but that will become available only after the implementation of the project activity.]

(Copy this table for each piece of data or parameter)

Data/parameter	$P_{NH3,Act,y}$	
Description	Annual production of renewables-based ammonia from the activity.	
Data unit	tNH_3	
Equations referred	*Equation (3)*	
Purpose of data	☒ Baseline emissions ☐ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	Measured continuously by flow meters/weighbridge and recorded in daily logs; aggregated monthly and reported annually.	
Measurement methods and procedures	Renewables-based ammonia production and export will be determined based on continuous readings from calibrated flow meters at the ammonia synthesis outlet or weighbridge records (for bulk transfers). These measurements will be cross-checked with production records, dispatch notes, and stock balances.	
Entity/person responsible for the measurement	Plant operator / project activity manager.	
Measuring instrument(s)	*Type of instrument*	Calibrated flow meter (continuous measurement) / weighbridge (batch-wise transfer), verified against production logs.
	Accuracy class	Minimum ±1% of measured value.
	Calibration requirements	1. Calibration procedures: As per manufacturer's specifications / national standards.

		2. Calibration frequency: At least once every year or as per manufacturer's recommendation, whichever is earlier. 3. Responsible entity: Accredited third-party calibration agency / internal QA team.
	Location	At project site, downstream of ammonia synthesis unit / dispatch point.
QA/QC procedures	• Cross-check measured production data with dispatch notes, invoices, and stock records. • Internal reconciliation of production, dispatch, and inventory data on a monthly basis. • Annual third-party verification of records and calibration certificates. • Electronic data backed up and hard copies of invoices/records archived securely.	
Treatment of uncertainty	• Uncertainty minimized through use of calibrated instruments, or • national standards as applicable to reduce methodological uncertainty. • Any missing or inconsistent data will be conservatively treated to avoid overestimation of emission reductions.	
Additional comment		

Data/parameter	$LK_{H2,y}$	
Description	Quantity of hydrogen physically leaked from the production facility in year *y*	
Data unit	tH_2	
Equations referred	*Equation (14)*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	Option 1 (preferred approach): Continuous measurement of hydrogen produced and consumed; aggregated annually Option 2: Estimated based on volumes of pipes and equipment. The activity proponent must determine the quantity of leaked hydrogen by transient flow rate calculations for compressible fluids appropriate for the expected evolving conditions in the pipeline or component based on the approximate geometry of the escaping flow and pipelines/components connected to the leak. For Option 2, appropriate leak detection equipment must be in place that would detect hydrogen leakage and result in an emergency shutdown of the production process.	
Measurement methods and procedures	For Option 1: Hydrogen production will be determined based on continuous readings from calibrated flow meters at the hydrogen transfer area or weighbridge records (for bulk transfers). These measurements will be cross-checked with production records, dispatch notes, and stock balances.	
Entity/person responsible for the measurement	Plant operator / project activity manager.	
Measuring instrument(s)	*Type of instrument*	For Option 1: Calibrated flow meter (continuous measurement) / weighbridge (batch-wise transfer), verified against production logs.

	Accuracy class	For Option 1: Minimum ±1% of measured value.
	Calibration requirements	For Option 1: 1. Calibration procedures: As per manufacturer's specifications / national standards. 2. Calibration frequency: At least once every year or as per manufacturer's recommendation, whichever is earlier. 3. Responsible entity: Accredited third-party calibration agency / internal QA team.
	Location	At project site, downstream of electrolysis unit / dispatch point.
QA/QC procedures	For Option 1: • Cross-check measured production data with dispatch notes, invoices, and stock records. • Internal reconciliation of production, dispatch, and inventory data on a monthly basis. • Annual third-party verification of records and calibration certificates. • Electronic data backed up and hard copies of invoices/records archived securely.	
Treatment of uncertainty	For Option 1: • Uncertainty minimized through use of calibrated instruments, or • national standards as applicable to reduce methodological uncertainty. • Any missing or inconsistent data will be conservatively treated to avoid overestimation of emission reductions.	
Additional comment		

Data/parameter	$EC_{grid,y}$	
Description	Quantity of *renewable electricity* generated and supplied to the green ammonia production facility in year y	
Data unit	MWh/year	
Equations referred	*Equation (15)*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	Continuous measurement, recorded at least monthly.	
Measurement methods and procedures	Directly measured using calibrated electricity meters	
Entity/person responsible for the measurement	Project operator / Renewable power plant operator	
Measuring instrument(s)	*Type of instrument*	Bi-directional energy meter
	Accuracy class	Regulated electricity-meters: in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements Non-regulated electricity-meters: in accordance with the stipulation of the meter supplier or national requirements (if the standards are not available and meter supplier does not

		specify, calibrate the meters every 3 years and use the meters with at least 0.5 accuracy class)
	Calibration requirements	Regulated electricity-meters: in accordance with national standards or requirements set by the meter supplier or requirements set by the grid operators Non-regulated electricity-meters: in accordance with national standards or requirements set by the meter supplier
	Location	For electricity supplied to the electric grid: installed at the grid interface.
QA/QC procedures	Electricity meters will be subject to regular maintenance and testing in accordance with the stipulation of the meter supplier and/or as per the requirements set by the grid operators or national requirements. The electricity generation (gross or net) shall be cross-checked with records of electricity sale (e.g. sales receipt)	
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments	
Additional comment		

Data/parameter	$FC_{i,y}$	
Description	Is the quantity of fuel type *i* combusted in process *j* during the year *y*	
Data unit	Mass or volume unit/year	
Equations referred	*Equation (16)*	
Purpose of data	☐ Baseline emissions ☒ Project emissions ☐ Leakage emissions	
Measurement and updating frequency	Fuel consumption shall be recorded daily Continuous measurement and at least monthly recording	
Measurement methods and procedures	Fuel consumption for the Green Ammonia project and associated transportation shall be recorded daily. All fuel meters, flow meters, or tank gauges must be properly calibrated at least once per year.	
Entity/person responsible for the measurement	Activity participants / Project operators	
Measuring instrument(s)	*Type of instrument*	Flow meters, tank gauges, transducers, sonar, piezoelectric devices for facility use; on-board meters for vehicles
	Accuracy class	Follow manufacturer specifications or national standards
	Calibration requirements	Ruler gauge must be calibrated at least once a year. Transducers, sonar and piezoelectronic devices must be calibrated with the ruler gauge and receiving a reasonable maintenance
	Location	N/A
QA/QC procedures	The consistency of metered fuel consumption quantities should be cross-checked by an annual energy balance that is based on purchased quantities and stock changes.	

	Where the purchased fuel invoices can be identified specifically for the Article 6.4 activity, the metered fuel consumption quantities should also be cross-checked with available purchase invoices from the financial record
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments
Additional comment	Article 6.4 activities faced with data gaps due to meter failure or other reasons unforeseen, may estimate the quantity of fuel, using one of the following options, provided the gap period does not exceed 30 consecutive days within six consecutive months: • The purchased fuel/energy invoices/bills, where the purchased fuel can be identified specifically for the Article 6.4 activity; • The energy produced by the equipment, adjusted by efficiency. A conservative value for efficiency of the equipment is of 40 per cent for combustion engines and generator and 80 per cent for thermal heaters shall be used, while energy produced is measured directly or calculated based on operation hours; • The highest value of the parameter for the same calendar period of the previous years; • The fuel consumption of a representative sample of the first batch1 of project devices. It may be assumed that the fuel consumption measured in a representative sample of the first batch of project devices apply to all subsequent batches

Data/parameter	D_f		
Description	Return trip distance between the origin and destination of freight transportation activity *f*		
Data unit	km		
Equations referred	*Equation (20)*		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions
Measurement and updating frequency	Determined for each freight transportation activity once for a reference trip Updated if routes or distances change		
Measurement methods and procedures	Determined for each freight transportation activity *f* for a reference trip		
Entity/person responsible for the measurement	Activity participants or vehicle operator (if the trucks are not owned by the activity participants)		
Measuring instrument(s)	*Type of instrument*	Vehicle odometer, other appropriate sources (e.g. on-line sources)	
	Accuracy class	*N/A*	
	Calibration requirements	*N/A*	
	Location	*N/A*	
Measurement intervals	Determined once for each freight transportation activity f. To be updated whenever the distance changes		

QA/QC procedures	Cross-check distances using route planning tools or GPS logs and maintain records of reference trips and any updates.
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments
Additional comment	

Data/parameter	$FR_{f,i,y}$		
Description	Total mass of freight transported in vehicle class *i* and freight transportation activity *f* in year *y*		
Data unit	Tonnes		
Equations referred	*Equation (20)*		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions
Measurement and updating frequency	Measured continuously or per shipment and aggregated annually for reporting.		
Measurement methods and procedures	Determined for each freight transported f		
Entity/person responsible for the measurement	Activity participants or vehicle operator (if the trucks are not owned by the activity participants)		
Measuring instrument(s)	*Type of instrument*	N/A	
	Accuracy class	N/A	
	Calibration requirements	N/A	
	Location	N/A	
Measurement intervals	Continuously		
QA/QC procedures	Cross-check freight mass values with transport invoices, delivery records, and typical payload capacities for the vehicle class used.		
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments		
Additional comment			

Data/parameter	$w_{c,i,y}$		
Description	Mass fraction of carbon in fuel type *i* in year *y*		
Data unit	t_C /mass unit of the fuel		
Equations referred	*Equation (17)*		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions

Measurement and updating frequency	Determined continuously for each fuel delivery and aggregated annually for reporting	
Measurement methods and procedures	Values provided by the supplier of the fuel (preferred source); Measurements by activity participants undertaken in line with national or international fuel standards	
Entity/person responsible for the measurement	Activity participants or vehicle operator (if the trucks are not owned by the activity participants)	
Measuring instrument(s)	*Type of instrument*	NA
	Accuracy class	NA
	Calibration requirements	NA
	Location	N/A
Measurement intervals	Continuously	
QA/QC procedures	NA	
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments	
Additional comments	Verify if the values measured or sourced from the fuel supplier or from measurements are within the uncertainty range of the product of the IPCC default values as provided in Table 1.2 and Table 1.3, Vol. 2 of the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements. The laboratories in (b) should have ISO17025 accreditation or justify that they can comply with similar quality standards	

Data/parameter	$\rho_{i,y}$		
Description	Density of fuel type *i* in year *y*		
Data unit	Mass unit/volume unit of the fuel		
Equations referred	*Equation (17)*		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions
Measurement and updating frequency	Variable (depends on the type of fuel)		
Measurement methods and procedures	- Values provided by the supplier of the fuel (preferred source); - Measurements by activity participants undertaken in line with national or international fuel standards (if the values provided by the supplier of the fuel are not available); Regional or national default values (if the values provided by the supplier of the fuel are not available and only for liquid fuels)		
Entity/person responsible for the measurement	Activity participants or vehicle operator (if the trucks are not owned by the activity participants)		

Measuring instrument(s)	*Type of instrument*	*NA*
	Accuracy class	*NA*
	Calibration requirements	*NA*
	Location	*NA*
Measurement intervals	Continuously	
QA/QC procedures	NA	
Treatment of uncertainty	Uncertainties are determined based on the measuring instruments	
Additional comments	For option 1: The density of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated	

Data/parameter	$NCV_{i,y}$		
Description	Weighted average net calorific value of the fuel type *i* in year *y*		
Data unit	TJ per Mass unit or volume unit of the fuel		
Equations referred	*Equation (19)*		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions
Measurement and updating frequency	Determined for each fuel delivery and aggregated annually to derive a weighted annual NCV value if calculated.		
Measurement methods and procedures	• Option 1: Values provided by the supplier of the fuel (preferred source). The density of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated; • Option 2: Measurements by activity participants undertaken in line with national or international fuel standards (if the values provided by the supplier of the fuel are not available). The NCV of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated; • Option 3: Regional or national default values (if the values provided by the supplier of the fuel are not available and only for liquid fuels). Values shall be reviewed annually • Option 4: Upper bound of the 95 per cent confidence interval from IPCC default values provided in Table 1.2 of Chapter 1 of Vol. 2 (Energy) of the 2019 Refinement to the 2006 IPCC Guidelines on National GHG Inventories (if the values provided by the supplier of the fuel are not available). Update based on future revisions of the IPCC Guidelines		
Entity/person responsible for the measurement	Fuel supplier (for Option 1); Activity participants or accredited testing laboratory (for Options 2–4)		
Measuring instrument(s)	*Type of instrument*	*NA*	
	Accuracy class	*NA*	

	Calibration requirements	*NA*
	Location	*NA*
Measurement intervals	Per fuel delivery; annual averaging.	
QA/QC procedures	NA	
Treatment of uncertainty	Verify if the values under Options 1, 2 and 3 are within the uncertainty range of the IPCC default values as provided in Table 1.2, Vol. 2 of the 2019 Refinement to the 2006 IPCC Guidelines. If the values fall below this range collect additional information from the testing laboratory to justify the outcome or conduct additional measurements – the laboratories in Options 1, 2 and 3 should have ISO17025 accreditation or justify that they can comply with similar quality standards	
Additional comments	For option 1: The density of the fuel should be obtained for each fuel delivery, from which weighted average annual values should be calculated	

Data/parameter	$EF_{CO2e,i,y}$		
Description	Weighted average CO_2e emission factor of fuel type *i* in year *y*		
Data unit	tCO_2e/GJ		
Equations referred	*Equation (17*)		
Purpose of data	☐ Baseline emissions	☒ Project emissions	☐ Leakage emissions
Measurement and updating frequency	Determined for each fuel delivery or consumption event and aggregated annually; updated whenever new fuel is purchased or when emission factors change.		
Measurement methods and procedures	• Option 1: Values provided by the supplier of the fuel (preferred source) in line with national or international fuel standards; • Option 2: Measurements by activity participants undertaken in line with national or international fuel standards (if the values provided by the supplier of the fuel are not available); • Option 3: Regional or national default values (if the values provided by the supplier of the fuel are not available and only for liquid fuels). Values shall be reviewed annually; • Option 4: Upper bound of the 95 per cent confidence interval from IPCC default values provided in the 2019 Refinement to the 2006 IPCC Guidelines on National GHG Inventories (if the values provided by the supplier of the fuel are not available). Update based on future revisions of the IPCC Guidelines		
Entity/person responsible for the measurement	Activity participants (e.g., project operator) or the fuel supplier, depending on whether the emission factor is provided by the supplier or measured by the project.		
Measuring instrument(s)	*Type of instrument*	NA	
	Accuracy class	NA	
	Calibration requirements	NA	

	Location	*NA*
Measurement intervals	Determined for each fuel delivery or batch; aggregated and reported annually.	
QA/QC procedures	NA	
Treatment of uncertainty	For Option 1, if the fuel supplier of the fuel does provide the NCV value and the CO_2 emission factor on the invoice and these two values are based on measurements for this specific fuel, this CO_2 factor should be used. If another source for the CO_2 emission factor is used or no CO_2 emission factor is provided, Options 2, 3 and 4 should be used. The emission factors of CH_4 and N_2O shall be converted to tCO_2e/GJ and added to the emission factor of CO_2 to estimate a total equivalent emission factor in tCO_2e/GJ for the three greenhouse gases	
Additional comments		

15.1. Frequency of submission of monitoring reports

91. No specific requirements applicable as no removals or risk of reversals.

92. For activities involving removals and for emission reduction activities with risks of reversals:

    (a) The maximum permissible interval between the start date of the first crediting period and the submission of the first monitoring report is one to five *[Specify the frequency, between one and five years as per the requirements in paragraph 21 (a) of the "Standard: Requirements for activities involving removals under the Article 6.4 mechanism" (hereinafter referred to as the removals standard)]* years; and

    (b) The maximum permissible interval between the submission of two consecutive monitoring reports after the first monitoring report is one to five *[Specify the frequency, between one and five years as per the requirements in paragraph 21 (b) of the removals standard]* years.

16. Methodologies principles

[Note: This section is to demonstrate compliance with other provisions contained in the "Standard: Application of the requirements of Chapter V.B (Methodologies) for the development and assessment of Article 6.4 mechanism methodologies" (hereinafter referred to as the methodologies standard)]

16.1. Encouraging ambition over time

93. Following the conservative approaches of the baseline standard and the related downward adjustment over time this methodology contributes to encouraging ambition over time.

    [Demonstrate how the methodology encourages ambition over time based on the requirements of the methodologies standard.]

16.2. Contributing to the equitable sharing of mitigation benefits between participating Parties

94. Fertilizer production facilities using renewables-based ammonia will continue to generate emission reductions well beyond the end of the crediting period of an Article 6.4 activity.

As such, the host Party will continue to derive long-term mitigation benefits even after the end of crediting period.

The use of the Sustainable Development Tool is mandatory in the design and implementation of the activity to demonstrate that it supports the host Party's sustainable development objectives and that any potential negative social or environmental impacts, such as water stress or land-use conflicts, are avoided.

Activity participants are requested to verify whether the host Party has issued conditions for the equitable sharing of mitigation benefits between participating Parties, and shall ensure that such conditions are fully respected, thereby safeguarding that mitigation benefits accrue fairly to the host Party.

[Explain how the provisions included in the methodology for contributing to the equitable sharing of mitigation benefits between participating Parties ensure compliance with the requirements set in paragraph 31 to 33 of the methodologies standard.]

16.3. Encouraging broad participation

95. This methodology is designed to be globally applicable also in host countries with limited data availability. This is for example achieved by allowing use of various default values and the underlying benchmark approach.

[Explain how the methodology or methodological tool complies with the requirements contained in paragraph 51 of the methodologies standard.]

16.4. Attributability of emission reductions or net removals to the Article 6.4 activity

96. The production of renewables-based ammonia as proposed activity under this methodology is typically not sensitive to exogenous factors.

[If required, explain how the methodology or methodological tool complies section 5 in Appendix 1 of the baseline standard]

16.5. Potential perverse incentives

97. The production of renewables-based ammonia as proposed activity under this methodology is typically not sensitive to perverse incentives as the emission reduction is for example not a result of the destruction of a GHG as a byproduct of the production process where the destruction could potentially be more attractive than the production itself.

[If required, explain how the methodology or methodological tool addresses section 6 in Appendix 1 of the baseline standard]

16.6. Rebound effects

98. The production of renewables-based ammonia as proposed activity under this methodology is typically not sensitive to rebound effects as it is not an activity related to energy-efficient appliances or similar.

[If applicable, explain how the methodology or methodological tool addresses section 7 in Appendix 1 of the baseline standard.]

Appendix 1. Activity emissions from use of electricity from renewable sources[7]

1. The emission factor for renewable sources of electricity can be considered to be zero under the following two conditions (i.e. paragraph 2 and paragraph 3).

2. For (share of) electricity that is provided to the activity from a dedicated renewable energy source facility via a direct connection not using the public/national electricity grid and where the following two conditions are fulfilled:

   (a) The renewable energy facility would be either sourced from wind or solar power[7].

   (b) The renewable energy facility is not connected to the public/national grid or the electricity supply to the activity can be clearly metered to ensure no electricity from the grid is supplied via the direct connection to the activity;

   (c) The renewable energy facility started operation no more than 3 years before the project start date of the activity.

3. For (the share of) electricity that is provided to the activity from a dedicated renewable energy source facility via the public/national electricity grid and where all of the following conditions are fulfilled:

   (a) The renewable energy facility would be applicable would be either sourced from wind or solar power[7].

   (b) The renewable energy facility started operation no more than 3 years before the project start date of the activity;

   (c) The renewable energy facility is located in the same country as the activity;

   (d) The capacity of the renewable energy facility used exceeds any jurisdictional renewable portfolio requirements or is otherwise excluded from those requirements if existing;

   (e) A power purchase agreement (PPA) is established and complies with all of the following conditions:

      (i) The PPA is mutually executed by both the activity proponent (or activity proponent's representative) and the renewable energy facility before the start of construction of the renewable energy facility (or phase);

      (ii) The PPA forbids the activity proponent and the PPA counterparties from generating, transferring, or selling renewable energy credits (RECs) or other instruments representing the low-carbon benefits of the energy to others for the quantity of energy supplied to the project through the agreement.

[7] The procedures as proposed under this sub-section are an interim solution, since the revision of the CDM methodologies "ACM0002: Grid-connected electricity generation from renewable sources," "AMS-I.D.: Grid-connected renewable electricity generation," and "Methodological Tool: Emission factor for an electricity system," and "Methodological Tool: Baseline, project and/or leakage emissions from electricity consumption and monitoring of electricity generation" are yet to be finalized. This mechanism methodology shall be revised accordingly to refer to the related methodologies and tools as soon as the related methodologies and tools and the respective standard(s) are adopted by the Supervisory Body. This shall include and reflect all renewable energy sources as per the revised ACM0002.

(f) The production of electricity at the renewable energy facility and the consumption of electricity at the activity site takes place during the same period of time on an hourly basis.

[Use one or more appendixes to add complementary information to the main part of the methodology which could make the main part of the methodology too long, such as providing additional details, supporting evidence or examples to comply with specific requirements.]

Appendix 2. Water risk assessment

4. Activities have to ensure that negative impacts to fresh or drinking water resources are minimised by the following requirements.

5. Development of a water risk assessment showing that the overall risk to fresh or drinking water resources is not exceeding “low-medium” levels following the WRI Aqueduct methodology on global water risk indicators or adequate methodologies for the following indicators:

   (a) Water stress;

   (b) Water depletion;

   (c) Interannual variability;

   (d) Seasonal variability;

   (e) Groundwater table decline;

   (f) Drought risk;

   (g) Unimproved/No Drinking Water

   The water risk assessment shall be done once at validation and for each renewal of the crediting period.

6. Development and implementation of a water management and monitoring plan including a description of

   (a) the operational practices that will be implemented to maintain or enhance water quality;

   (b) the operational practices that will be implemented to use water efficiently and to avoid the depletion of surface or groundwater resources beyond replenishment capacities;

   (c) how an increase in the risk of negative impacts will be detected;

   (d) the corrective measures to be implemented if risk of negative impacts is observed to be significantly increasing compared to the water risk assessment described above.

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Document information

Version	*Date*	*Description*
0.2.0	19 August 2025	Revision to incorporate new sections and sub-sections in line with current standards; provide completion instructions, realign their sequence, and allow inclusion of explanatory notes.
01.0	18 December 2024	Initial publication of form template.

Decision Class: Regulatory
Document Type: Form
Business Function: Methodology
Keywords: A6.4 mechanism, developing methodologies and tools