GLOBAL STAKEHOLDER CONSULTATION FORM FOR PROPOSED NEW BASELINE AND MONITORING METHODOLOGY OR METHODOLOGICAL TOOL (version 01.0)

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Reference number of proposed new methodology or methodological tool	A6.4-PMM006
Based on an assessment of information in the A6.4-FORM-METH-002 and its application in sections A to C of the submitted draft project design document (A6.4-FORM-AC-020), provide your comments to the proposed new methodology using the tabular format below. Please indicate the sections or issues to which your comments refer to.	
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1	Section 5, paragraph 8 (e)(iii), page 7	te	The methodology allows the use of electricity from the grid for the production of hydrogen, when the grid emission factor (i.e. the combined margin) is equal and less to .2tCO_{2e}/MWh provided 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. However, the use of an average combined-margin grid emission factor may mask the mobilisation of high-emitting power generation in response to the introduction of a new, large, and constant electricity load such as an electrolyser, particularly at times when renewable energy sources have already been dispatched. As such, the combined margin does not adequately reflect ***which* power generation sources are mobilised as a direct consequence of the project activity**, and therefore does not reliably capture the marginal emissions impact of grid electricity use. Furthermore, in accordance with Appendix 1, project activities rely on electricity supplied through onsite renewable generation or grid-connected renewable energy facilities under power purchasing agreements (PPAs) signed prior to the start of the crediting period. These PPAs shall be designed to cover the total electricity requirements **of the "Fertilizer production with renewables-based ammonia"** activity to be coherent with the title of the methodology. In this context, the methodology does not clearly justify the need for additional, uncontrolled sources of grid electricity beyond the electricity contracted through such renewable PPAs. In addition, the requirement that the expansion of electricity production must have occurred in the five years prior to the start date of the project activity appears to be i**rrelevant.** The threshold of the national grid emission factor should be an indicator to ensure that the ***marginal* emissions impact** of electricity consumption during the crediting period from the project **avoids inducing fossil-fuel-based generation when renewables have already been dispatched.**	**Option A)** Eliminate the allowance of fossil fuel generated electricity from the grid to be coherent with the title and scope of the methodology. **Option B)** Provided there is an adequate justification, the combination of the below: 1) De-risk the use of fossil-fuel-based electricity by replacing average combined-margin emission factors with *marginal* grid emission factors, which more accurately reflect the power generation sources mobilised to supply additional, constant electricity demand from electrolysers. 2) Indicate and harmonise the maximum share of grid electricity consumption to ensure consistency with other sections of the methodology. 3) Remove the requirement that electricity-production expansion must have occurred in the five years prior to the start date of the project activity, as this criterion does not address marginal emissions impacts during the crediting period. 4) Change the name of the methodology to avoid deceiving the public by saying it's renewable-based, when the intention is to use non-renewable electricity, potentially from the combustion of fossil fuels. Proposed text, with changes introduced in bold: *(iii) From the grid, where the marginal grid emission factor is equal or less than .2tCO_{2e}/MWh and it can be demonstrated that the share of total electricity consumption from the grid**, not covered by the power purchasing agreements with renewable energy facilities as defined in Appendix 1, is below 10%.*** Proposed new name: *A6.4-PMM006 fertilizer production using **low-carbon** ammonia*

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2	Section 5, paragraph 8 (e)(iv), page 7	te	The methodology allows the use of electricity from the grid for the production of hydrogen, when the grid emission factor (i.e. the combined margin) is above .2tCO_{2e}/MWh and it can be demonstrated that the share in total electricity consumption from the grid is below 15%. However, section A.2 on page 3 limits the use of grid electricity to 10%, resulting in **an internal inconsistency** in the permitted share of grid electricity use. In addition, contrary to logic, the methodology **allows a higher share of grid electricity** (15% instead of 10%) precisely **when the grid emission factor exceeds the defined threshold of .2tCO_{2e}/MWh**, rather than applying more stringent limits for higher-emitting electricity sources. Furthermore, **no upper bound is defined** for the grid emission factor under this provision, such that electricity from very high-emitting power systems could still be eligible provided the share of total electricity used in the project remains below 15%. As a result of the current parameter choices, the project activity may source up to 15% of its energy demand from a high-emitting source, for example a coal-fired plant, which dispatches well after all the renewable energy generation has been dispatched into the grid and the project activity would **still** duly meet the requirements of this methodology and be credited as a renewables-based ammonia production facility. Recalling that the **title and scope of the methodology** is "Fertilizer production with **renewables-based ammonia**", additional safeguards are required to ensure that the use of grid electricity does not undermine the renewables-based character of the ammonia produced.	**Option A)** Eliminate the allowance of fossil fuel generated electricity from the grid to be coherent with the title of the methodology. **Option B)** Provided there is an adequate justification, the combination of the below changes: 1) De-risk the use fossil fuels-based electricity by replacing combined margin emission factors to *marginal* grid emission factors which more accurately reflect the power generation sources mobilised to supply additional, constant electricity demand from electrolysers. 2) Apply a **more stringent cap** on the total grid electricity consumption allowed where the marginal grid emission factor exceeds the defined threshold. 3) Introduce an **upper emission-factor limit** to exclude electricity from very high-emitting power systems. 4) Change the name of the methodology to avoid deceiving the public by saying it's renewable-based, when the intention is to use non-renewable electricity, potentially from the combustion of fossil fuels. Proposed text, with changes introduced in bold: *(iv) From the grid, where the **marginal** grid emission factor is above .2tCO_{2e}/MWh and **lower than .5tCO_{2e}/MWh** it can be demonstrated that the share in total electricity consumption from the grid, **not covered by the power purchasing agreements with renewable energy facilities as defined in Appendix 1, is below 5%.*** Proposed name: *A6.4-PMM006 fertilizer production using **low-carbon** ammonia*

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3	Section 11 (Activity Scenario), paragraph 70, page 70, including Equation (13)	te	The methodology defines $AE_{EC,y}$ as activity emissions as a result of electricity consumption in year y (tCO_{2e}) and specifies that where the conditions of Appendix 1 of this methodology are fulfilled, the emission factor for electricity can be assumed to be zero. However, the methodology also explicitly allows the use of electricity from the grid with emission factors both below and above 0.2 tCO_2e/MWh, provided that the share of total electricity consumption from the grid remains below a specified threshold, as set out in section 5, paragraph 8(e)(iv) on page 7. As currently framed, in the absence of a 2nd monitor parameter to account for the non-renewable grid electricity associated with the grid emission factors referenced in comment No 1 and No 2, the methodology implicitly treats **all electricity consumption** under the project activity is supplied from renewable energy sources in accordance with Appendix 1. In the absence of a clear distinction between electricity supplied from renewable energy facilities meeting Appendix 1 requirements and electricity supplied from non-renewable grid sources, there is a risk that the zero emission factor intended for renewable electricity could be inadvertently applied to all electricity consumption. This results in an overestimation of emission reductions and consequent over crediting.	1) Introduce a new parameter ($\boldsymbol{AE_{EC,y\ \text{N-RE}}}$) that clearly identifies and accounts for grid electricity from non-renewable sources. 2) Integrate this new parameter into Equation 13 and monitored parameters. 3) Clearly label the initial parameter as renewables based ($AE_{EC,y\ \text{RE}}$) <u>Proposed text, with changes introduced in bold:</u> *Equation (13):* $AE_y = AE_{H2,y} + AE_{EC,y\ \text{RE}} + \boldsymbol{AE_{EC,y\ \text{N-RE}}} + AE_{FC,y} + AE_{T,y} + AE_{LC}$ Where: *$AE_{EC,y,\ \text{RE}}$ = Activity emissions as a result of electricity* ***consumption from renewable sources*** *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,* ***for that share of electricity supplied from renewable energy facilities.*** ***$AE_{EC,y,\ \text{N-RE}}$ = Activity emissions as a result of electricity consumption from non-renewable sources in year y (tCO_2e). For this share of electricity consumption, the applicable grid emission factor shall be applied and shall not be assumed to be zero.***

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4	Section 15 (monitored parameters), paragraph 90, page 35	te	The methodology currently monitors the "Quantity of *renewable electricity* generated and supplied to the green ammonia production facility in year y". The methodology fails to monitor and quantify the total *non renewable* electricity consumption by the ammonia production facility in year y which is required to avoid systematic overestimation of emission reductions resulting in over crediting, considering the methodology allows the use of electricity from the grid, beyond the wind and solar facilities indicated in Appendix 1.	1) Introduce a new monitored parameter for the total *non-renewable* electricity consumption by the ammonia production facility in year y ($AE_{EC,y\ \text{N-RE}}$). 2) Quantify the new parameter by subtracting the total renewable electricity supplied to the ammonia production facility through renewable energy power purchasing agreements from total electricity demand (MWh/year) for the facility. <u>Proposed text:</u> $AE_{EC,y\ \text{N-RE}} = AE_{EC,y\ \text{TOTAL}} - AE_{EC,y\ \text{RE}}$ (new equation) where: $AE_{EC,y\ \text{TOTAL}}$ = total electricity sourced from the grid (MWh) $AE_{EC,y\ \text{N-RE}}$ = electricity sourced from non-renewable energy through the grid (MWh) $AE_{EC,y\ \text{RE}}$ = electricity sourced from renewable energy facilities through power purchasing agreements (MWh)

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5	Section 13 (Emission Reductions), paragraph 87, page 30	te	The methodology accounts for hydrogen leakage as an activity emission. However, hydrogen leakage is currently incorrectly treated as a greenhouse gas through the application of a Global Warming Potential (GWP), without distinction between direct and indirect climate effects, as shown on Equation 14 in Section 11.1. **Treating hydrogen leakage as a CO_2-equivalent greenhouse gas without nuance creates two risks:** (i) underestimation of climate impacts where leakage rates are material, and (ii) inconsistency with environmental integrity principles as scientific understanding evolves. Hydrogen is not a greenhouse gas, as it does not absorb infrared radiation. However, hydrogen has **material indirect climate impacts**, as its presence in the atmosphere alters atmospheric chemistry in ways that increase warming. Hydrogen leakage leads to positive radiative forcing primarily by: (a) extending methane lifetimes through competition for hydroxyl radicals (OH), (b) increasing tropospheric ozone formation via indirect photochemical processes, and (c) increasing stratospheric water vapour through oxidation of hydrogen to water vapour, which itself contributes to warming. Current scientific literature indicates that hydrogen leakage has a non-negligible warming effect per unit of hydrogen emitted, particularly over shorter time horizons (e.g. 20 years). The methodology uses a GWP over 100 years to estimate emission from H_2, which leads to an undermined assessment of the climate impact of hydrogen through this approach. Existing estimates for the GWP of H_2 vary significantly depending on the time horizon, atmospheric chemistry assumptions, and leakage rates. Therefore, it would be more appropriate to stop accounting a non-greenhouse gas with the same methodology for a GHG. In this context, a climate-integrity-oriented approach is not to fix a single GWP value for hydrogen, but rather to: (i) Explicitly recognise hydrogen as an **indirect climate forcer** with time-dependent impacts, (ii) Require transparent monitoring of hydrogen leakage (which the methodology already does), and (iii) Apply conservative safeguards where leakage is non negligible, without locking the methodology into uncertain or evolving climate metrics.	1) The introduction of a novel concept, without precedents in this or other carbon crediting methodologies: **climate-integrity adjustment factor (CIAF).** 2) Introduction of a new parameter: *Adjusted* Emission Reductions for project activity. <u>Proposed text (entirely new section):</u> *Where hydrogen leakage exceeds a defined threshold, conservative climate-integrity adjustment factors (CIAF) shall be applied to emission reductions to reflect indirect warming impacts, pending further IPCC methodological refinement.* *Leakage rate is defined as the proportion of H2 leaked in a given year to the total H2 produced or used in the same given year, where:* ***Leakage Rate ($LR_{H2,\ y}$)** = H_2 leakage ($LK_{H2,\ y}$) / H_2 produced or used, y (new equation)* ***Adjusted Emission Reductions** are defined as the project Emission Reductions in year y multiplied by the Climate Integrity Adjustment Factor (CIAF), where:* *(AERy) = ER,y * CIAF (new equation)* *Where:* ***Climate Integrity Adjustment Factor (CIAF)**, subject to periodic reviews, shall be applied according to the following performance thresholds:* • *If $LRH_2 \leq 1.0\%$, a CIAF = .99 shall be applied to total emission reductions* • *If $1.0\% < LRH_2 \leq 3.0\%$: a CIAF = 0.95 shall be applied to total emission reductions. In this range, climate impact is sensitive to H_2leakage assumptions.* • *If $3.0\% < LRH_2 \leq 5.0\%$ a CIAF = 0.85 shall be applied to total emission reductions* with a requirement for corrective actions. In this range, H_2 leakage could severely erode climate benefit • *If $LRH_2 > 5.0\%$ a CIAF = 0 shall be applied to total emission reductions (suspension of crediting due to environmental integrity failure)*

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6	Section 8 (Activity Boundary) / Table 2 / pages 12-13	te	Table 2 of the methodology accounts for H_2 emissions associated with hydrogen production as a source in the activity section of the table, given that a shift in hydrogen production pathways may increase emissions. However, Table 2 does not acknowledge physical hydrogen leakage as a distinct source of emissions in the leakage section of the table, where emission sources outside the system boundary are reflected. Considering hydrogen only becomes an emission when it leaves the intended system boundary, it **should** be correctly classified as a fugitive emission**, meaning an unintended release,** in accordance with IPCC language, along with the other associated fugitive emissions. Hydrogen is not emission resulting from the process itself. Furthermore, H_2 is incorrectly presented as a greenhouse gas both in Table 2 and in the estimation of project emissions in Section 11.1 (Activity Scenario), paragraph 71, page 25. Technically, H_2 does not absorb infrared radiation and is therefore not a greenhouse gas in the strict physical sense; however, it does have material climate impacts through indirect atmospheric effects, as further explained in Comment No. 5.	1) The introduction of a novel Table (Table 2.2), without precedents in this or other carbon crediting methodologies accounting for non-GHGs relevant to the methodology, following Table 2 (proposed to be named Table 2.1 to acknowledge the difference). 2) Create a new category in the table named “fugitive emissions as such” not to be confused with activity emissions 3) Rename sources currently called “leakage” as out-of-boundary emissions sources to avoid confusion between two very distinct sources of emissions.
7	Entire document / All methodologies	ge	Out-of-boundary emission sources are currently referred to as “leakage” in standard carbon-crediting methodology language. However, this conflates broader system boundary effects with fugitive emissions, which are the technically correct form of “leakage.”	1) Rename sources currently called “leakage” as out-of-boundary emissions sources to avoid confusion between two very distinct sources of emissions. 2) Acknowledge fugitive emissions as leakage.

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8	Section 11.1 (Activity Scenario) / Equation 14		Equation 14 in Section 11.1 (Activity Scenario) where emissions from hydrogen leakage are estimated by multiplying the quantity of hydrogen leaked (tH_2) by a Global Warming Potential for hydrogen (tCO_2e/tH_2).	1) Eliminate this equation to avoid double counting the effects of hydrogen leakage into the atmosphere 2) Rather, adopt the Climate Integrity Adjustment Factor approach set forward in Comment 5.
9	Appendix 1, paragraph 3 (b), page 45	te	Appendix 1 requires the renewable energy facility to have started operations no more than three years before the project start date of the activity. This requirement is **not technically justified.** It constrains supply in a way that commercially biases project design. An older solar or wind power plant may experience gradual degradation in capacity or efficiency over time, but its electricity generation remains zero-emission (emission factor = 0). The introduction of this requirement in Appendix 1 **unfairly** and unnecessarily excludes existing renewable energy assets and limits the participation of a broader range of stakeholders in the renewable energy sector.	Improve marketplace fairness and technical soundness by eliminating requirement 3b.

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10	Appendix 1, paragraph 3 (e) (i), page 45	te	Appendix 1 requires the renewable energy facility to have established a power purchasing agreement with the project proponent prior to the start of construction of the renewable energy facility or phase. This requirement is **not technically justified.** It constrains supply in a way that commercially biases project design. The relevant date for the purpose of crediting is the start of the project activity and the crediting period. It is not relevant when the PPA was signed, provided the power generation facility is operational and demonstrably delivering renewable electricity to the project activity from the start of the activity.	Proposed change: substitute the start date of the construction of the renewable energy facility or phase with the start of the crediting period for the project activity. Proposed text, with changes introduced in bold: (*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 the crediting period for the project activity.***

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