



**Approved baseline and monitoring methodology /
methodological tool clarification response form
(Version 03.0)**

INFORMATION TO BE COMPLETED BY THE SECRETARIAT OR PANEL / WG

Date and number of Panel / WG meeting:	7–11 February 2022 / MP 87
Title/Subject of the request for clarification:	Clarification on application of AMS-III.AH. for using Green Hydrogen for energy purpose in ammonia production
Reference number of the request for clarification:	SSC_825
Exact reference (number, title and version) of the methodology or methodological tool to which the request for clarification applies:	AMS-III.AH.: Shift from high carbon-intensive fuel mix ratio to low carbon-intensive fuel mix ratio --- Version 3.0
Fast track or Regular track:	<input type="checkbox"/> Fast track <input checked="" type="checkbox"/> Regular track

Summary of the request for clarification

Original text from Stakeholder:

We are approaching to seek clarification regarding applicability of Small Scale Methodology AMS.III.AH “Shift from high carbon-intensive fuel mix ratio to low carbon-intensive fuel mix ratio”

The baseline and project scenarios are explained below.

Baseline:

In the baseline, ammonia production utilises COREX gas as a source of energy, which is a mixture of CO₂ and H₂ and is produced by the gasification of fossil fuel (e.g. coal, natural gas). Therefore there is direct emission of GHG.

Project case:

The project activity entails introducing use of “Green Hydrogen” for energy purpose partly or fully replacing use of COREX gas. Green Hydrogen is produced by the electrolysis of water where it is broken into hydrogen and oxygen using renewable energy sources i.e. wind and solar power projects. Hence there are no GHG emissions.

Query:

Is the methodology AMS.III.AH applicable to the proposed project activity?

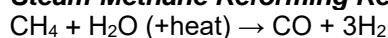
On 18 January 2022, the secretariat requested additional information from the submitter on the final use(s) of the ammonia produced in the baseline and project scenario. Also, additional description of current and envisioned ammonia production processes, including a flowchart or diagram showing both baseline and project process. Additional information received on 28 January 2022, below:

- Use of Ammonia:** Ammonia is the main intermediary for providing nitrogen in all nitrogen-containing fertilizers. The use case remains the same in the baseline and in project scenario.
- Ammonia production process:** In both the baseline and project scenario, hydrogen is used to produce ammonia. The only difference is in the method of production of hydrogen.
- Hydrogen production process:
Baseline scenario: In the baseline, hydrogen is produced using Steam Methane Reformation (SMR) process where natural gas (or naphtha) is used as a raw material. CO₂ is produced as a by-product of SMR process which is a greenhouse gas. The process consists of heating the natural gas to 700 °C–1100 °C in the presence of steam and a nickel catalyst. The resulting endothermic reaction breaks up the methane molecules and forms carbon monoxide CO and hydrogen H₂. The carbon monoxide gas is then passed with steam over iron oxide or other oxides and undergoes a water gas shift reaction to obtain further quantities of H₂. The downside to this process is that its by-products

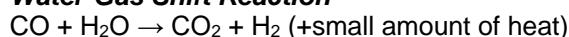
are major atmospheric release of CO₂, CO and other greenhouse gases. It is estimated that depending on the quality of the feedstock (natural gas, rich gases, naphtha, etc.), one ton of hydrogen produced will also produce 9 to 12 tonne of CO₂.

Chemical reaction of SMR:

Steam-Methane Reforming Reaction



Water-Gas Shift Reaction



Project scenario: The Green Hydrogen is used in ammonia production instead of the one produced in SMR process. Due to this CO₂ emissions of the baseline can be prevented. The green hydrogen is produced by electrolysis of water which is an electrochemical process that splits water into hydrogen and oxygen using electricity. So, if electricity is procured or generated using renewable sources there would not be any GHG emissions.

Clarification by the secretariat or Panel / WG

The Methodologies Panel (Meth Panel) would like to thank the stakeholder for the submission. The Meth Panel would like to clarify that AMS-III.AH is applicable to project activities that switch to less-carbon-intensive *fuel* in energy conversion processes. Hence, the methodology cannot be applied in case the hydrogen is used as feedstock for the ammonia synthesis.

The stakeholder may wish to submit a new methodology, recognizing the large mitigation potential for use of Green Hydrogen in ammonia production.

Version(s) of the approved methodology / methodological tool to which the clarification is applicable:

AMS-III.AH.: Shift from high carbon-intensive fuel mix ratio to low carbon-intensive fuel mix ratio ---
Version 3.0

- - - - -

Document information

Version	Date	Description
03.0	13 May 2016	Revised to include the row "Version(s) of the approved methodology / methodological tool to which the clarification is applicable"
02.0	18 July 2013	Revised to remove the row "Date and signature of the chair and vice chair of Panel/WG (in case of clarification by Panel/WG)"
01.0	4 July 2013	Initial publication. This document supersedes and replaces the following documents: <ul style="list-style-type: none"> Recommendation Form for Small Scale Methodologies (F-CDM-SSCwg) (Version 01.1) Recommendation Form for Small Scale A/R Methodologies and Procedures (F-CDM-SSC-AR) (Version 01.1)

Decision Class: Regulatory
Document Type: Form, Clarification
Business Function: Methodology
Keywords: applying methodologies and tools