New methodology to unlock carbon credits for green ammonia fertiliser

Perspectives Climate Research

The challenge

Most nitrogen-based fertilisers are derived from fossil fuels, relying on grey ammonia, which is produced from natural gas. The global ammonia industry — over 80% of which is used for fertiliser production — accounts for approximately 1.8% of worldwide CO_2 emissions.

A lower-emission alternative is to produce fertilisers using green ammonia, which is synthesised from renewable hydrogen and atmospheric nitrogen via the Haber-Bosch process. Depending on the fertiliser type, switching from grey to green ammonia could reduce emissions by 70% to nearly 100%. However, the primary obstacle to large-scale adoption is cost.

Carbon markets offer a solution to this challenge. By issuing carbon credits for the emission reductions achieved through green ammonia production, producers can generate additional revenue, making the transition economically viable.

Carbon markets were already successfully introduced two decades ago under the Clean Development Mechanism (CDM) of the United Nations Framework Convention on Climate Change (UNFCCC) and voluntary markets have since expanded, with Gold Standard and Verra as key issuers.

Since 2016, negotiations have been ongoing to establish new market mechanism under Article 6 of the Paris Agreement. At COP29 in Baku (November 2024), implementation rules were finally agreed upon, setting the stage for Article 6.4 to become the central carbon market mechanism under UN-quality assurance.

Yet, while progress has clearly been made, there is currently still no approved methodology for issuing carbon credits for fertilisers produced with renewable ammonia. In fact, no approved methodology exists under Article 6.4 at all.

Plant fertiliser accounts for approximately 1.8 per cent of worldwide CO_2 emissions.

The solution

To address this gap, the Public-Private Partnership (PPP) with Perspectives Climate Research develops a methodology for fertilisers produced with renewable ammonia under Article 6.4 of the Paris Agreement.

The methodology must be approved by the Art. 6.4 Supervisory Body, following its specific review and approval processes. Once approved, it can be directly applied by any company's projects that meet all eligibility requirements.

This will allow fertiliser producers globally to participate in carbon markets. It will provide financial incentives for transitioning to renewable ammonia-based fertilisers, particularly in countries with limited climate policies or carbon pricing mechanisms.

In addtion, switching to green fertilisers can reduce the carbon footprint of certain crops, making food production significantly more sustainable, and, due to reduced international dependencies on natural gas, will enhance food resilience and nutritional security.

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How it will be done

The PPP collaborates with fertiliser producers in Egypt, Morocco, and/or India to study planned renewable fertiliser plants. These facilities serve as real-world examples, providing crucial insights for developing a practical and industry-relevant methodology. Industry partners contribute technical expertise, sharing knowledge on production processes, trade patterns, and consumption trends to ensure applicability. Engaging multiple countries allows the methodology to account for regional differences, ensuring its global relevance.

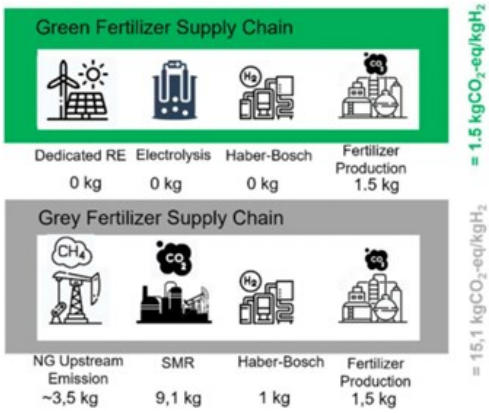
To establish a strong foundation, the PPP analyses the latest requirements under the Rules, Modalities, and Procedures (RMP) for renewable ammonia-based fertiliser production. If needed, additional clarifications are provided. A broader analysis assesses the implications for renewable hydrogen projects, ensuring this initiative informs not only the fertiliser methodology but also other Article 6.4 methodologies related to hydrogen and ammonia.

Building on these insights, the PPP develops a first of its kind Article 6.4 methodology for using renewable ammonia in fertiliser production. Once submitted to the UNFCCC, the partnership actively supports the approval process, addressing feedback, engaging in global stakeholder consultations, and refining the methodology to meet the highest standards.

To drive adoption, the PPP raises industry awareness of how renewable ammonia-based fertiliser projects can benefit from carbon markets. Clear guidance is provided on eligibility requirements and procedural steps. Outreach efforts include targeted information campaigns at international conferences, in-person roadshows in partner countries, and a webinar series to engage industry players beyond the initial focus regions.

Expected impact

- Accelerate the use of renewable ammonia in global fertiliser production
- Development of renewable hydrogen markets in the partner countries
- Awareness raising with relevant industries.



Schematic CO2 emission reduction potential

At a glance	
Duration	September 2024 – September 2026
Country	Global with potential focus on Morocco, Egypt and India
Objective	Markets for green H2/PtX-technologies and applications are further developed in partnership with private businesses.
Partners	Perspectives Climate Research
Expected Results	• Facilitating industry partnerships • Analysing new methodology requirements under Art 6.4 • Conceptualization of methodological concept for renewable ammonia-based fertiliser production • Developing a renewable ammonia-based fertiliser methodology under Art. 6.4 of the Paris Agreement • Knowledge dissemination and communication

The International Hydrogen Ramp-up Programme (H2Uppp) of the German Federal Ministry for EconomicAffairs and Climate Action (BMWK) promotes projects and market development for green hydrogen in selected developing and emerging countries as part of the National Hydrogen Strategy.

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