Decarbonization of the Fertilizer Industry

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Meeting of the WTO’s TESSD Working Group on Trade-related Climate Measures

11 May 2023
I. Macro View:
   A. Why should we talk about Fertilizers?
   B. International Fertilizer Association (IFA)
   C. Sustainable Fertilizers
   D. Ammonia Production
   E. Ammonia Trade

II. Micro View
A. Why should we talk about Fertilizers?

• A plant needs four things to grow strong: sunlight, water, air, and *nutrients*

• The nutrients are in the *soil*: nitrogen (N), phosphate (P), potassium (K) ...

• Soil quality varies - you can add missing nutrients with help of *fertilizers*

• There are *organic* (compost, manure ...) and *mineral* (processed) fertilizers

• Mineral fertilizers *feed around 40% of the world’s population* *every day*

• Production + use of mineral nitrogen fertilizers = *2.5% of all CO₂ emissions*
B. International Fertilizer Association (IFA)

• IFA is the only global fertilizer association (founded in 1927)

• Its membership includes all actors in the fertilizer value chain:
  ➢ 450 members are based in 80 countries (50% in developing countries)
  ➢ Around 400 of them are producers, distributors, or traders
  ➢ These represent about 75% of mineral fertilizer production

• IFA’s mission is to promote the efficient and responsible production, distribution and use of plant nutrients

• Member Services include Sustainability and Market Intelligence
C. Sustainable Fertilizers

• **Background:** IFA is active in this area for years; dedicated Service launched in 2021

• **Mission:** It promotes the sustainable production and use of plant nutrients

• **Actions:**
  1. Developing tools:
      - Decarbonization of Ammonia Production
      - Milestones and Alternative Uses (Shipping …)
      - Reduction of Nitrogen Use

  2. Sharing knowledge
  3. Providing guidance
  4. Recognizing leaders
D. Ammonia Production

Source: IFA Market Intelligence

Decarbonization of the Fertilizer Industry
E. Ammonia Trade

Decarbonization of the Fertilizer Industry

Source: ICIS
I. Macro View

II. Micro View:
   A. Low carbon pathways for the Fertilizer Industry
   B. The tools we have
   C. What will it take?
   D. Beyond fertilizers
A. Low carbon pathways for the Fertilizer Industry

Why we need to decarbonize:

- About 1% of the world’s CO₂ emissions come from NH₃ production + 1.5% come from fertilizer use
- About 2% of the world's energy is needed for the synthesis of NH₃

What technologies are available?

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<th>Color</th>
<th>GREY AMMONIA</th>
<th>BLUE AMMONIA</th>
<th>GREEN AMMONIA</th>
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</thead>
<tbody>
<tr>
<td>Process</td>
<td>SMR or gasification</td>
<td>SMR or gasification with carbon capture (85-95%)</td>
<td>Electrolysis</td>
</tr>
<tr>
<td>Source</td>
<td>Methane or coal</td>
<td>Methane or coal</td>
<td>Renewable electricity</td>
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Note: SMR = steam methane reforming.
B. The tools we have

Ammonia Technology Roadmap

Objectives:
Roadmap provides different pathways to reduce CO$_2$ emissions from NH$_3$-production for different regions by 2050

➢ In line with Paris Agreement

Roadmap outlines the roles and actions of stakeholders, quantifies the investment and policies needed, and establishes milestones for innovation and deployment

Conclusions:
The fertilizer industry can’t do it on its own:

➢ Stakeholder collaboration (industry, technology providers, governments, supply chain...) and enabling conditions (policy, infrastructure, R&D, investments).

Decarbonization of the Fertilizer Industry
C. What will it take?

More investment opportunities into climate action

- Investments required to scale-up low carbon technologies
- Access to finance and implementation of decarbonization routes as soon as possible
- The fertilizer industry requires an annual investment of $14 billion in new ammonia production facilities is required between now and 2050
- More developing countries will need their own tailored decarbonization roadmaps to transition to a low-carbon fertilizer production

“Our Industry is no longer hard to abate, but costly to abate.”
Svein Tore Holsether, President & CEO, Yara International and current Chair, IFA (at UN COP 26)
C. What will it take?

Local decarbonization roadmaps:

There is no one path that will fit everybody - each country will have a different decarbonization journey.

Tailored local decarbonization roadmaps need to be drafted to assess each country’s specific risks and opportunities to decarbonize their fertilizer industry.

Example: EGYPT

Other countries like Turkey, Jordan Uzbekistan are developing their own roadmaps.
C. What will it take?

Right policies and enablers:

- Carbon trading schemes: ETS in the EU + ~20 similar schemes worldwide
- Carbon intensity requirements and carbon pricing regulations (e.g. EU Carbon Border Adjustment Mechanism)
- Policies investing incentivizing clean energy/ammonia production (e.g. USA Inflation Reduction Act)
- Development of carbon footprint standards and certifications: fertilizer, ammonia and hydrogen industry working towards the harmonization of standards for a level playing field
- Increasing reporting & ESG requirements: voluntary ESG reporting and commitments from the industry
D. Beyond fertilizers

➢ An estimated annual investment of $59 billion-$105 billion in new ammonia production facilities is required between now and 2050
Conclusions

• The fertilizer industry plays a big role in **feeding the world** and to **fight climate change** - ammonia will also **decarbonize shipping**

• The industry needs **the right support** as soon as possible to **unlock decarbonization routes** to meet its **climate goals**

• IFA is available to help the WTO to better **understand and assess decarbonization opportunities** related to nitrogen fertilizers through its Sustainability and Market Intelligence Services
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