FertigHy: reducing dependence on fossil-based fertilizers in Europe

WEBINAR

José Antonio de las Heras
CEO, FertigHy

FertigHy

David Franz
Director Technology Licensing, Stamicarbon

STAMICARBON

AMMONIA ENERGY ASSOCIATION

Tuesday, March 4
3PM CET (9AM EST)

House rules

AMMONIA ENERGY ASSOCIATION

- Please post your questions for the speakers in the Q&A section. Your questions will be answered by text by the speakers or will be discussed live.

- The recording of this webinar will be shared with all registrants after the webinar, and will be available at www.ammoniaenergy.org

- An article summarizing this webinar will be posted on www.ammoniaenergy.org in the coming days.

Phase-out of Free Allowances in EU

AMMONIA ENERGY ASSOCIATION

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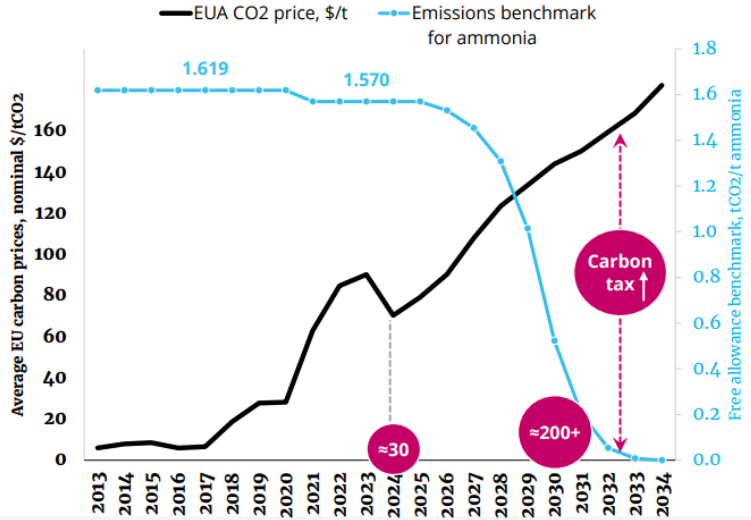
The importance of carbon pricing: ammonia (and hydrogen) will be included in the EU's Carbon Border Adjustment Mechanism (CBAM)

Phasing out of EUA & outlook for CO_2 prices in Europe



- **Progressive removal of free allowances will increase carbon costs (and price) for grey products, with implications beyond EU.**
- **So far the only "mandatory" cross-border carbon scheme.**

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https://ammoniaenergy.org/wp-content/uploads/2024/11/O-Hatfield-2024.pdf

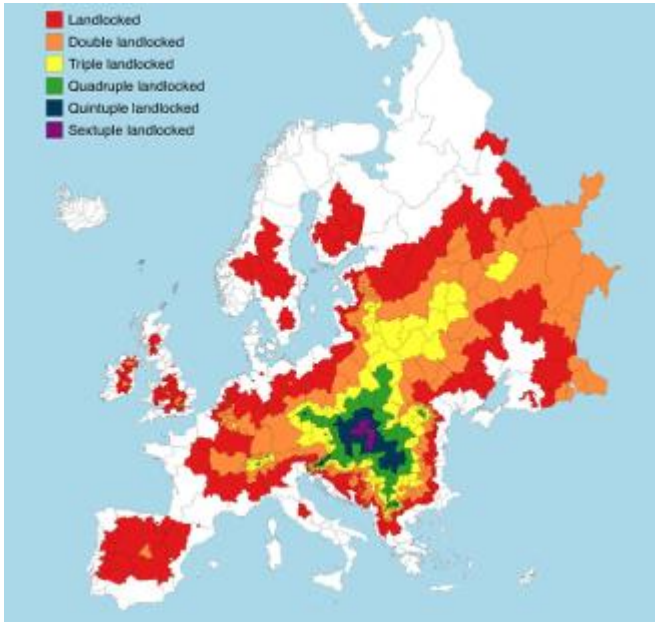
Phase-out of Free Allowances in EU

AMMONIA ENERGY ASSOCIATION

Options for decarbonization in Europe:

- **Revamping Gas Reformation Plants**: CCS for existing Gas Reformation Capacity (SMR), Biogas/Biomethane
- **Importing Ammonia**: Newbuild Gas Reformation Capacity (ATR) with CCS outside Europe, RFNBO-compliant Renewable Ammonia (H2Global Mechanism)
- **Local Water Electrolysis Capacity**: Up till recently restricted to Renewables for RFNBO-compliant hydrogen, with stringent additionality rules

The **EU Clean Industrial Deal** was presented on February 26th 2025, aimed at increasing the EU's competitiveness, while stimulating decarbonization. This includes Nuclear power as a clean baseload electricity source for hydrogen and ammonia production.



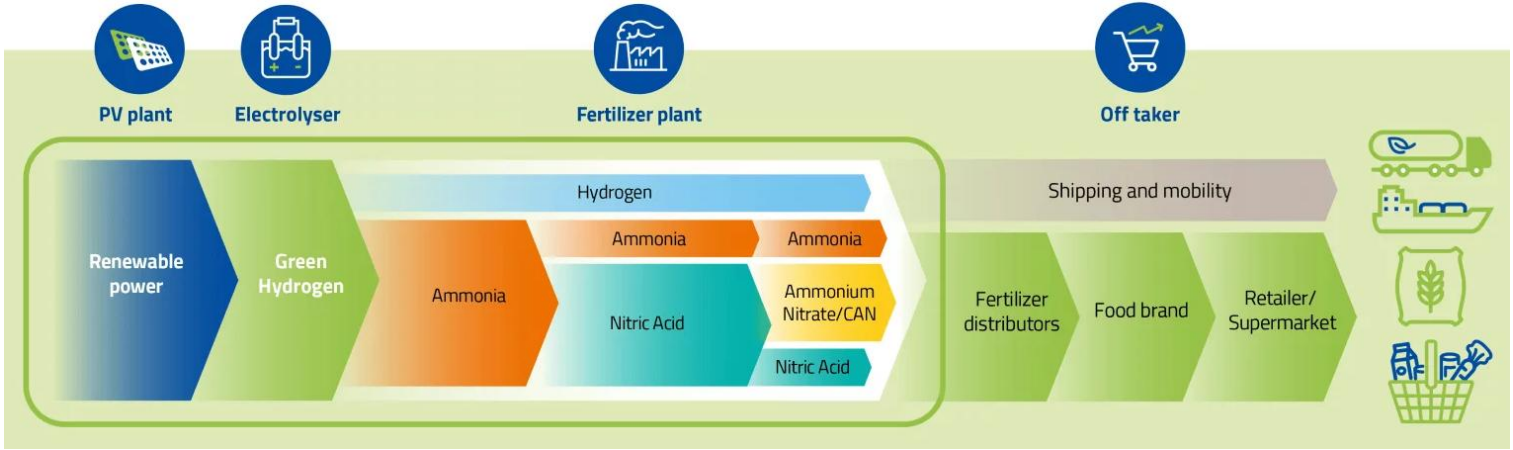
https://commission.europa.eu/topics/eu-competitiveness/clean-industrial-deal_en

FertigHy

FertigHy was established in June 2023 by a consortium along the value chain, including founding investors EIT InnoEnergy, RIC Energy, Maire, Siemens Financial Services, InVivo and Heineken.

- The plant is scheduled to start construction in 2027 and is set to produce **500,000 tons per year of low-carbon nitrogen-based fertilizers**, using ammonia produced from electrolytic hydrogen.

In the context of the EU Clean Industrial Deal**: (1) Decarbonization**: Baseload nuclear electricity in France (baseload). Spain some of the best renewables in Europe; **(2) Competitiveness**: Integrated fertilizer complex so value added product, not just competing in bulk market



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Low carbon fertilisers to decarbonise the food value chain

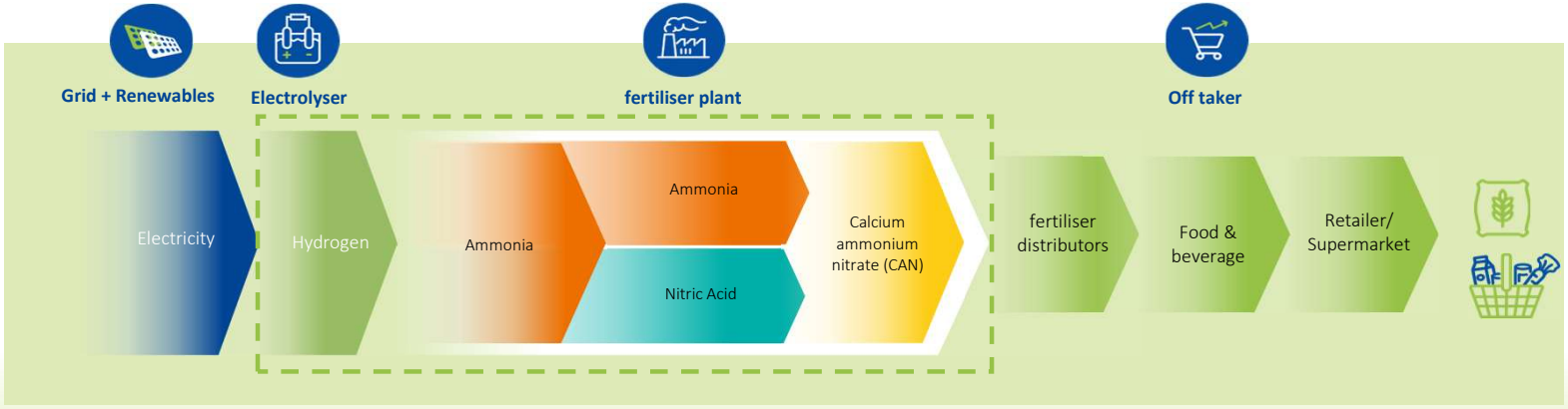
Jose Antonio de las Heras
CEO

March 4th, 2025

1. Who is FertigHy?

A Pan European company created in July 2023 to pioneer of the low-carbon transition of the European fertiliser industry

FertigHy's shareholders are key actors across the value chain



RIC ENERGY MAIRE SIEMENS inVivo HEINEKEN

eit InnoEnergy Co-funded by the European Union

2. The problem & opportunity

FertigHy

Decarbonization

Fertilizers production:
2% GHG Global

CBAM – Carbon Border Adjustment Mechanism
European Green Deal

SCIENCE BASED TARGETS
DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

Net zero strategies

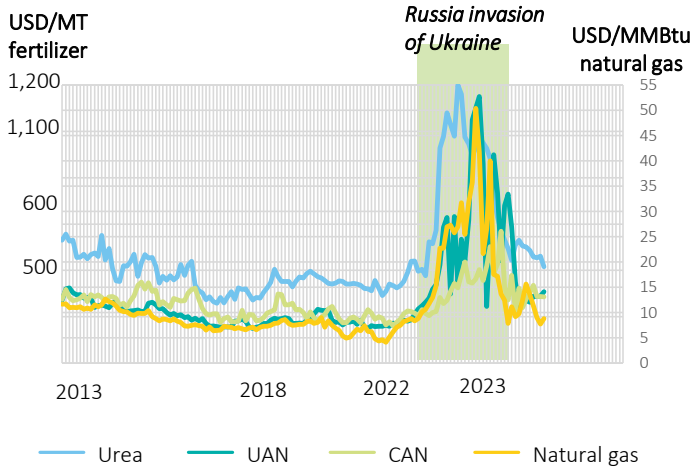
Scope 3 represents :
80-90% GHG

Dependency on imports

Europe imports represent 2/3 of its fertilizer needs.

Russia-Ukraine crisis highlighted EU dependency on foreign fossil fuel and fertilizers.

Price volatility



NG & Fertilizer prices ↑

Fertilizer usages ↓

Production quality & yield ↓

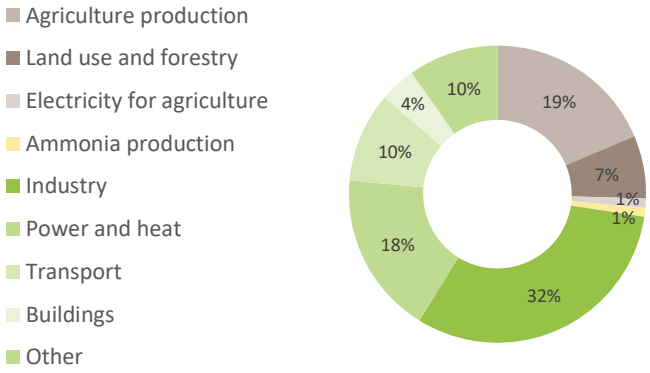
Food Security ⚠

2

3. Fertilisers significant GHG emissions

+25% of global GHG emissions stems from agriculture

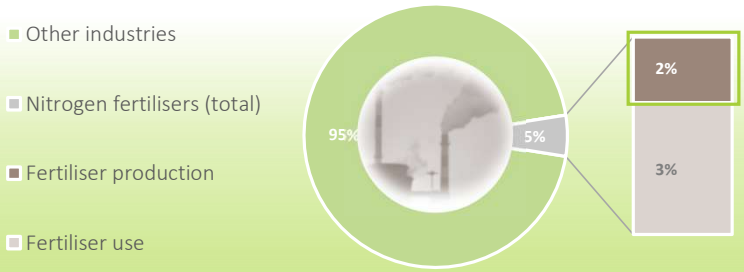
Agriculture share of total GHG emissions by sector (in % 2018)



28% of global GHG emissions

Fertiliser production and use currently represent c.5% of total global emissions

Global GHG emissions in 2023



Source: CVA, World CO_2 emissions from fuel combustion, Word economics of CO_2, OECD, FAOstat

Diapositiva 4

0 Added, our focus on production
Cayetano Hernandez; 2024-12-18T11:38:28.008

1 Vs2%
Cayetano Hernandez; 2024-12-18T12:56:25.774

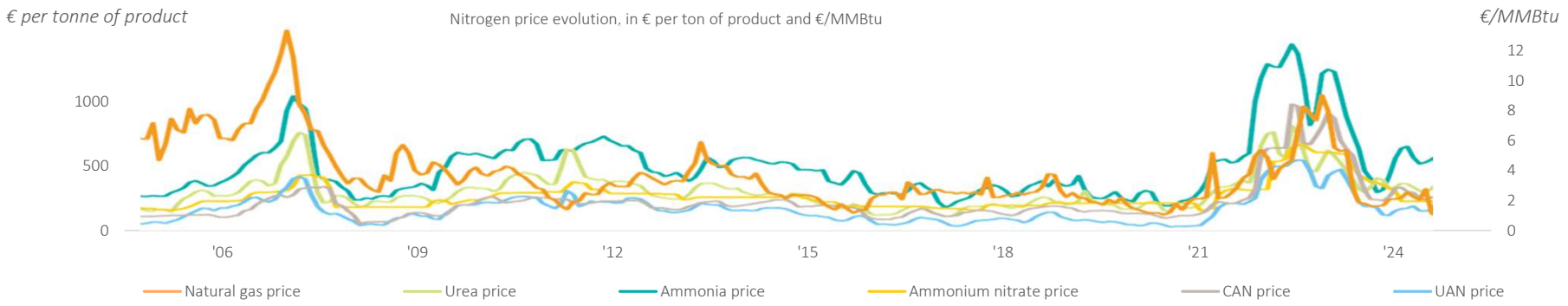
PB1 0 If we mention on the left figure 2%, we should stay with that number, if not is confusing
Paola Baldivieso Freitas; 2024-12-18T13:46:35.236

2 [@Paola Baldivieso Freitas] puedes complementar con algo mas porfa?
Cayetano Hernandez; 2024-12-18T16:22:28.354

PB2 0 Done, but if you want we can keep the other figure regarding the impact of fertilisers in a farm
Paola Baldivieso Freitas; 2024-12-19T12:45:52.876

4. Nitrogen-based fertiliser price volatility

Since ammonia production relies on natural gas, its price volatility has a direct impact on fertiliser prices, with some increasing by more than 90%.



Source: CVA Analysis

Solution from low-carbon European alternative

- The **only feasible solution** for **fertiliser price stability** is focusing on fertilisers that are **not dependent on natural gas prices** (i.e. **low-carbon fertilisers**).

5. Europe dependency on fertilisers imports & Sovereignty

The majority of nitrogen fertilisers are imported from outside Europe, mostly from Russia, which is facing increasing export barriers

Supply chain dependency on imports poses a threat to European crop production **and food security.**

- Europe is consuming 9m tonnes of nitrogen fertiliser per year with a **strong negative import balance** (i.e. Europe is **importing 2/3 of its fertiliser needs**)

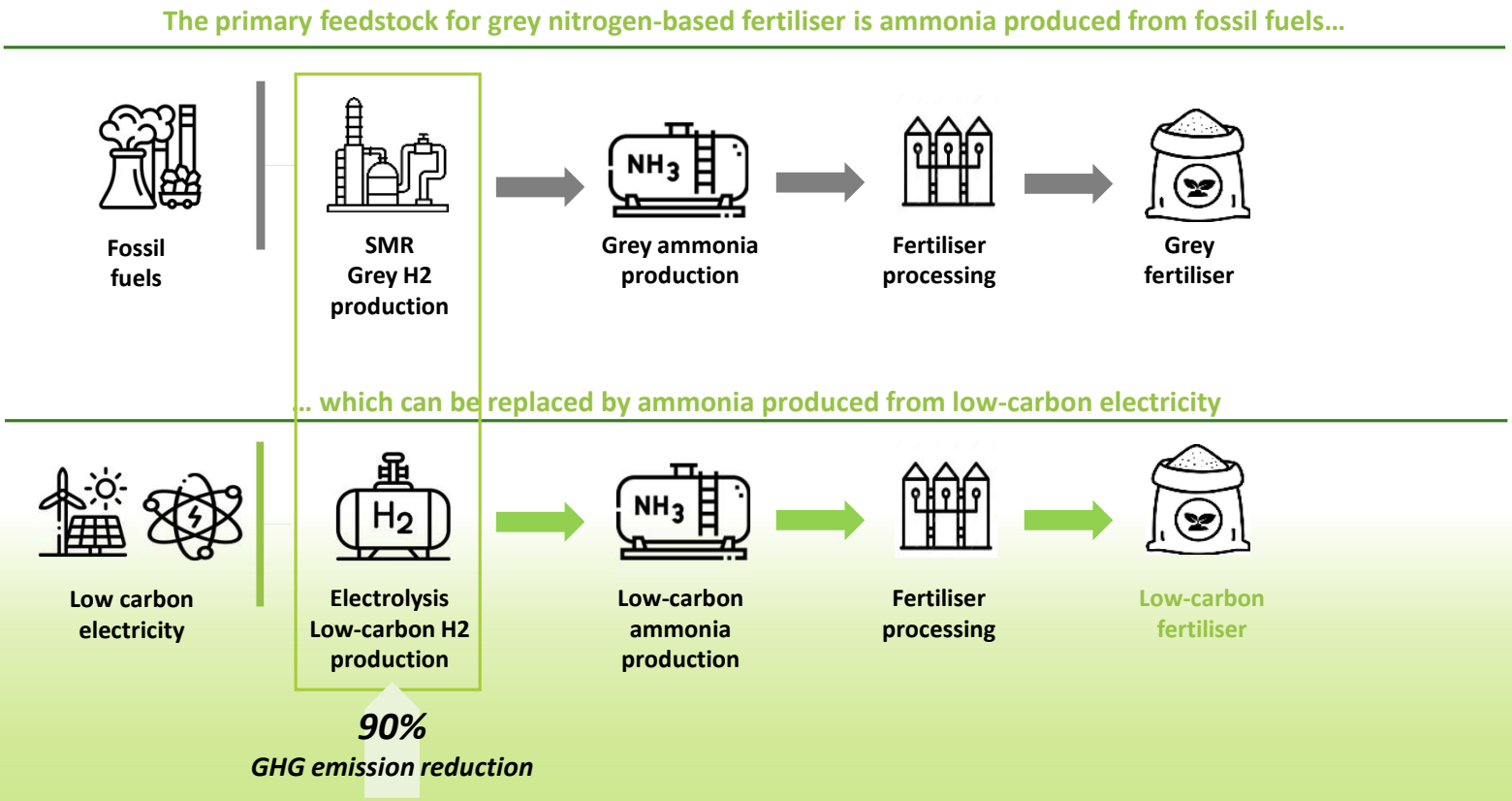
Russian market current challenges

Russia superiority	• **#1 non-European supplier** (3mt of nitrogen fertilisers imported in 2022).
Trade restrictions	• The current conflict with Ukraine has strongly impacted trade between Europe and Russia.
Logistics costs	• Freight costs are continuously increasing.
Anti-dumping tax	• Russian suppliers have to pay an anti-dumping tax to serve Europe.
Import duties	• Import duties on nitrogen fertilisers (100% in 3 years).
CBAM	• Expected impact could be up to **€200-400/tonne** of CAN

Source: CRU (May 2023), CVA Analysis

6. From grey to low-carbon fertilisers (decoupling from NG)

Decarbonisation will be achieved mainly by the substitution of natural gas (SMR) for renewables/nuclear (electrolysis)



7. FertigHy as the solution and replacement of grey CAN

Grey CAN has been the superior nitrogen fertiliser available but poses several challenges…

Current industry market challenges	
Agricultural GHG emissions	Grey fertiliser production and use currently represent c.5% of total global emissions
Increasing CO_2 prices	Current EU regulation will increase CO_2 prices
Price volatility	High dependency on natural gas and unavailability of LT purchase contracts
Supply chain dependency	Negative import balance, with Europe importing 2/3 of its fertiliser needs

… to which FertigHy's low-carbon CAN provides the solution

FertigHy

Value proposition

Product superiority	Higher crop yield and ROI for the same nitrogen input
Decarbonising potential	Reducing fertiliser GHG emissions.
Minimum impact of CO_2 costs	Price competitive with minimum exposure to increasing carbon prices
Price risk mitigation	Production without natural gas, hedging against volatile prices
Supply chain security	Sovereignty protection in Europe over the food value chain

8. FertigHy's project

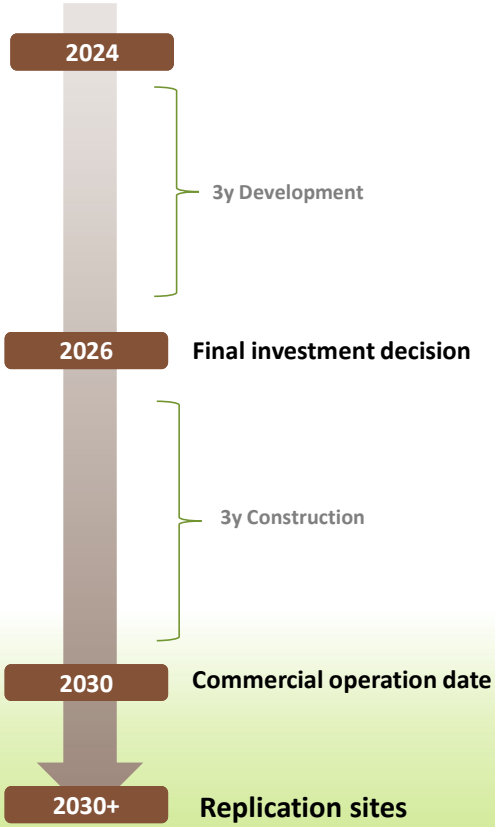
FertigHy's first plant : Languevoisin, France:

- **Energy sourcing:** access to a 24/7 low-carbon electricity mix
- **Logistics:** optimal inland shipping connections maximizing market reach
- **Grid connection**: secured access for 240 MW to the high-voltage transmission grid of RTE (French TSO).
- **Public funding:** strong government support
- **Off-take:** strategic fertiliser market

The plant:

- **Produce 500k metric tonnes** per year of low-carbon calcium ammonium nitrate (CAN27)
- Operate an **electrolyser** with a capacity of **200 MW**
- Green field giga-factory with an estimated investment of c.**€1.3bn (CapEx).**

FertigHy



Low carbon fertilisers to decarbonise the food value chain

Jose Antonio de las Heras
CEO

March 4th, 2025

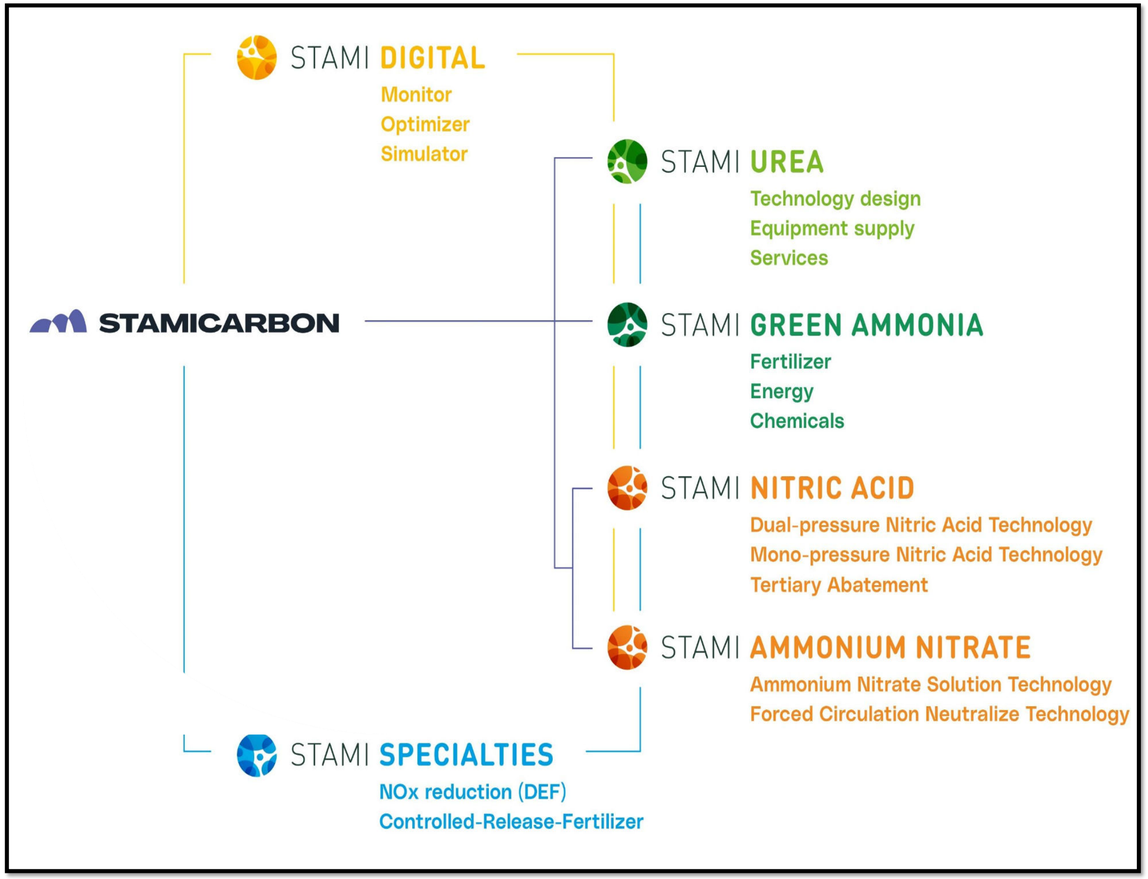
03/04/2025

AMMONIA ENERGY ASSOCIATION WEBINAR - STAMICARBON

STAMICARBON

ABOUT US: STAMICARBON

- World leaders in the design and licensing of **urea plants**, **nitric acid plants**, and related services, including the supply of proprietary equipment. Over 300 grass-root licenses issued world-wide.
- **Commercially Proven Ammonia technology** for multiple applications including significantly decarbonized fertilizer solutions.
- Active in the licensing of various technologies and in **project development** for the fertilizer and petrochemical industry.
- A **pioneering company** with a vision to help enable the world to feed itself and improve quality of life focused on **reducing the carbon footprint from the fertilizer industry.**



HOME TO THOSE WHO MAKE TO INSPIRE

SUSTAINABLE TECHNOLOGY SOLUTIONS

We offer **Sustainable Technology Solutions** to fully **ENABLE** energy transition. Innovative and sustainable processes, optimizing conventional ones and creating new processes from non-fossil feedstock.

INTEGRATED E&C SOLUTIONS

We **MAKE** energy transition happen through our **Integrated E&C Solutions**. We bring into reality complex plants and frontier projects designed to provide access to the latest technologies.

PROJECT DEVELOPMENT

ABOUT MAIRE GROUP

SUSTAINABLE TECHNOLOGY SOLUTIONS

- NEXTCHEM Holding
- NEXTCHEM
- MYRECHEMICAL
- MYREPLAST Industries
- MYREMONO
- STAMICARBON
- CONSER

GasContec

MAIRE

PROJECT DEVELOPMENT

MET DEVELOPMENT

INTEGRATED E&C SOLUTIONS

- TECNIMONT
- KT
- MST

OVERVIEW – NX STAMI AMMONIA™

Small-mid capacity

Mid-large capacity

Low-carbon (Blue)

No-carbon (Green)

NX STAMI AMMONIA™

Ammonia storage and transportation

DOWN-STREAM INTEGRATION

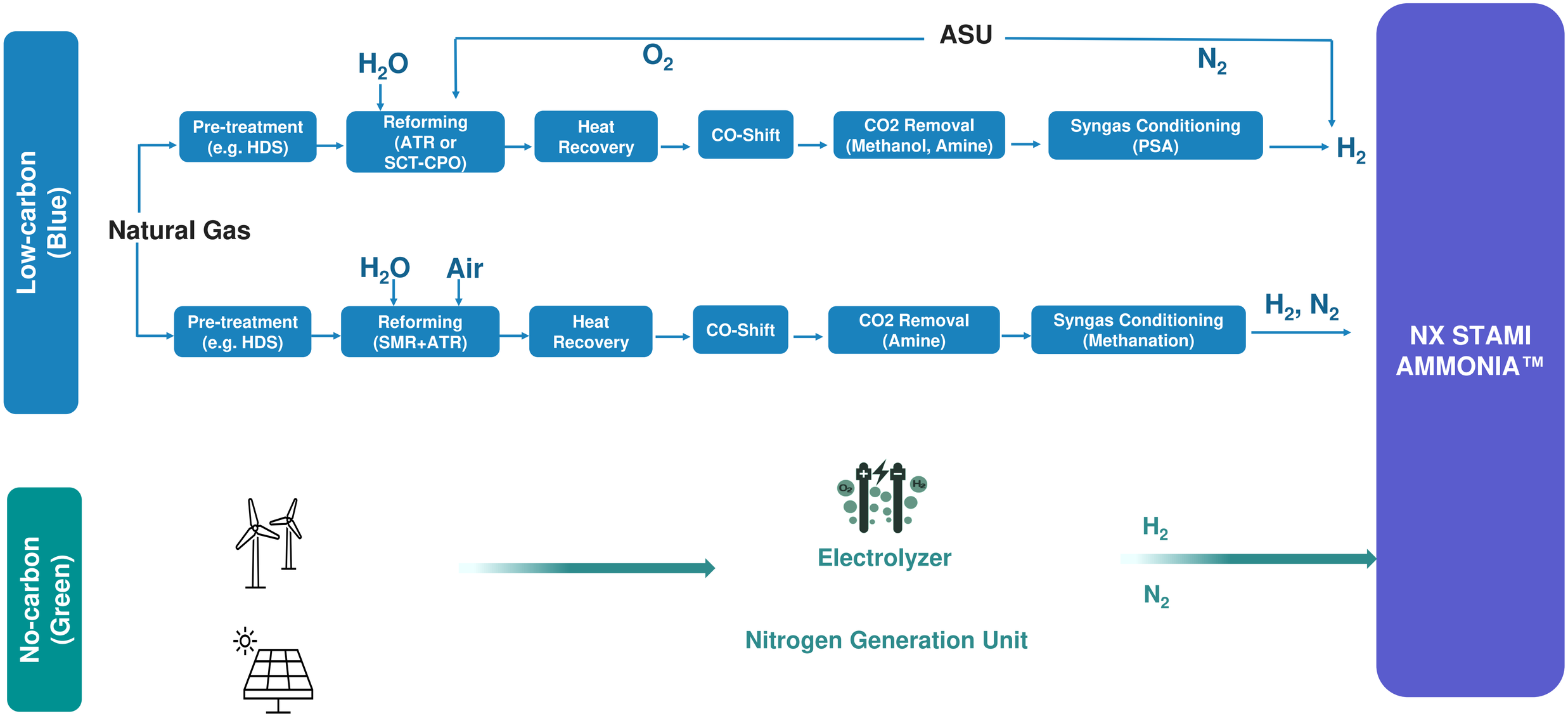
NX STAMI UREA™

NX STAMI NITRIC ACID ™

STAMI AMMONIUM NITRATE

AMMONIUM NITRATE GRANULATION

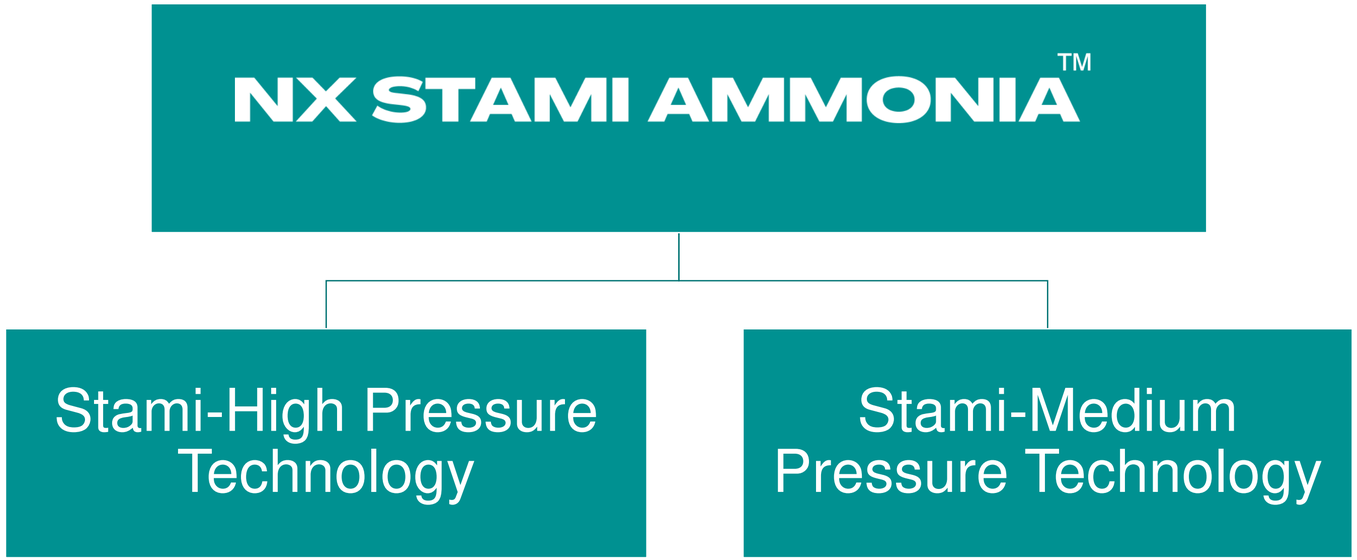
HYDROGEN: LOW-CARBON & NO-CARBON



STAMICARBON AMMONIA TECHNOLOGIES

Common highlights

- Based on Haber-Bosch route of ammonia synthesis
- Operating plant references: > 5 (High pressure) and > 45 (Medium pressure)
- Custom capacity, design and possible integration with other units (upstream, downstream)
- Only 1 propriety equipment: Ammonia Converter
- Suitable for any traditional Fe based catalyst available in market
- High single pass hydrogen conversion and high overall hydrogen efficiency



NITRIC ACID ROADMAP

STAMI **NITRIC ACID**

1960

Stamicarbon starts licensing nitric acid plants

1989

Worldwide track record. More than 40 plants licensed, of which 20 still are in production

Commissioning of last dual pressure plant in Geleen, Netherlands

2017

Stamicarbon has revived and relaunched its nitric acid technology

2020

Revamp studies

Replacement equipment

2022

License grassroot plant

REFERENCE NITRIC ACID PLANTS

> 40

PLANTS LICENSED

> 20

PLANTS IN OPERATION

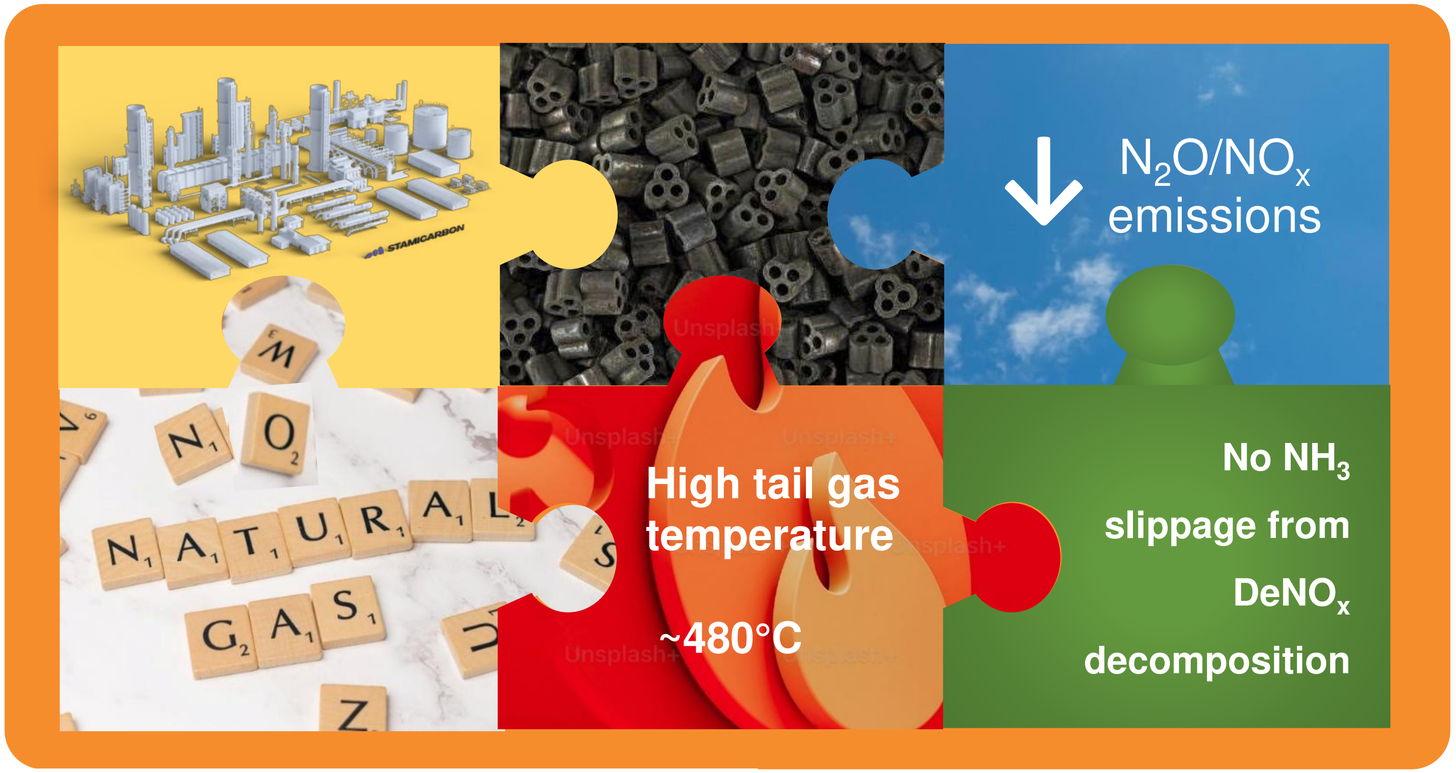
- OCI (Netherlands)
- Toros (Turkey)
- CFI (US)
- Duslo (Slovakia)
- Fertial (Algeria)
- Azomures (Romania)
- CFI (UK)
- SEMADCO (Egypt)
- Pulawy Azot (Poland)
- El Nasr. Co (Egypt)
- PSC Nitrogen (US)
- KIMA (Egypt)
- Monómeros (Colombia)

NITRIC ACID PROCESS

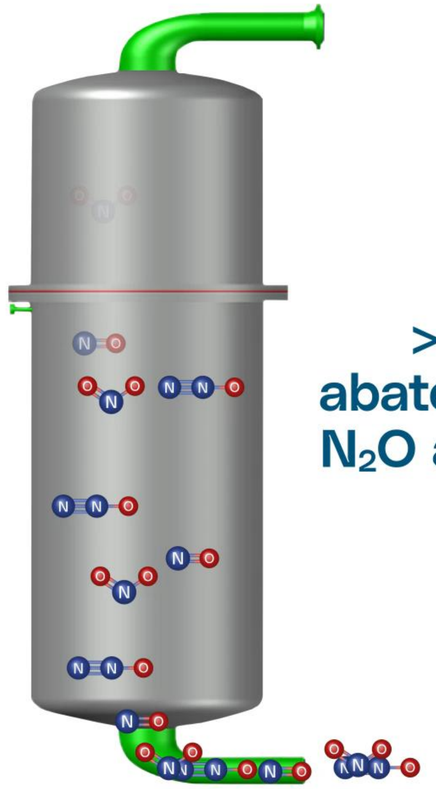
DUAL PRESSURE VS MONO PRESSURE

MONO PRESSURE	DUAL PRESSURE
P = 8 bar	P = 5/11 bar
Low plant capacities **< 600 MTPD**	High plant capacities **600-2000 MTPD**
✓ Less equipment	✗ More equipment
✓ Lower CAPEX	✗ Higher CAPEX
✗ Higher OPEX	✓ Lower OPEX

GRASS ROOT STAMI NITRIC ACID PLANTS



NX STAMI NITRATES



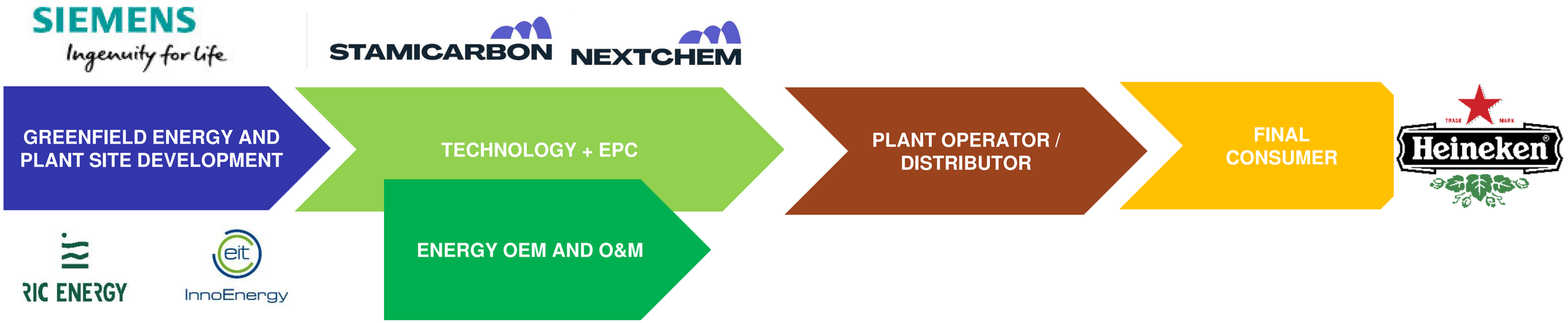
>99% abatement of N_2O and NOx

MITIGATION

GREEN FERTILIZER COMPLEX – FOOD INDUSTRY

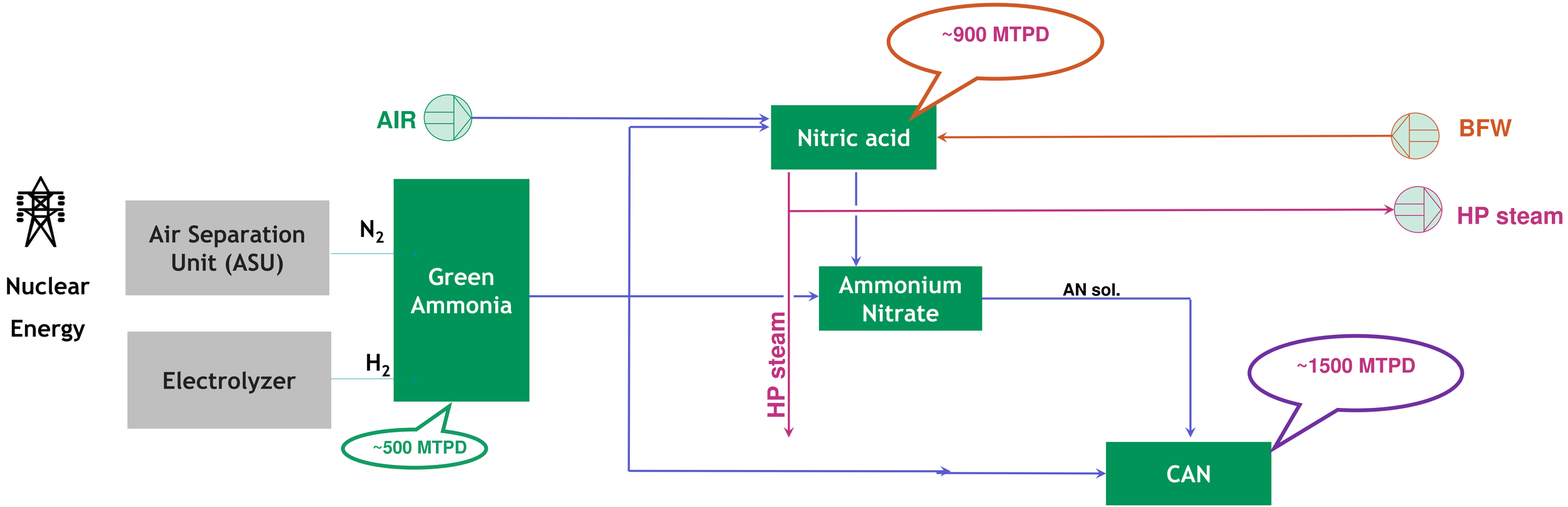
Country: France
Status: Pre-Feed **stage**

FertigHy



1. First plant in France and plans to replicate it in other European countries.
2. More than 0.5 million metric tones per year of low-carbon CAN fertilizers
3. 100% renewable electricity and green hydrogen, construction planned in 2027

FERTIGHY – LOW CARBON AMMONIA TO FERTILIZERS



- Ammonia - Stamicarbon
- Nitric acid - Stamicarbon
- Ammonium nitrate prills (Partner- INCRO)
- Calcium Ammonium Nitrate (Partner- INCRO)

THANK YOU

STAMICARBON