STAMI GREEN AMMONIA FOR GREEN FERTILIZERS

AEA Conference |Boston

Medici Mauricio
New Business Develpment Manager

9th November 2021

ABOUT US: STAMICARBON

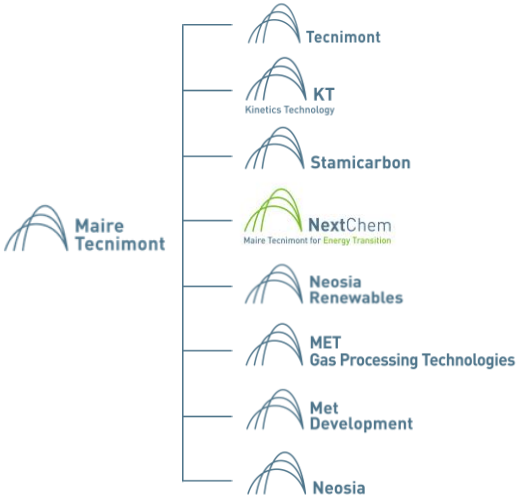
- We are world leaders in the licensing and design of **urea plants, nitric acid** and related services, including the supply of proprietary equipment.
- Recently launched its own **Stami Green Ammonia technology,** suitable for small scale plants.
- Active in licensing of various technologies and in **project development** for the fertilizer and petrochemical industry.
- A **pioneering company** with a single-minded vision to help enable the world to feed itself and improve quality of life focused to **reduce the carbon footprint from the fertilizer industry, including carbon recycling**.

AT A GLANCE: MAIRE TECNIMONT GROUP AS TECHNOLOGY DRIVEN CONTRACTOR

INDUSTRY

PETROCHEMICALS | FERTILIZERS | OIL&GAS REFINING | POWER | RENEWABLES & GREEN CHEMISTRY

OPERATING COMPANIES



Tecnimont	Oil&Gas Refining, Petrochemicals, Fertilizers, Polyolefins, Power Large-scale contracting
KT Kinetics Technology	Refining, Hydrogen&Syngas Production, Sulphur Recovery and Process Heaters
Stamicarbon	Development and licensing of Urea, Nitric Acid and Ammonia Technology
NextChem Maire Tecnimont for Energy Transition	Green Acceleration Project, Technological initiatives for energy transition
Neosia Renewables	Flexible solutions in Renewable Energy
MET Gas Processing Technologies	Downstream Innovative Technologies
Met Development	Project development to originate business through early involvement in investment initiatives
Neosia	Engineering and contracting in Transportation and Civil Engineering

ORGANIZATION

MORE THAN **9,350** professionals

~6,350 employees **+3,000** professionals in Electrical & Instrumentation

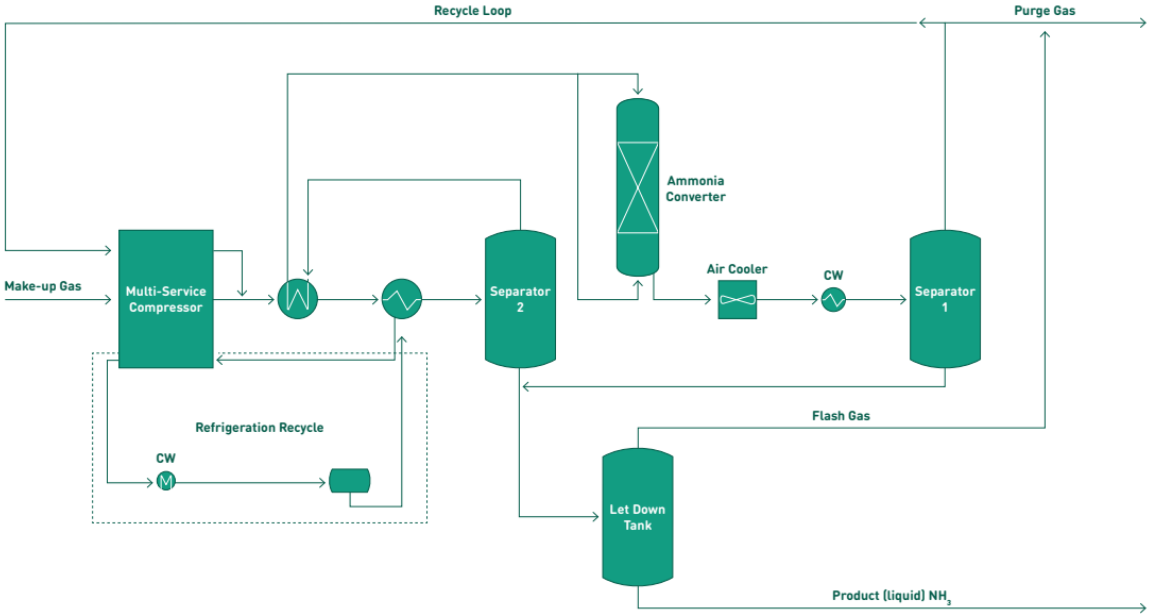
45 countries
50 operating companies

STAMI GREEN AMMONIA TECHNOLOGY

Technology highlights

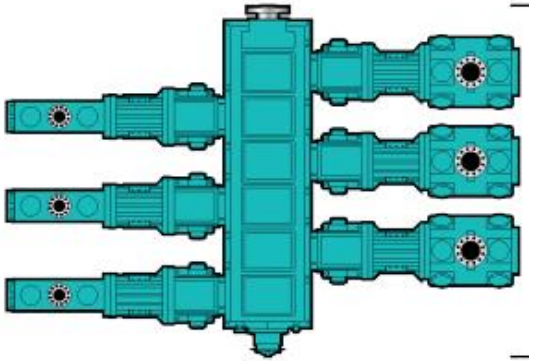
- Two proven design capacities: 100 and 200 mtpd for grey NH_3 production
- Technology design is flexible and scalable down and upwards.
- Strongest technology reference (4 references) in the small-scale range based on NG.
- Ammonia Synthesis Loop operates at ~300 bar, customized for most efficient plant design at small scale, high conversion rate, and low catalyst volume required.
- The plant operates with a single proven and reliable multiservice reciprocating compressor, electrically driven.
- Minimum footprint required ~15 x 30, including the compressor building for a 100mtpd plant.
- Leanest technology design with simple and minimum # of equipment → lowest CAPEX.
- The plant is designed for easy modularization, reducing erection time and site works.

STAMI GREEN AMMONIA TECHNOLOGY



- Proven Haber-Bosh process.
- Lean design with a minimum number of equipment - simple Hex and separator vessels.
- State of the art Reciprocating compressor.
- High conversion rate with low catalyst volume.
- Majority of produced NH3 is condensed by means of CW.
- Small NH3 refrigeration circuit included in the multiservice compressor.
- Minimum Utilities requirement:
  - CW
  - Instrument air
  - No steam/condensate is produced or required.

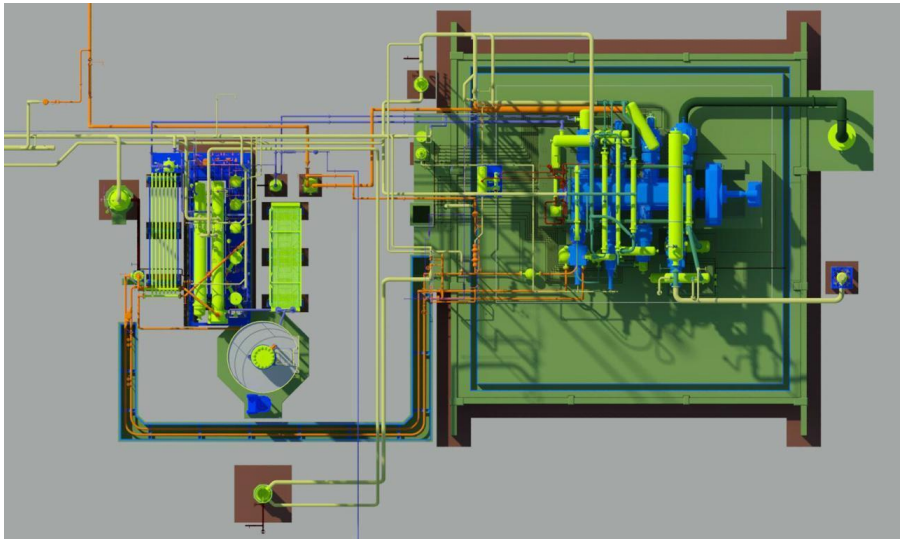
STAMI GREEN AMMONIA TYPICAL RECIPROCATING COMPRESSOR

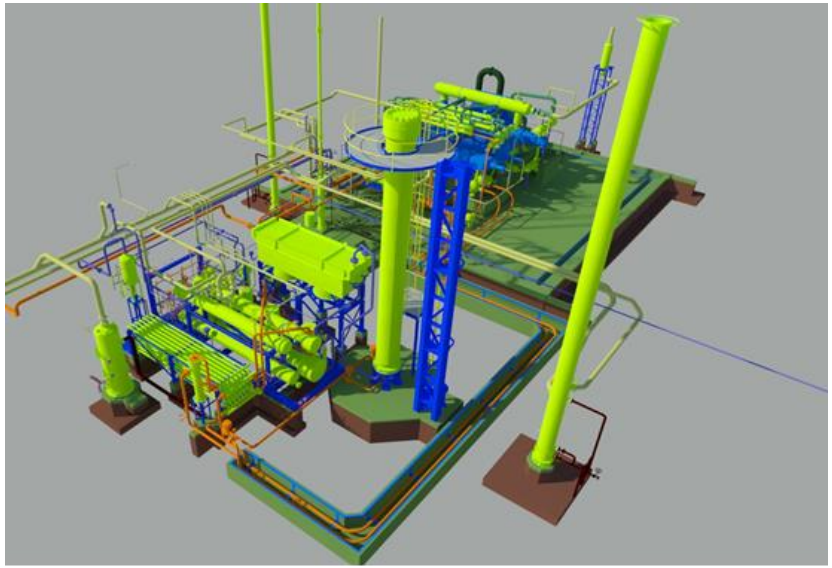


- Typical configuration of a multiservice compressor.
- State of the art Reciprocating compressor.
- Wide range of operation is possible.
- Operational points to be defined in anticipation.
- All services included in a single compressor:
  - Syngas Make up
  - Recycle
  - Refrigeration
- Electrically driven motor.

* Compressor ilustrations courtesy of Siemens Energy

100 MTPD MODULARIZED STAMI GREEN AMMONIA TECHNOLOGY



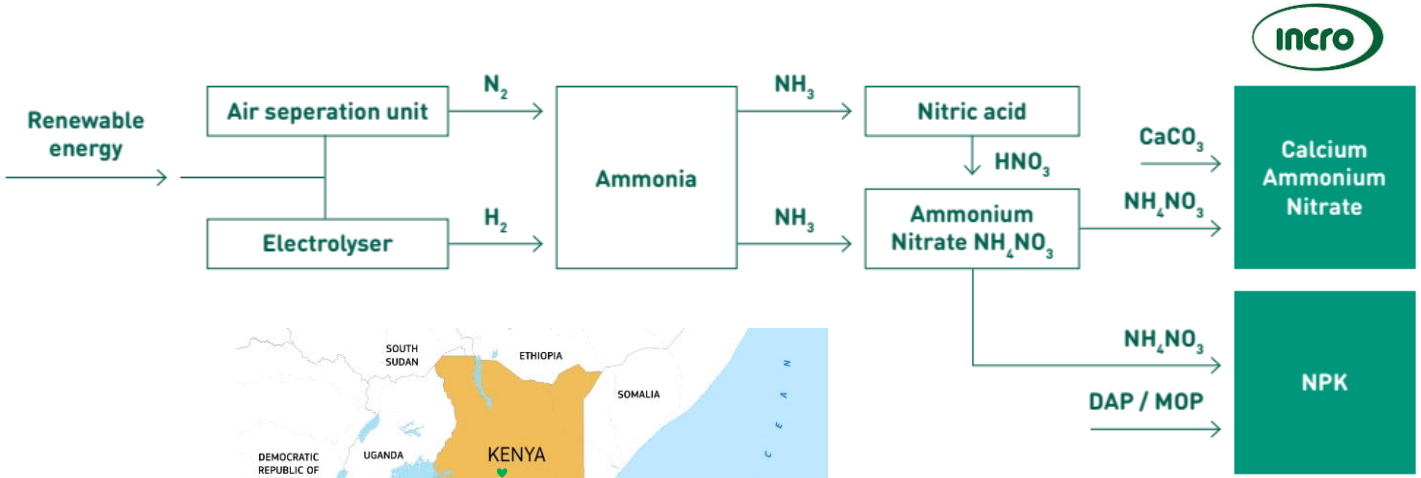


The innovation & license company
of Maire Tecnimont

Stamicarbon

EXAMPLE 1: KENYA GREEN FERTILIZER PROJECT

- Focus on local production of green fertilizers (CAN/NPK).
- Commercial operation at industrial scale (~200 kton/a).
- Niche location identified, supported by a consortium of development partners.
- First-of-a-kind commercial installation for green fertilizers.



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Stamicarbon

EXAMPLE 2: GREENFIELD NITROGEN – GARNER, US

Maire Tecnimont

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GROUP BUSINESS & OPERATIONS INVESTORS GOVERNANCE SUSTAINABILITY

HOME > MEDIA > PRESS RELEASES > MAIRE TECNIMONT GROUP REACHES AGREEMENT WITH GREENFIELD NITROGEN LLC FOR THE DEV...

GREENFIELD NITROGEN

Maire Tecnimont Group reaches agreement with Greenfield Nitrogen LLC for the development of a green ammonia plant in the United States

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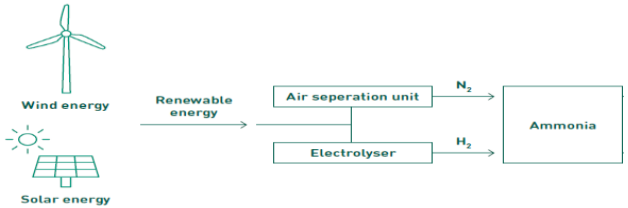

Met-Dev and Greenfield Nitrogen to co-develop the project / Feasibility Study under execution by Next Chem

Project Highlights:
100% renewable electricity supply
Grid Connected assuring 24/7 operation of NH3 plant
Capacity: ***250mtpd*** *NH3* plant
Location: heart of the US corn-belt with a high NH3 demand.
The business case makes perfect sense.

CAPEX AND OPEX BREAK DOWN

Stami Green Ammonia technology Capex & Opex impact on the overall Green Ammonia complex for 100mtpd capacity plant .

Block	*Capex*	*Opex*
ASU (N2)	***7%***	***2%***
Electrolyzers (H2)	***53%***	***93%***
Stami Green Ammonia (NH3)	***40%***	***5%***
Total	***100%***	***100%***

Capex Exclusions & Assumptions:

- Utilities.
- Storage.
- AWE considered.

Opex:

- Referred as EE consumption only

CONCLUSIONS

1. Green ammonia technology is now available at Stamicarbon.
2. Small and medium size plants play a crucial role to bridge the technological gap and accelerates the Green Ammonia transition to decarbonize the industry.
3. Stami Green Ammonia technology is a lean, robust and reliable design.
4. Wide portfolio of applications: Green ammonia (Fuel, Energy carrier, Chemicals)
5. Green Nitrate fertilizers plants are available today, based on proven technologies, with various projects at FS stage.
6. Stami Green Ammonia is the “most competitive technology design” for green small-scale applications both in Opex and Capex.