PROTON VENTURES

NH3 & Energy Transition: A Challenge meeting Reality

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Empowering green ammonia and energy solutions

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- About Proton Ventures
- NEW PROJECT: Green Ammonia Pilot Plant in Morocco
  - Teamwork with UM6P and OCP group
  - Project overview
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PROTON VENTURES

FUN FACTS

Diverse and young

F/M Ratio

Average age :40 years

Flexible/Scalable

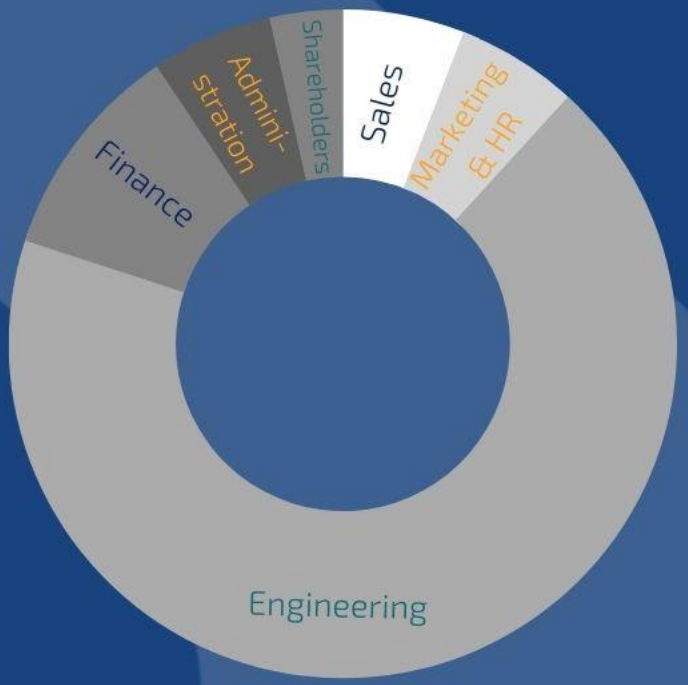
Total Employees YTD: 45

Contractors

Freelance

Payroll

Knowledge focussed

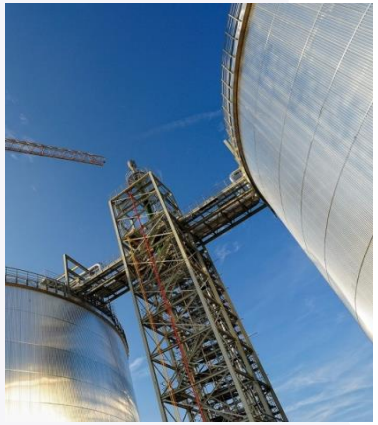


Global

Empowering green ammonia and energy solutions

Proton Ventures Building Ammonia Solutions Expertise in the Global Market Since 2001

NH3 & Energy Storage



Storage Terminal References

- 2x30.000 Metric ton Estonia
- 10.000 Metric ton Bulgaria
- 2x30.000 Metric ton Estonia
- 12.000 Metric ton Bulgaria
- 2x30.000 Metric ton UAE

H2 / NH3 Production

GAPP Project Overview

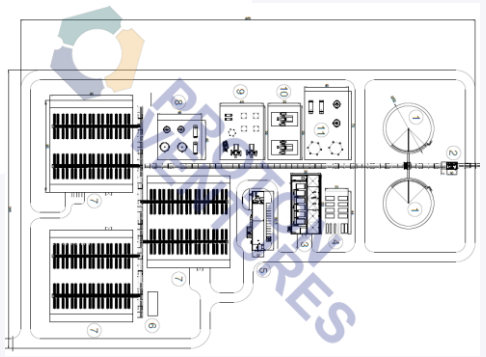
- 4 MTPD green ammonia pilot plant, in Jorf Lasfar, Morocco
- Pilot plant to perform RE intermittency studies
- EPC scope including:
  - Renewable Energy Emulator
  - 2x type of electrolyser technology
  - 12h of N2 and H2 storage
  - All auxiliary systems

NOx & N2O Removal

Greece Project Overview

- Nitric acid unit in Greece reduced its greenhouse gas emission by more than 30,000 tonnes of CO2 equivalents per year
- The plant has already exceeded its design conversion with N_2O emissions below 10 ppm

Engineering Services



#>100(45) Performed business analysis for (green)ammonia production

#>25(10) performed Feasibility Studies for (green) ammonia production

#>5 Performed FEED / Basic Engineering Packages for (green) ammonia production

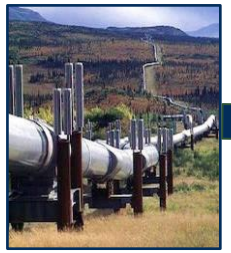
Empowering green ammonia and energy solutions

Our business segments

1. Project Development

Renewable Power

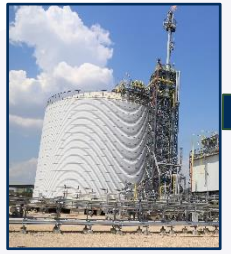
H_2 Production & Conversion



Local gas distribution

Storage & Export

Transport

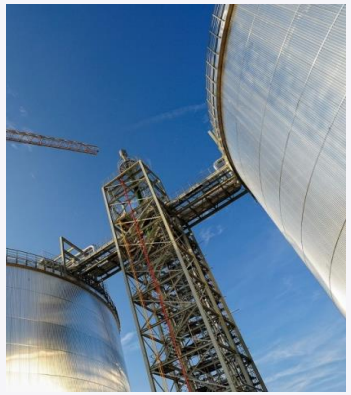


Storage Design & operation

Local distribution

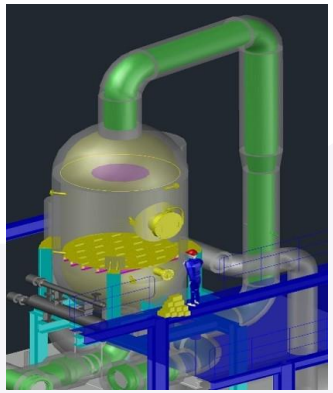
Decomposition H_2 or NH_3 sales

2. Ammonia Solutions



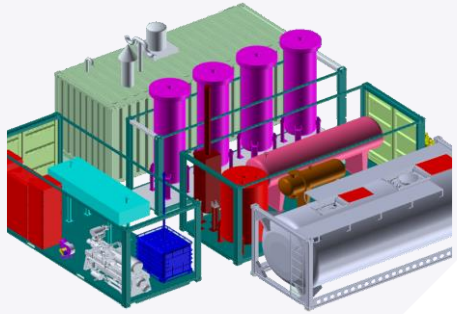
NH_3 & Energy storage

NH_3 Production



NOx & N_2O removal

3. Innovations



Ammonia decomposition

> 70 projects in over 15 different countries around the world.

NEW PROJECT: Green Ammonia Pilot Plant in Morocco

Benguerir, Morocco, 19th July 2022 - Announcement GAPP project:

- Mohammed VI Polytechnic University (UM6P)
- OCP group
- IRESEN

UM6P, Dutch Proton Ventures to Build 'Green Ammonia Pilot' in Jorf Lasfar

The project seeks to promote Morocco's economic growth, while making the country a continental hub for the production of green hydrogen.

Dutch Proton Ventures and UM6P to build green ammonia pilot in Morocco

Hydrogen

25/07/2022 Arnes Biogradlija 583

Morocco – An agreement for the construction of the Green Ammonia Pilot at the OCP Group chemical complex in Jorf Lasfar, Morocco, was signed by the Mohammed VI Polytechnic University (UM6P) and the Dutch company Proton Ventures.

AMMONIA ENERGY ASSOCIATION

ARTICLE

Proton Ventures partners with UM6P for renewable ammonia demonstration plant in Morocco

Teamwork with OCP group, UM6P & IRESEN

OCP group

- OCP is a Moroccan state-owned phosphate rock miner, phosphoric acid manufacturer and fertilizer producer. OCP has access to **more than 70% of the world's phosphate rock reserves** and it is one of the largest producers of fertilizers in the world. OCP annually imports some 2 million tons of ammonia.

UM6P

- The Mohammed VI Polytechnic University (UM6P) is a Moroccan non-profit private research university owned by OCP. UM6P is the R&D business unit of OCP.

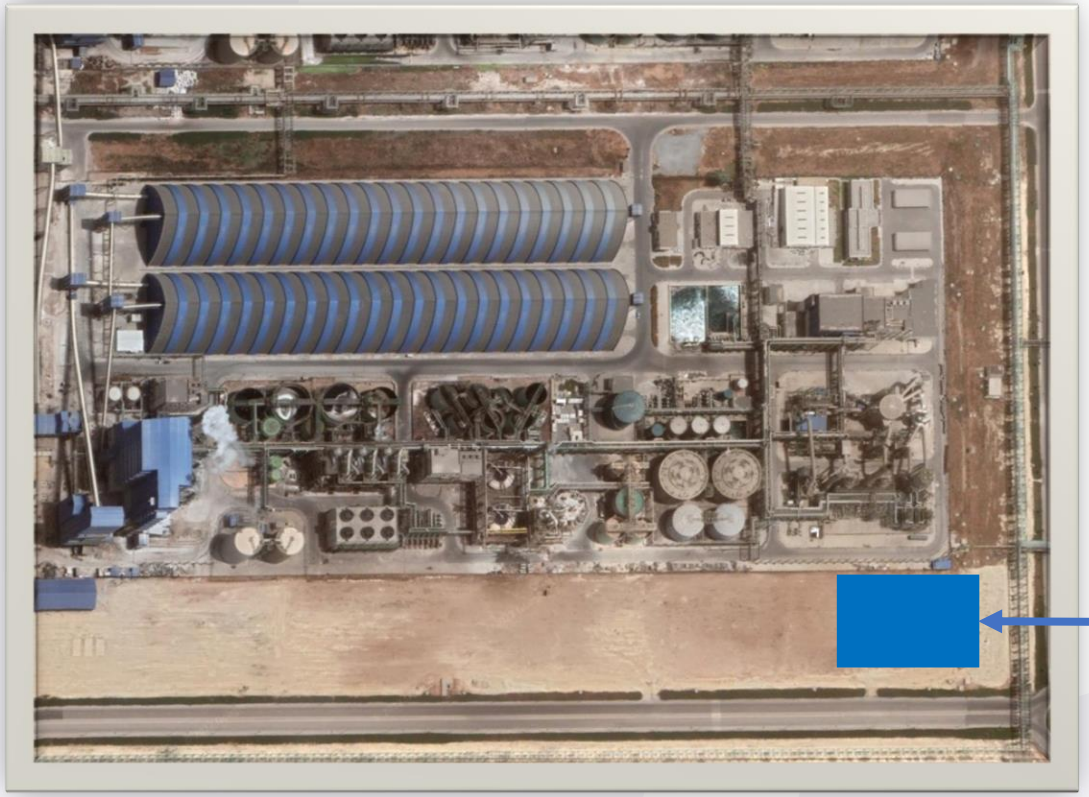
IRESEN

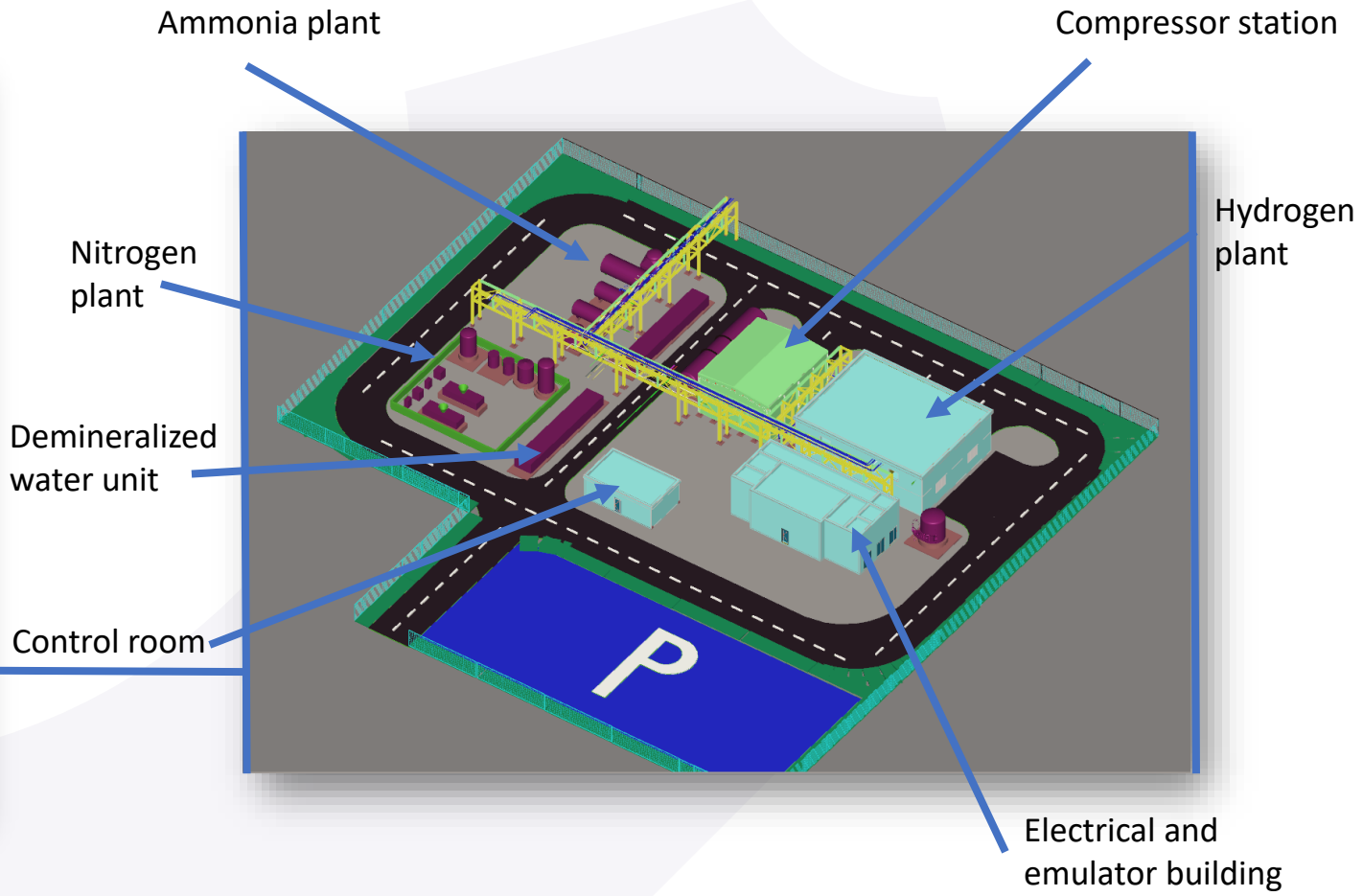
- IRESEN is the Research Institute for Solar Energy and New Energies

GAPP – Project overview

- 4 MTPD green ammonia pilot plant, in Jorf Lasfar, Morocco.
- Duration: 23 months
- Scope: EPC of a Green Ammonia Pilot Plant, including proven blocks of technology:
  - Emulator which can mimic any renewable energy system output
  - 2x type of electrolyzer technology (Alkaline – PEM) 2MW each.
  - 12h of N2 and H2 storage to compensate day – night power fluctuation
  - Small scale NH3 production unit
  - All auxiliaries systems (Storage, purification systems, utilities, etc…)

GAPP Layout

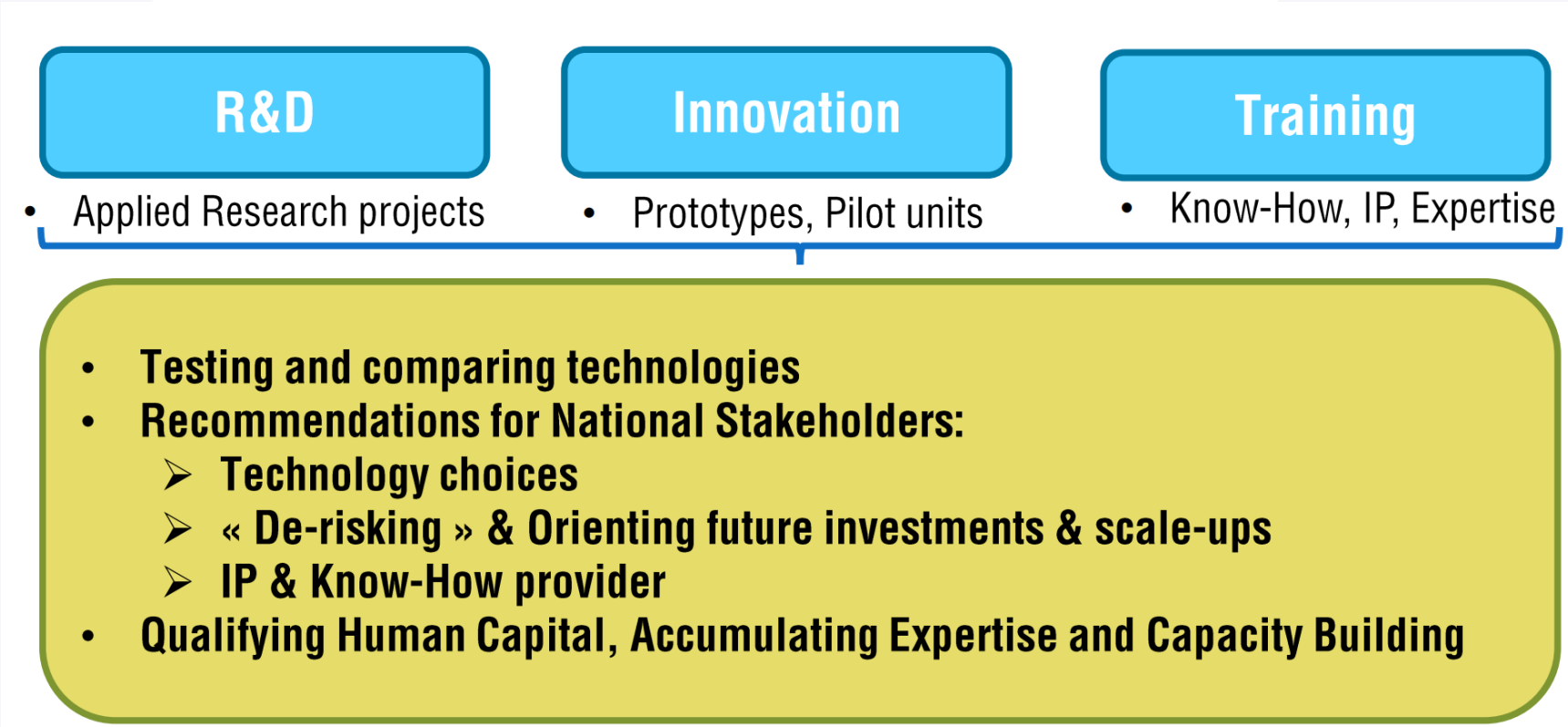



Ammonia plant
Compressor station
Nitrogen plant
Hydrogen plant
Demineralized water unit
Control room
Electrical and emulator building
P

Living Laboratory

Mohammed VI Polytechnic University :

A giant university complex where training is of the utmost importance



Source: NH3 Event Europe 2022 – Presentation UM6P

Living Laboratory

Living Laboratory

1. GAPP will be a living laboratory available to UM6P Researchers, Doctoral Students and Professors for research and education in the fields of hydrogen and green ammonia

2. GAPP will be a pilot for training and feasibility studies for a large industrial unit of Green Ammonia.

Source: NH3 Event Europe 2022 – Presentation UM6P

NH3 & Energy transition: a challenge meeting reality

Seeing is believing

- A pilot plant in Jorf Lasfar, Morroco
- Pilot results for large scale unit in green Ammonia

Believing is seeing

- A living laboratory to educate and train people
- Worldwide knowledge sharing

NH3 Event Europe 2023

- Organiser of the yearly European (green) NH3 event since 2017
- > 200 participants
- In 2023 the event takes place on 8 & 9 June, 2023
- Call for papers is open.
- www.nh3event.com

PROTON VENTURES

Thank you

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