

Tractebel



TRACTEBEL

ENGIE

WIC Fair Focus on international green H2 projects

June 2024

ENR Ranking

ENR INTERNATIONAL
DESIGN FIRMS
2023
Engineering News-Record

POWER &
FOSSIL FUEL
#10



MARINE & PORT
FACILITIES
#21



PETROLEUM
#26



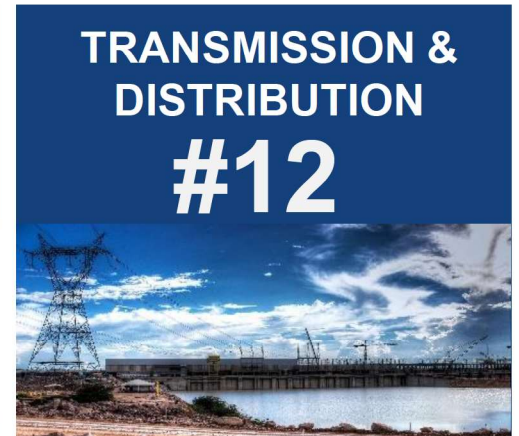
HYDRO
PLANTS
#2



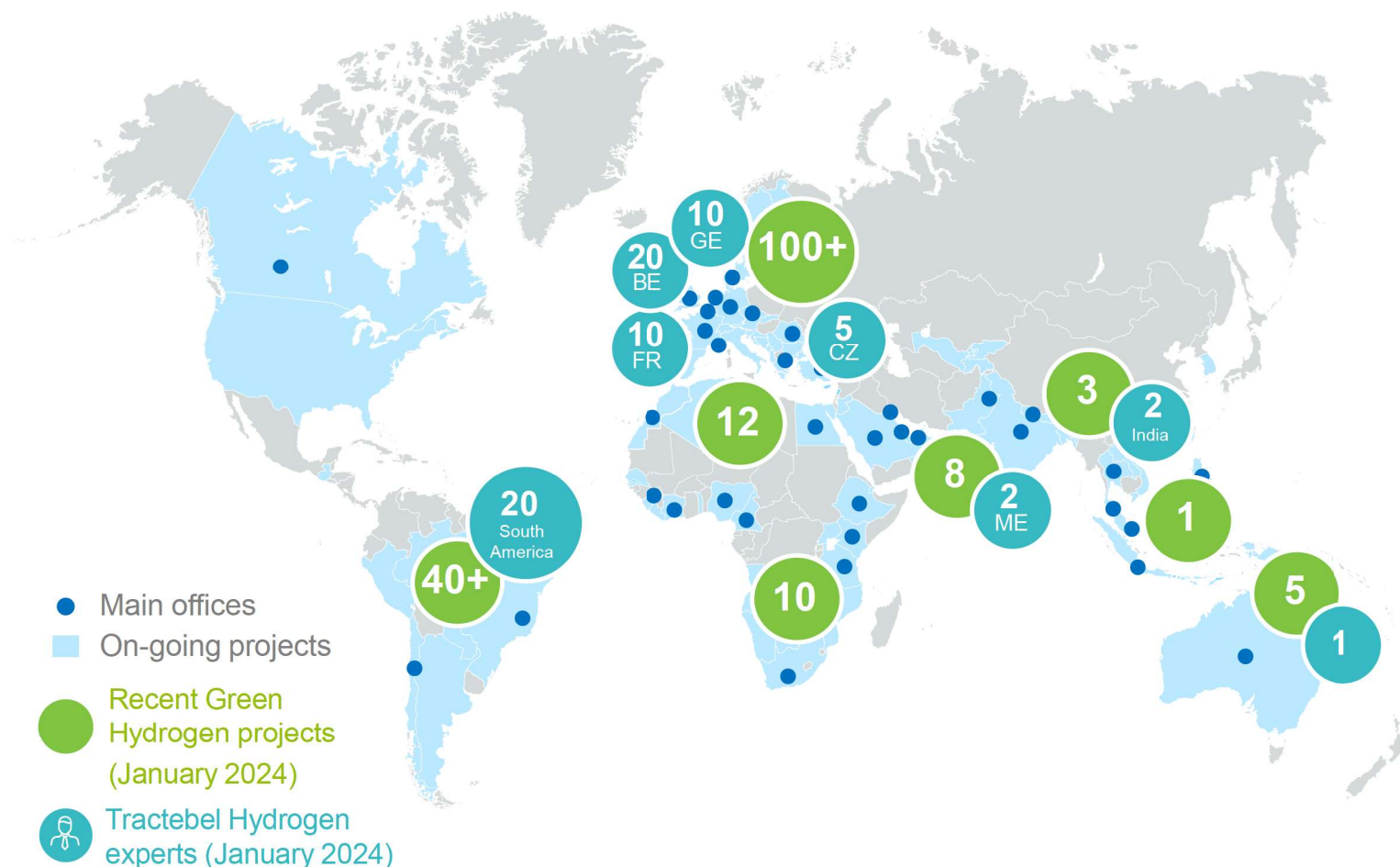
WIND
#10



TRANSMISSION &
DISTRIBUTION
#12



Wherever you are located



WIC Fair 2024

654 M€

Turnover (2023)



5,600*
employees

40
presence in
40 countries

>80
projects in over 80
countries

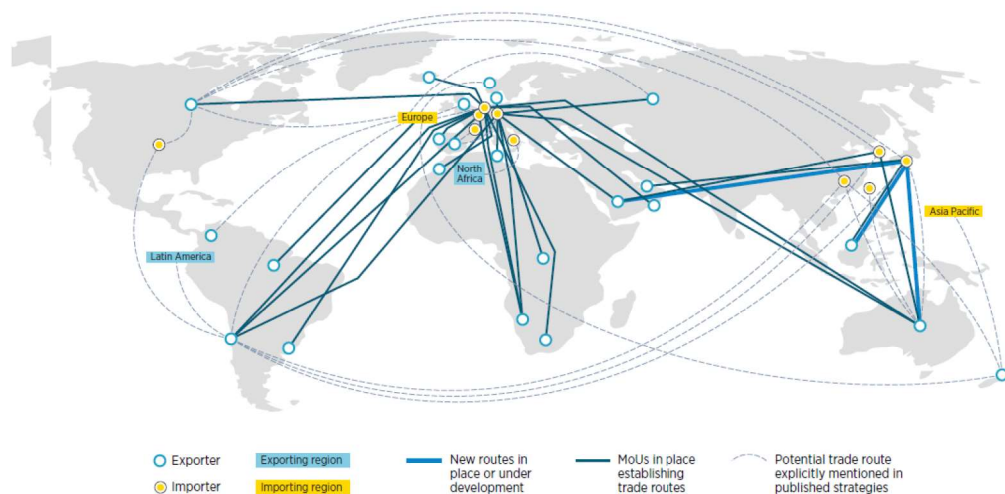
0,3
High safety standard:
frequency rate 0,3

* source: GSR Q4 2023

H₂ for Europe will be sourced intra- and intercontinental

Through maritime routes, as H₂ or H₂-derived fuels

Figure 2.9 An expanding network of hydrogen trade routes, plans and agreements



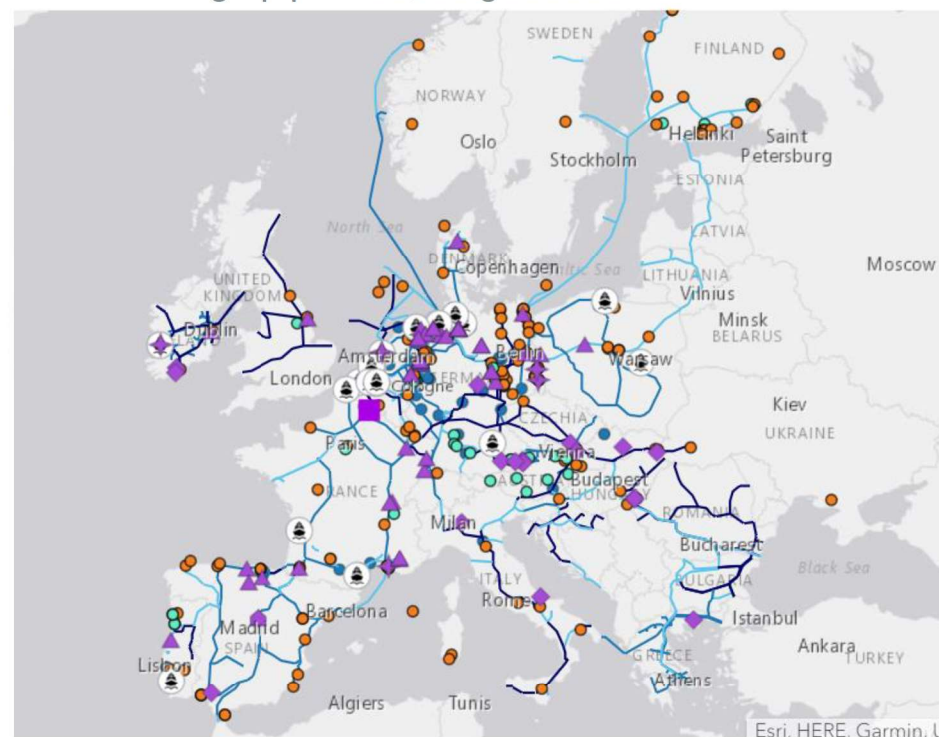
Map source: Natural Earth, 2021

Notes: Information on this figure is based on the information contained in government documents at the time of writing.

Disclaimer: This map is provided for illustration purposes only. Boundaries and names shown on this map do not imply any endorsement or acceptance by IRENA.

Source: IRENA, « Geopolitics of the Energy Transformation: the Hydrogen Factor », Jan. 2022

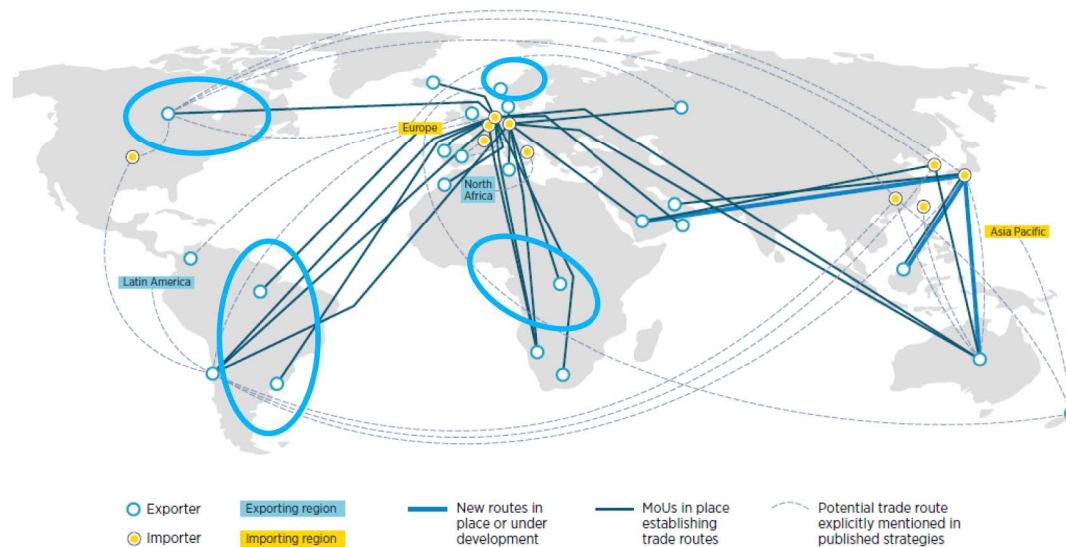
Through pipelines, as gaseous H₂



Source: [H2 Infrastructure Map Europe \(h2inframap.eu\)](https://h2inframap.eu/) May 30, 2024

Some regions have abundant hydro benefiting from baseload power

Figure 2.9 An expanding network of hydrogen trade routes, plans and agreements



Some projects

H2 Green Steel - Sweden

700MW Ez for green steel production - FID

H2 **green steel**

<https://www.h2greensteel.com/>

Green Energy Park – Brazil

5GW Ez for green ammonia for export - FS



<https://gep-krk.com>

Piaui Hydrogen Valley

Hydrogen Valley/Hydrogen export Hub located in Piauí, based on a vertically integrated value chain with baseload power from Electrobras (WHS2024)

CLIENT Investe Piaui

LOCATION Brazil

CAPACITY 5GW

PERIOD 2023 – ongoing

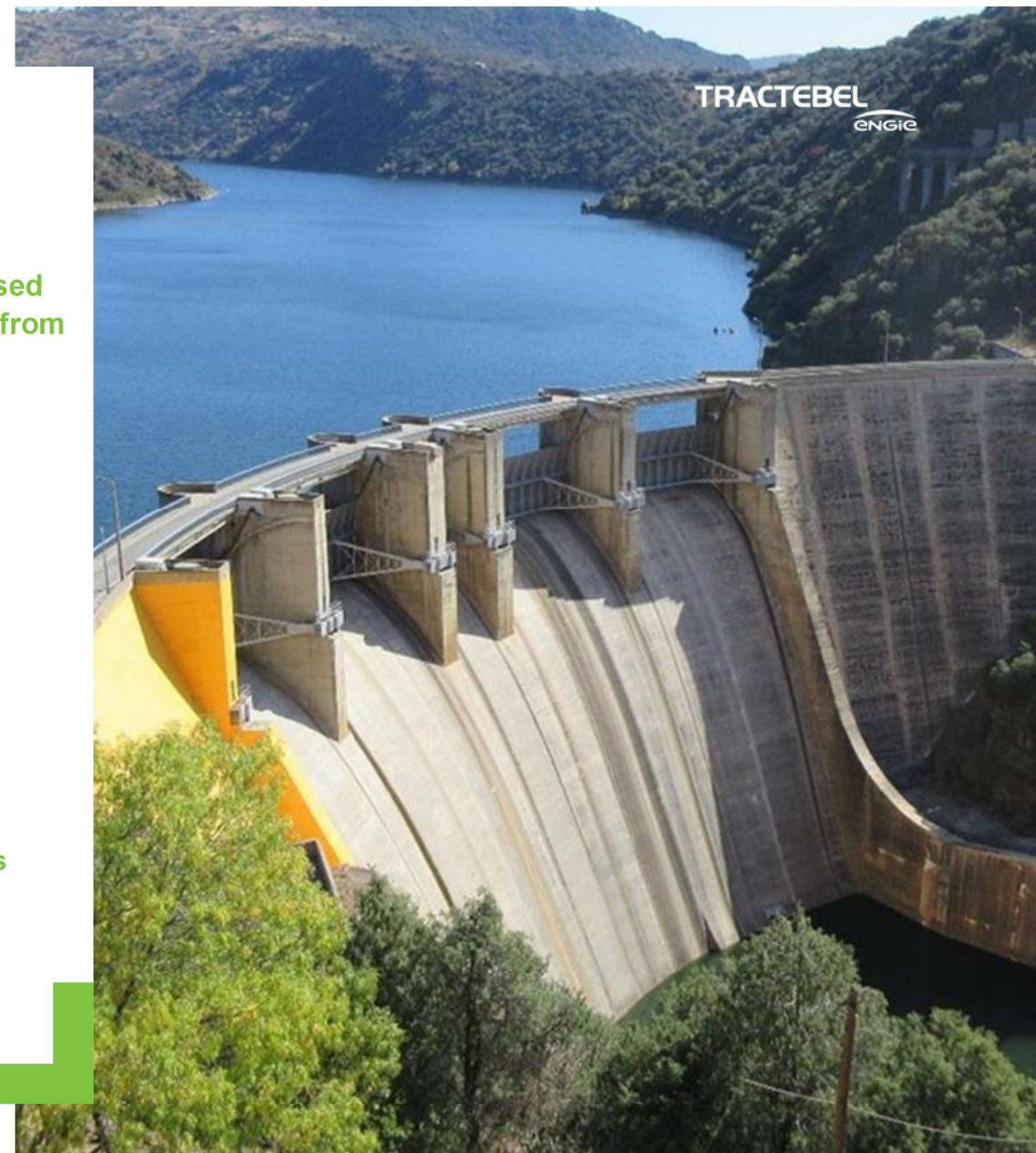
SERVICES PROVIDED

H₂ Economy Development for the state of Piaui

- Assessing real potential: Sizing of H₂ demand
- H₂ roadmap: Assessment of H₂ production
- Investment dynamics studies

Policy requirements and Environmental Studies

Licensing of the project along with the regulation policy



Most regions however count on variable wind and/or sun with need of digital tools to optimize sizing

Tractebel WisoGIS software

to optimize Wind and Solar data in a single software with our worldwide database

Link Webinar on WisoGIS

<https://content.media.tractebel.engie.com/l/890233/2023-04-03/nr5nq>

Tractebel Prosumer software

to optimize the concept preliminary sizing using hour-by-hour data for a full year.

Link Webinar on Prosumer

<https://content.media.tractebel.engie.com/l/890233/2023-01-23/n9jpg>



Wind and/or Sun regions for Giga-projects

Neom – Saudi Arabia

2GW Ez for green NH3 based on wind & sun - FID

Duqm – Oman

+20GW Ez for green ammonia for export with multiple investors based on wind & sun – MOU

Suez Canal Zone – Egypt

+30GW Ez for mainly green ammonia for export with multiple investors based on wind & sun initiated during COP27 – MOU

South of Morocco – Morocco

Offre de Maroc – Ez for green ammonia for local and export based on wind & sun recently initiated

Namibia and Mauritania

+5GW and +70GW Ez for green NH3 based on wind & sun

Chili

+40GW Ez for green NH3 and e-fuels based on wind & sun

Canada

+5GW Ez for green NH3 mainly for export based on wind only

Australia

+95GW Ez for green NH3 based on wind and sun

Kazakhstan

+20GW Ez for green NH3 based on wind and sun

North Sea

Ez for H2 based on offshore wind

=> **it's global**

H2 Morocco

Isolated facility for green ammonia for export

CLIENT Confidential

LOCATION Morocco

PERIOD 2023 - ongoing

CAPACITY 400MW

SERVICES PROVIDED **Technical Advisor for Inception Study**

- Assessment of Wind and Solar Resources with **WisoGIS**
- Sizing of different components of the isolated facility (wind, sun, batteries, electrolyser, gas storage and ammonia facility) to optimize LCONH_3 with **Prosumer**



Taqa Voltalia Hydrogen

Developing a green molecule export hub

CLIENT Taqa - Voltalia

LOCATION Egypt

PERIOD 2023 - ongoing

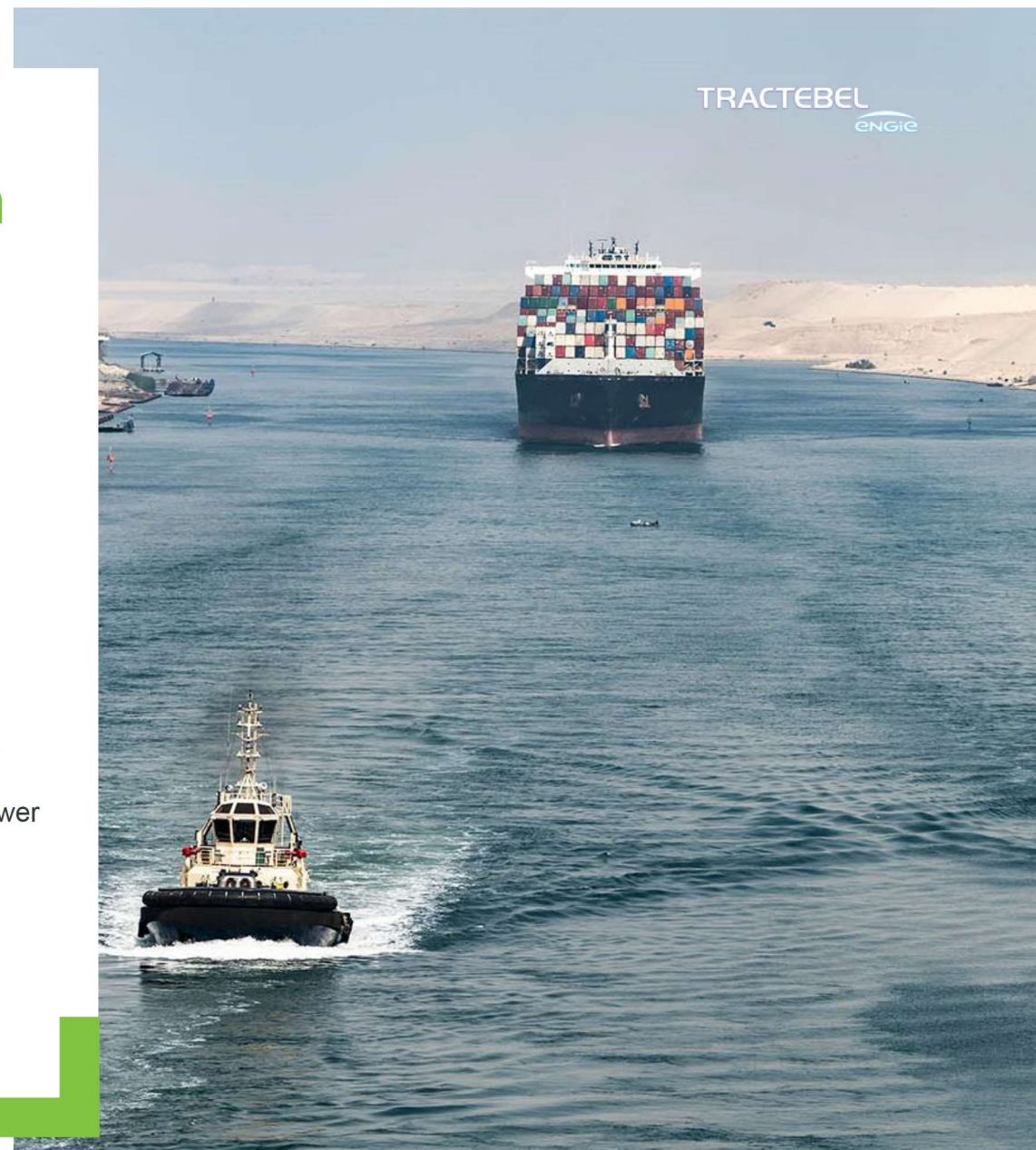
CAPACITY

- 100MW pilot project for green ammonia / e-methanol production
- 900MW in the scale-up phase

SERVICES PROVIDED

Feasibility study

- Concept screening and basic design of PV, Wind, electrolysis, $\text{NH}_3/\text{CH}_3\text{OH}$ plants & storage
- Optimization of the value chain nodes and the power supply configuration with **Prosumer**
- TIC and development cost estimation & financial analysis
- Business Model Development



HIF Paysandú

E-Fuels Facility

CLIENT	HIF Global
LOCATION	Paysandu, Uruguay
PERIOD	2023 - ongoing
CAPACITY	1GW Ez 210 000 t/y e-gasoline 27 000 t/y eLG 3 800 t/y Heavy Oil
SERVICES PROVIDED	Pre-FEED Engineering Development Heat & Material Balance, Process Flow Diagram, Layout and 3D Model <ul style="list-style-type: none">• H₂ production Plant• Biomass Boiler (engineering by Tractebel)• CO₂ capture from biomass boiler• Carbon-neutral Methanol production• e-gasoline and e-LG production for export



Green energy

Balance between

Transport :

- electrons (electrical grids) vs molecules (hydrogen value chain)
- molecules through pipeline vs shipping
- Shipping by Ammonia, liquid hydrogen, bulk

Storage : green electricity (batteries) vs molecules (pipeline storage vs underground hydrogen storage vs other molecule)



NH₃ Import Terminal

New build NH₃ import terminal on brown field location

CLIENT Confidential

LOCATION Europe

CAPACITY confidential

PERIOD 2023 - ongoing

SERVICES PROVIDED

Pre-FEED

- Review of existing design & site survey
- Feasibility study of the equipment relocation, sea water network and rail infrastructure
- Process studies (PFD's, Block Flow Diagram,...)
- Safety studies (HAZID, permitting note, safety concept,...)
- Electrical specifications (SLD, Cable list,...)
- Instrumentation & Automation (control system philosophy, instrument list,...)
- Civil Works (civil works design, civil works requirements, structural works requirements,...)
- Mechanical (plan, equipment datasheet for critical and long lead items,...)
- CAPEX estimate (class 3 +/-30%)
- Planning (EPC level 2)



H₂ & CO₂ pipeline

Developing European backbone for hydrogen and CO₂ transport.

CLIENT Confidential

LOCATION Europe

PERIOD 2023 - ongoing

TECHNICAL OVERVIEW Confidential

SERVICES PROVIDED **Engineering and Permitting**

- Executing feasibility for H₂ and CO₂ pipelines. Inventory of the present situation, routing and crossings, safety studies, risk analysis, interaction with authorities and stakeholders
- Elaboration of **Permitting files** to a suitable level of detail allowing for Permit of the pipeline construction and exploitation.
- **Detailed design**: preparation and drafting of Construction drawings.

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AI-generated image

Let's get in touch!



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