



MEETING

STRUTTURA DELLA MISSIONE **PIANO MATTEI**
&
COIPA ITALIA S.p.A
GREEN NHTREE PROJECT - 5 JUNE 2025





Mattei Plan for Africa

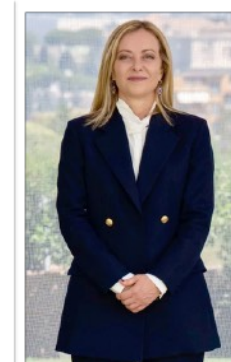


Piano Mattei per l'Africa

Global
Gateway



Rome - Italy, on June 20, 2025



GREEN NHTREE Project

Project for the production of **600 tons/day** of green ammonia, powered by a **1 GW** renewable plant (**750 MW solar + 250 MW wind**), using proven technologies for:



Desalination



Alkaline electrolysis



Nitrogen production (ASU)



Haber-Bosch synthesis



Liquefaction and storage



Transportation via pipeline to a marine terminal



01

RELIABLE SOLAR-WIND INTEGRATION

A renewable energy-powered project designed to produce green ammonia daily, leveraging well-established and reliable technologies

GREEN NHTREE Project

Italy European Hydrogen HUB: **A Strategic Vision**



NHtree is not just a technical project: it is a geopolitical lever that strengthens Italy's role in the **global energy** transition.



Today, **Italy has the opportunity** to apply as a **European Hydrogen HUB**, thanks to industrial skills, technological know-how and **international relations**.



Projects like **NHtree** concretely **demonstrate our country's** ability to lead **green hydrogen** supply chains on a **Euro-Mediterranean scale**.



MOU SIGNING Ceremony



Islamic Republic of Mauritania
Ministry of Oil, Energy and Mines



GOVERNANCE – Steering Committee



 To facilitate the **implementation** of the activities outlined in the **signed protocol**, a steering committee was established, composed of **two representatives** from the **Ministry** and two from the **MSME**.



Islamic Republic of Mauritania
Ministry of Oil, Energy and Mines



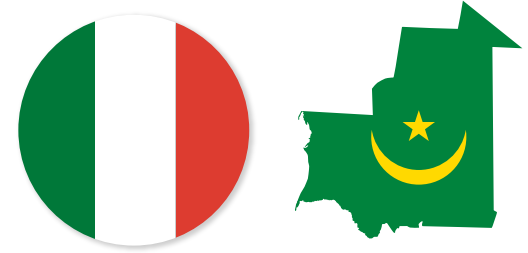
Two representatives



Two representatives



Steering committee



A KNOWLEDGE-BASED PARTNERSHIP

Supporting the **Mattei Plan**

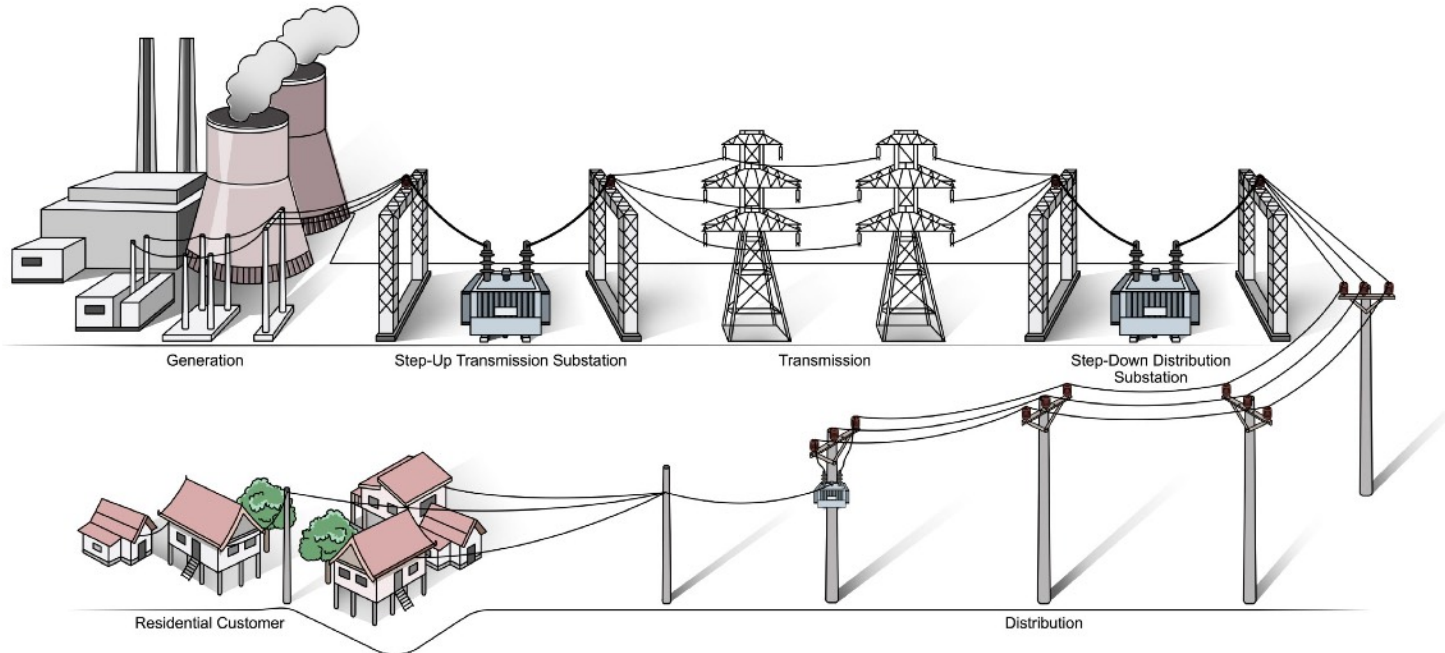


COIPA is establishing strategic partnerships **between Italian Universities** and the **University of Nouakchott** to support the training and development of **young Mauritanian technicians**.



BENEFIT TO THE NHTREE Project

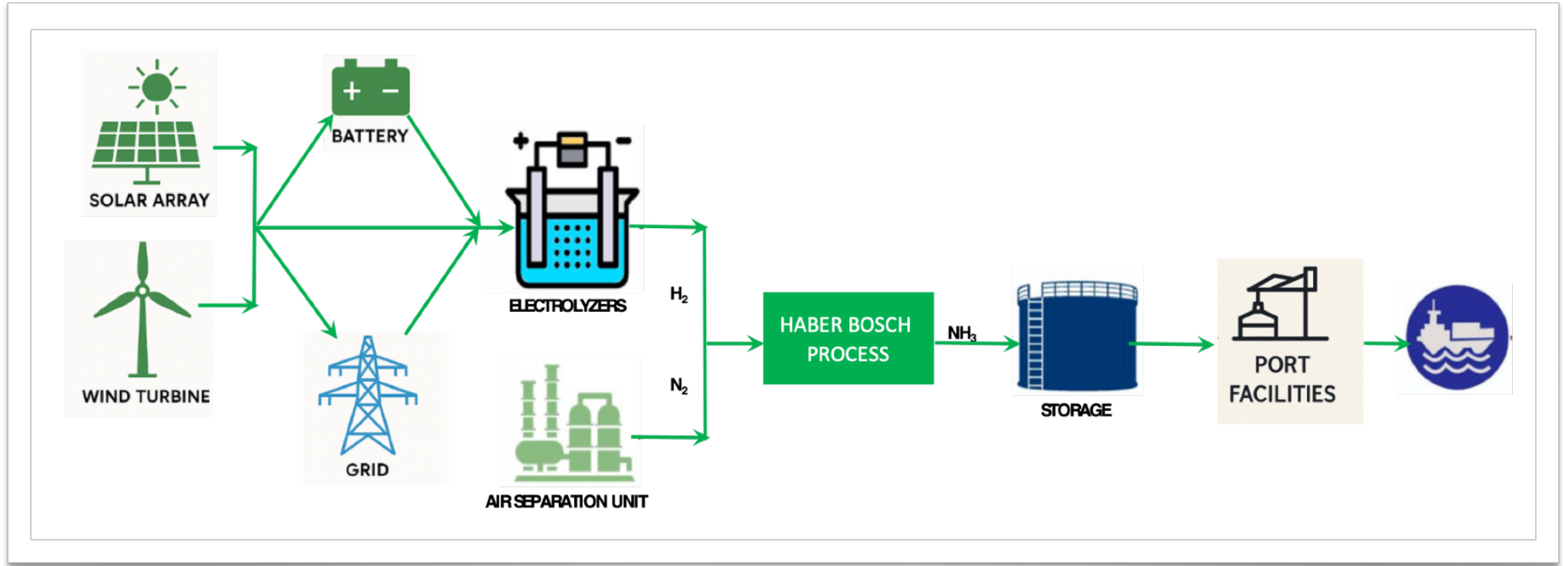
COIPA has committed to supplying **sustainable electricity** and **potable water** to approximately **10,000 local residents**, contributing to the **socio-economic development** of communities surrounding the project area. Furthermore, the **construction of the plant** will include the **development of a road and lighting network**, improving traffic safety and **reducing the isolation** of nearby settlements



Drinking Water



NHTREE PROJECT - Process Flow Diagram



NHTREE PROJECT – COIPA partners

- 1** System Integrator 
- 2** Section Solar Pv And Wind Onshore 
- 3** Desalination & Electrolyzer 
- 4** Air Separation Unit 
- 5** Ammonia Synthesis 



PLANT TECHNICAL Specifications

Production Capacity

NH₃ Green Ammonia
Generation

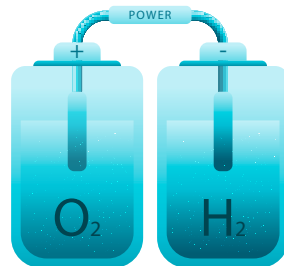
Energy
Perspective



GREEN AMMONIA: 600 tons/day = 219,000 tons/year (assuming 365 days/year)



ESTIMATED UTILIZATION FACTOR: 90% for H-B and ASU systems, variable for electrolysis (balanced with storage and/or grid)



ENERGY Sources

- **Photovoltaic solar:** 750 MWp
- **Onshore wind:** 250 MW
- **Total installed capacity:** 1,000 MW
- **Average energy production:** ~5,000 GWh/year (average CF 0.57)



← Wind Turbine & Solar Array

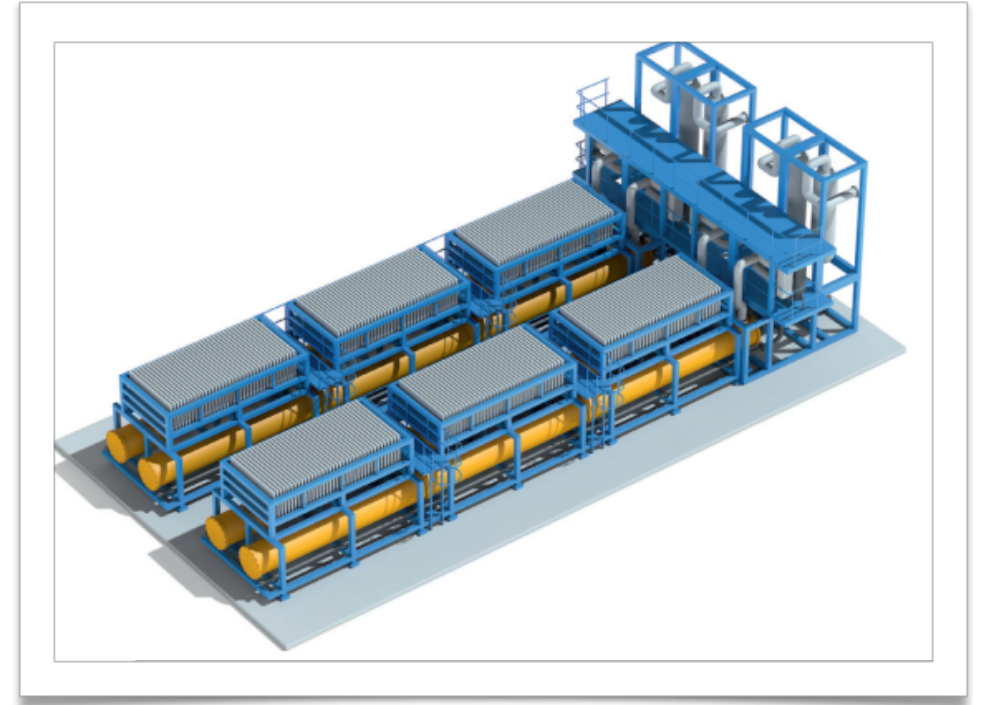
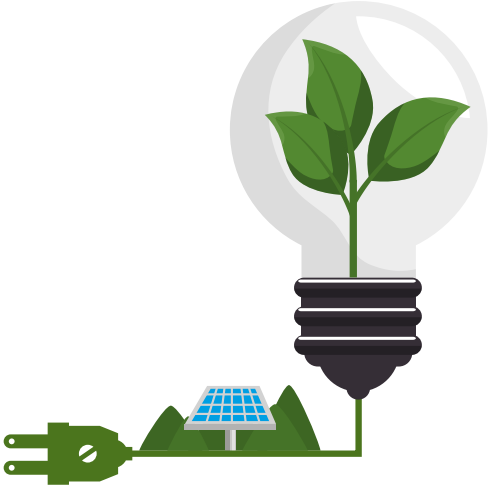
WATER Desalination

- **Type:** RO (reverse osmosis) or MED
- **Estimated water consumption:** $\sim 1.5 \text{ m}^3 \text{ H}_2\text{O} / \text{kg H}_2 \rightarrow 900 \text{ m}^3/\text{h}$
- **Required production:** approx. $22,000 \text{ m}^3/\text{day}$
- **Energy estimate:** $\sim 3 \text{ kWh/m}^3 \rightarrow 66 \text{ MWh/day}$



ELECTROLYZERS

- **Technology:** Alkaline
- **Required H₂ production:** ~106 tons/day
- **Energy required:** ~53 kWh/kg H₂ → ~5.6 GWh/day
- **Required installed capacity:** ~300–400 MW electric



AMMONIA production

ASU (Air Separation Unit)

- **Required N₂ production:** ~494 tons/day
- **Energy consumption:** ~0.5 kWh/Nm³ N₂ → ~75–100 MWh/day

Haber-Bosch Process

- **Reactants:** 3 H₂ : 1 N₂
- **Process energy efficiency:** 0.6–1.0 MWh/ton of ammonia
- **Estimated consumption:** ~500–600 MWh/day

Ammonia Liquefaction

- **Liquefaction temperature:** -33 °C
- **Energy consumption:** 0.2–0.3 MWh/ton → ~120–180 MWh/day



STORAGE AND Logistics [1]



Onsite Storage (2 days)

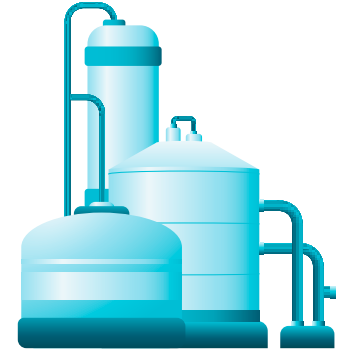
- **Capacity:** 1,200 tons (2 x 600)
- **Type:** cryogenic tanks (-33°C)
- **Boil-off recovery:** compression/recondensation

Pipeline

- **Length:** 30 km
- **Type:** stainless steel or carbon steel with internal coating
- **Flow rate:** ~ 25 tons/h
- **Pressure:** $\sim 20\text{--}30$ bar



STORAGE AND Logistics [2]



Port Storage (10 days)

- **Capacity:** 6,000 tons
- **Structure:** vertical cryogenic tanks
- Safety system for boil-off handling

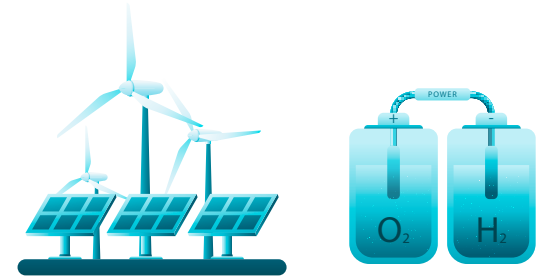


Ship Loading

- Dedicated loading arms (2)
- Vapor recovery system
- SCADA interface with main plant



YARA POSSIBLE Offtaker



Knowledge grows

Yara International – Strategic Offtaker Engagement

✓ **Confirmed Interest**

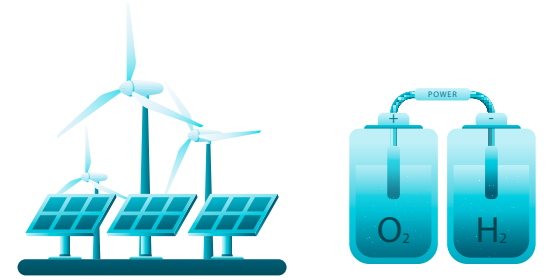
Yara International has expressed **clear interest** in the NHtree Project as a potential **long-term offtaker** for green ammonia.

✓ **Engagement Phase**

Discussions are aligned with Yara's internal process:

Technical Due Diligence and Commercial Negotiations typically commence **at or near completion of the Pre-FEED phase**.

YARA POSSIBLE Offtaker

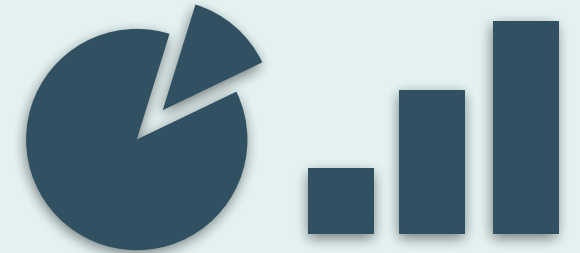


Knowledge grows

✓ Offtake Relevance

Yara is one of the **world's largest consumers and distributors of ammonia**, with strong interest in securing **green ammonia supply** for:

- ✓ Fertilizer decarbonization
- ✓ Maritime fuel blends
- ✓ Industrial applications in Europe



✓ Strategic Fit

The NHtree project aligns with Yara's decarbonization roadmap and enhances their supply diversification across **Africa-Europe corridors**.

INVESTMENT COSTS (CAPEX)

PRELIMINARY ESTIMATE

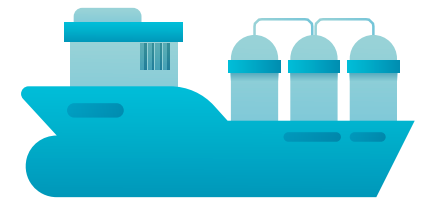
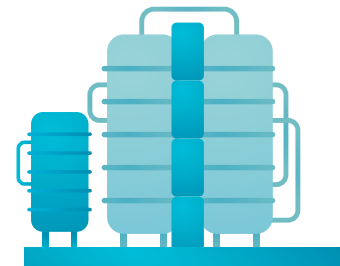
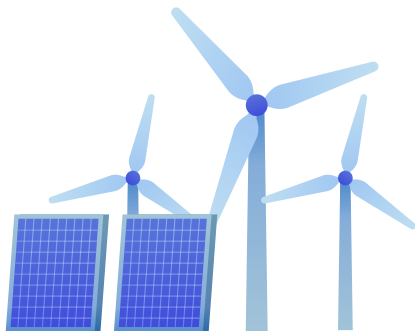


Item	Amount [€M]
750 MW Solar	580
250 MW Wind	330
Desalination (RO)	25
Electrolyzers (400 MW)	520
ASU	60
Haber-Bosch	200
NH ₃ Liquefaction	80
Storage (site + port)	130
30 km Pipeline	30
Port loading arms + boil-off recovery	40
Auxiliary Infrastructures	100
Total Estimated CAPEX	2100

FUNDAMENTALS terms

Same companies engaged for the **purpose of EPC** and supplies are currently elaborating on **Pre-FEED**
The "**Feasibility Study**" (needed to complete **Phase 1** under the MOU and define the final structure of the Project) is also being elaborated and including :

1. Assessment of **wind and solar resources** in the dedicated Project site;
2. Preliminary **environmental** impact study; preliminary **socio-economic** impact study of the Project;
3. Assessment of **regulatory framework** and investment regime **applicable to the Project**;
4. Preliminary market study on **green hydrogen** and the considered chemical compounds, identifying potential buyers whose needs align with the Project's specifications;



FUNDAMENTALS terms



High-level study including:

1. Land area requirements for **renewable energy** and production facilities;
2. Capacities of **renewable energy plants**, electrolyzers, and processes for chemical compounds;
3. **Water requirements** of the Project;
4. **Infrastructure, storage, and logistics** requirements for the product distribution chain;
5. Verification of the **international regulatory and policy** framework.



PRELIMINARY ORIGINATION and Development Activities

Activities needed to get the Project from initial proposal made to local Government to completion of phase 1, pursuant to MOU

Description	Area of Interest	Status
Initial development; deal concept and meetings with Mauritania Government, negotiation and execution of MOU; coordination of the project	<i>Business, Legal, Technical</i>	✓
Legal, Technical and Financial initial assessment	<i>Start & Develop of project Follow up</i>	✓
Preliminary technical assessments; coordination of pre-feed; final project technical structure	<i>Technical Commercial, Financial</i>	In process
Process Design Book, Pre-FEED carried out from licensors. <i>Technical</i>		In process
Pre-feasibility study <i>Technical/financial</i>		In process
On site visits and inspections; steering committee; reporting	<i>Business, Commercial, Technical</i>	In process
Technical survey; anemometric and irradiation measuring	<i>Technical</i>	In process
Coordination of contractors; initial agreement	<i>Commercial, Legal, Technical</i>	In process
Project Legal/contractual structure; term sheet commercial contracts and finance documents; application to SACE	<i>Legal, Financial</i>	To be done
Financial structure; Financial model	<i>Financial, Legal, Technical, Commercial</i>	To be done
Mattei plan and interaction with Italian Government	<i>Technical, Legal, Financial</i>	In process
Communication - Public relation	<i>Press release & Marketing</i>	In process
Expenses (travel & accommodation, secretarial, office, documentation, telephone, etc.)	<i>Indicative budget</i>	-



PROJECT Roadmap

Phase

Duration

Front End Engineering Design

6 months

Permitting & EPC Contracts

6 months

Construction and Testing

24–30 months

Commercial Operation

by 2028



CONCLUSION



- ✓ Following the presentation of the NHtree Project to the Mattei Plan Mission Structure, we ask that the initiative be recognized as a strategic pillar of Italy–Africa energy cooperation, and supported through financing, partnerships, and industrial diplomacy.
- ✓ We are ready to collaborate with all the institutions involved to make Italy a European leader in the green hydrogen supply chain and the just energy transition.



THANKS

FOR YOUR
ATTENTION

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