

Dott. Ing. Diomede Malvaso



Sicurezza e Certificazione in ITALIA

Barriere e
possibili
sviluppi



@RINA1861



@rina



@weatrina



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La nostra esperienza
la vostra crescita

RINA oggi



5,800
colleghi



200
uffici



70
Paesi

La nostra gente



More than
90 nazionalità



80%+
laureati



42
Età media

Settori



Energia

Soluzioni energetiche integrate che abbracciano fonti fossili e transizione energetica, focalizzate sulla sostenibilità



Navale

Norme, tecnologie e servizi innovativi per la gestione delle imbarcazioni da trasporto e da diporto



Certificazione

Soluzioni per supportare prodotti, persone e processi nel loro percorso verso l'eccellenza



Infrastrutture e mobilità

Il percorso verso la prossima generazione di infrastrutture ed edifici garantendone sicurezza ed efficienza



Industria

Accelerare il successo dei clienti con strategie e soluzioni basate sulla tecnologia



Immobiliare

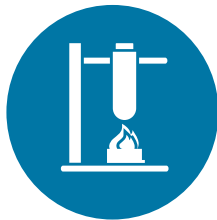
Proposte di valore innovativo di servizi integrati: RINA Prime Value Services è in grado di coprire l'intero ciclo di vita immobiliare



What we do



**Advisory
Consulting**



Testing

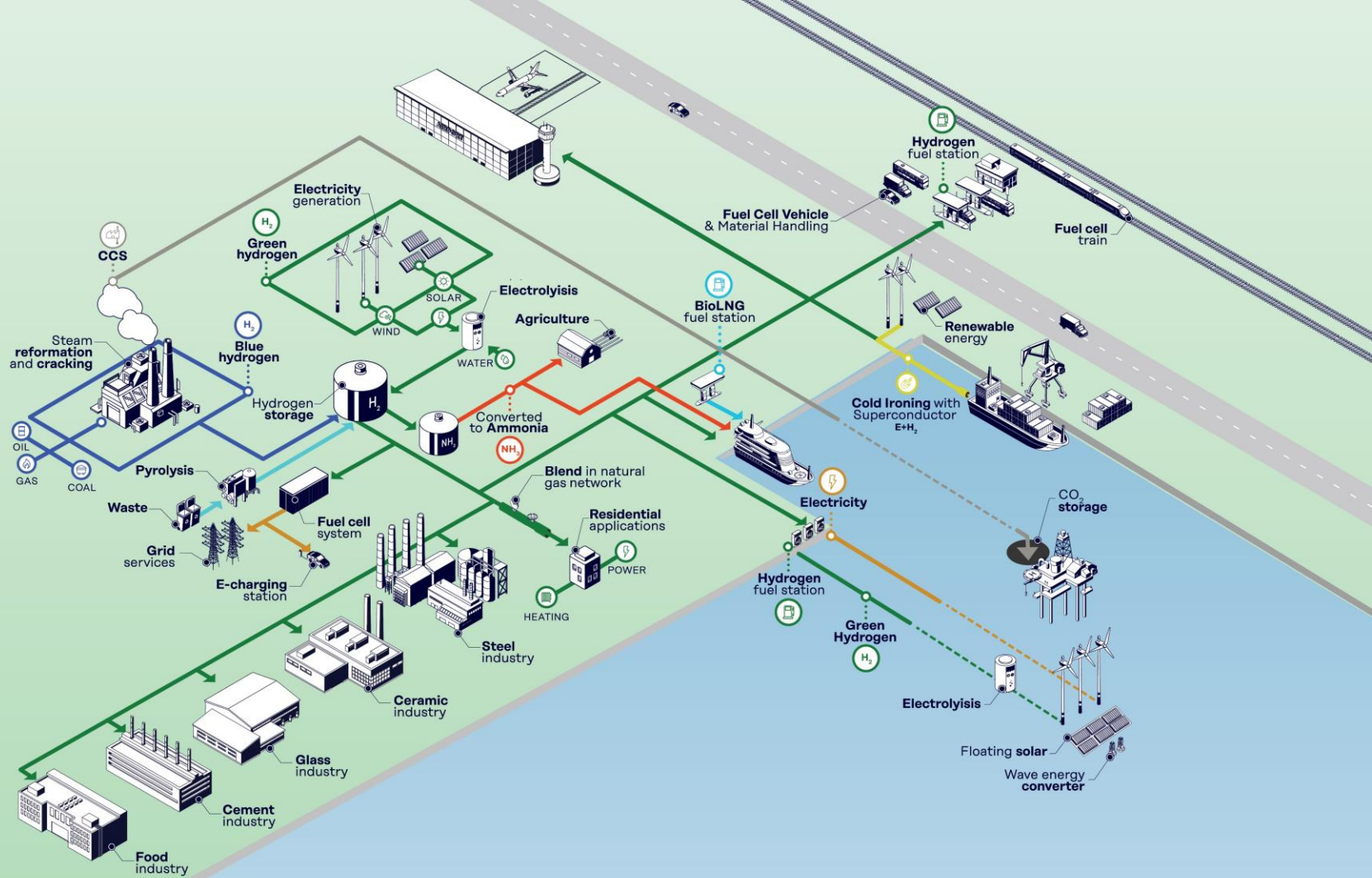


Inspection



**Certification &
Training**

The Advisor to the Energy Transition sector



Our Energy Transition key pillars

Multisector Expertise: integrating Cross-Industry

- Maritime
- Hard to Abate
- Renewables
- Industry
- Banks & Insurers
- Rail & Road Transport
- Multi-utilities
- IFIs
- Infrastructure

Global footprint

Global presence - 70+ Countries

Renewables

- 60GW+ experience in wind projects out of which 20 GW+ Offshore Wind
- 120+ GW of experience in solar projects, including 500+ MW in floating PV
- Battery Energy Storage Systems (BESS) coupled with renewable generation & stand-alone
- Grid interconnection services & HV interconnectors.

Digital

We empower our energy transition and decarb offer with digital enablers to maximize customer benefits

Certification Market Leader With Own Laboratories, Facilities and Training

- H₂ and CO₂ laboratories
- Carbon footprint, green products certification
- Training and certification of competences

R&D&I and Technologies

- Technologies scouting & assessment
- Green finance advisory
- Demo center for technologies validation
- Approval in Principle & Techn. Qualification
- Best Innovation Award by FCH JU, Clean H₂ JU

ON/OFFshore Asset

- Onshore and offshore
- HSE
- Project Management Consulting
- Asset Integrity
- Repurposing for transport and storage

RINA Key Factors

Hydrogen **Materials Laboratory**

We provide material compatibility testing on various materials and components (tensile bars, rings, valves, or complete systems).

In addition to this, H₂-CO₂ permeation tests are carried out on a wide scale of (semi-finished) products. The facilities also allow us to conduct: Risk and engineering assessments, Bespoke test campaigns based on specific polymer materials and applications.

Testing could include polymer hydrogen compatibility studies and permeation measurements. Fluid compatibility Chemical and Physical Analyses Mechanical Tests Microscopy.

Hydrogen **Tank and High Pressure Components Test Laboratory**

The Hydrogen Tank Test Facility is able to carry out lifecycle and functional testing of hydrogen fuelled products and associated appliances & systems.

Our hydrogen tank test laboratory is able to accommodate large H₂ tanks for full type approval test programs and certification projects.

We are able to test on high pressure 1050 bar hydrogen in various climatized conditions on a wide variety of components.

Hydrogen **Gas Laboratory**

We offer technical assistance to hydrogen burner manufacturers already in the research and development phase.

Our Gas Laboratory can support manufacturers either with existing burners and appliances (therefore assessing their ability to react to the different admixture of hydrogen and natural gas) or in the development of pure hydrogen burners.

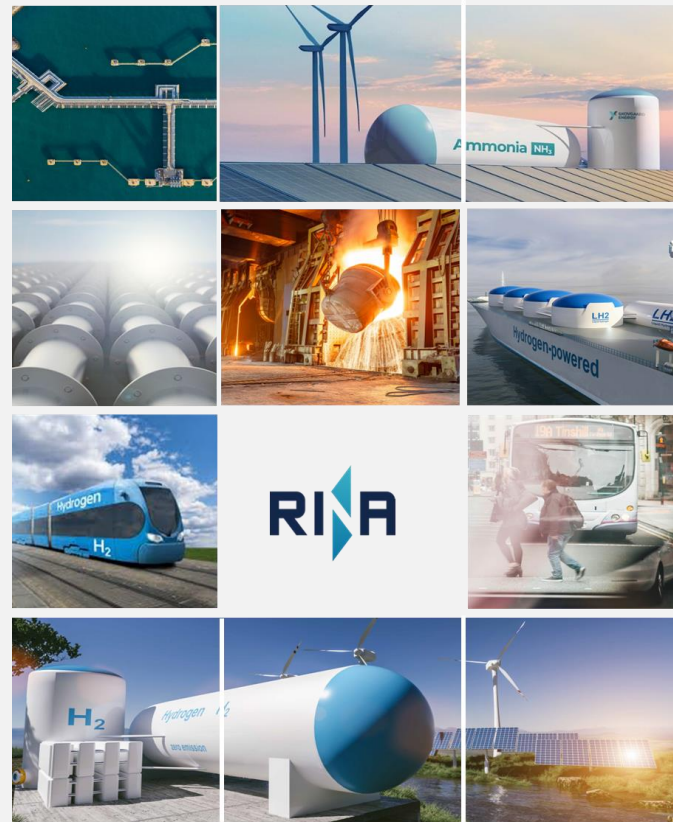
Spotlight on H2 and derivatives

System Integrator along the value chains

RINA is a key player in the hydrogen and derivatives value chains, offering a comprehensive range of solutions across multiple industry sectors.

- Access to Green Finance
- Engineering: from feasibility to FEED
- PMC
- Certification, Testing and Training

110+ clients in H2 projects

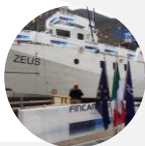


Some achievements

Concept design for 100 MW green H2 value chain in south Europe



ZEUS: RINA Classed Ship capable to be propelled by hydrogen



Value chain design, Project Management, Verification and Validation of the 1st H2 fueled trains infrastructure in Italy



Green steel open demo platform: Important Project of Common European Interest to demonstrate Direct Reduction of Iron ore feeded with hydrogen.



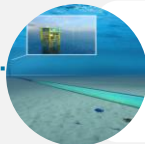
1st accredited entity in Italy for electrolyzers certification according to ISO 22734



Certification of Italian natural gas existing network (32,500 km) to transport up to 100% of hydrogen



Certification of Saipem qualification methodology of the performances of subsea H2 pipelines



Repurposing of existing combustion systems for the use of natural gas/hydrogen mixtures



Some case studies on Hydrogen



HARD TO ABATE

HYDRA: RINA's demo plant for steel industry decarb

DEVELOPMENT & TESTING FOR EXISTING AND NEW BURNERS readiness to H2/NG mix



MOBILITY

1ST HYDROGEN TRAINS IN ITALY: from Design to Project Management to independent third party validation
Mobility by **BUS:** Techno-economic feasibility **for fleet conversion**

Airports & ecosystem:
Mobility studies, green H2 plant design, Certification



Res/H2 PRODUCTION

100 MW Green H2 hub in south Europe: support to access green finance, conceptual design, business planning



PORTS

H2 terminal feasibility

Techno-Economic Feasibility Study for the installation of Green hydrogen production, Storage plant and Refueling for internal vehicles fleet



TRANSMISSION

ASSESSMENT AND CERTIFICATION of SNAM natural gas existing network (32,500 km) to transport up to 100% of hydrogen
Material selection and testing



MARINE TRANSPORT

AiP – TQ of new cargo systems

Classification of H2 carriers

Design support for equipment involved in the **transportation/storage and fuelling**

Risk analysis relevant to leaks and dispersion

Logistics and cost studies for H2 shipping

Hydrogen Projects



DECARBONIZING MARITIME: BLUE HYDROGEN ONBOARD | RINA CONCEPT

RINA developed a system concept where the ship operates on LNG as its primary fuel and integrates a next-generation compact **Steam Methane Reforming (SMR)** system for **onboard hydrogen production**. The resulting CO₂ is captured, liquefied using the cold energy from LNG gasification, and stored onboard. The final propulsion system can use a flexible mix of LNG and hydrogen, powering various engines or turbines. **This setup allows for dynamic CO₂ emission control, adjusting based on the proportion of LNG reformed.**



HYDROGEN READINESS OF EXISTING PIPELINE 32,500 KM | TSO | EUROPE

RINA supported the client in designing a **viable and robust methodology for technical requirements**, focusing on **material suitability** by referring to the applicable requirements reported in available international codes and standards and leveraging on our experience in **laboratory testing, in-depth knowledge of materials and engineering competencies** to add value defining the most appropriate requirements avoiding being too conservativeness.



HYDRA: GREEN STEEL PILOT PLANT | EUROPEAN COMMISSION | ITALY

A European Commission Next Generation EU funded R&D IPCEI project, backed by the Italian Ministry of Enterprises and Made in Italy, for the **decarbonization of the steel industry**. The RINA project will create a 100% hydrogen-fuelled pilot plant in Castel Romano (Italy). Development of a first-of-a-kind demonstrational line of **Direct Iron ore Reduction (DRI)** using green hydrogen as a reducing agent, an electric furnace (EAF), and burners for reheating furnaces



GREEN HYDROGEN PRODUCTION | ASLAN ENERGY CAPITAL PTE LTD | SINGAPORE

Execution of preliminary front engineering and Design (Pre-FEED) of the green hydrogen production facilities in Bintan Island, Riau Islands province of Indonesia to the offtake location in Singapore. The project development encompasses a solar farm, an **H2 production plant, and an H2 gas pipeline export** facility. The electrolyzers produce H₂ gas to export to Singapore via subsea pipelines.