

EPC-M GROUP

**Green Hydrogen Clean Energy System
Energy Transition Solution Provider**



**Green Hydrogen Production Project Development
Utilizing Renewables | Green Hydrogen | Derivatives
Green Ammonia | E-Methanol | E-Methane
Green Hydrogen Genset | Power Plant | Boiler Co-firing**

**Developing Actionable Solutions To Accelerate Your Energy Transition Journey
Developing Green Hydrogen Clean Energy Systems
With Plant Owner & Stakeholder**

EPC-M Group Partnership Capabilities For Modular Plant Design & Fabrication

Project Engineering	Project Management	Procurement	Construction	Fabrication Support	Code Certification
<ul style="list-style-type: none"> Process Design Product Design FEED Studies Conceptual/Basic Engineering Detailed Engineering Shop Drawings Commissioning Asst 	<ul style="list-style-type: none"> HSE Mgmt Project Mgmt Risk Mgmt Delivery Mgmt Manpower Mgmt Cost Mgmt Contract Mgmt X-Factors 	<ul style="list-style-type: none"> Local procurement International procurement 	<ul style="list-style-type: none"> Fabrication Manufacturing Operations Production QA/QC Documentation Site Erection 	<ul style="list-style-type: none"> Waterfront Fab Yard Facilities Mgmt. Sub-con / Vendors Construction/ Fab Equipment Rental Load-outs Logistics Accts/Finance/HR System & Procedure 	<ul style="list-style-type: none"> ISO 9001:2015 ISO 14001:2015 OHSAS 18001:2007 ASME Code : U, U2, S National Board: R, NB Third Party -ABS, Lloyds, DNV, etc



Modular Plant Design & Fabrication Experience Since 2013 Maximizing Local Content-Creating Jobs & Upgrading Local Capabilities

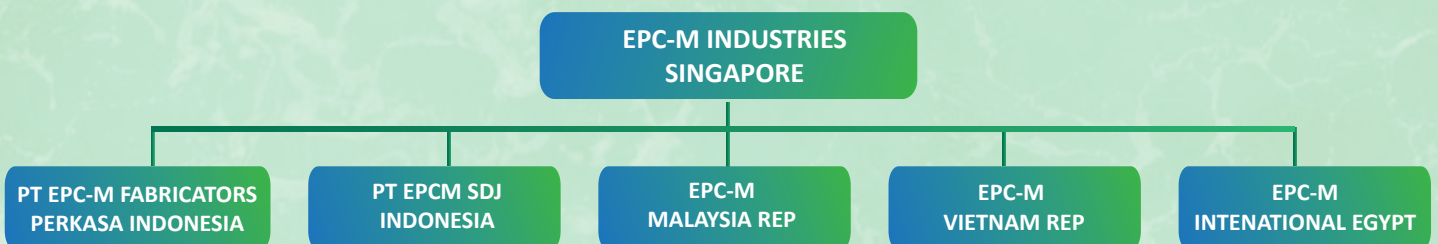
With the knowledge and experience acquired over time, EPC-M transforms ordinary waterfront yards into fully equipped module fabrication facilities to work on projects globally.

- EPC-M Group provides modular capability and capacity and create ecosystems that support project investments. With it comes technology partnerships, internationally qualified modular fabrication facilities, vast resources, job creation, skills upgrading and local workforce support. Investors can be confident that their projects will be delivered successfully and that the finished plant and facility can operate smoothly, ensuring safe return on investment.
- Bringing value added projects for the facilities
- Leveraging on our rich track record, we partner local project developers and bring international financing partners and international technology partners to your project.
- Assisting in developing and executing the project with maximum local content.
- Creating jobs, bringing vast international resources and upgrading local skills, capabilities and capacities.
- With subsidiaries in Indonesia & Egypt and representatives in Malaysia, Vietnam and China supporting it, the EPC-M Group works on several projects simultaneously, resulting in international presence, accomplished local content requirements, higher productivity, shorter delivery schedules and lower project management costs.

EPC-M GROUP PROFILE

- EPC-M Group is a green hydrogen clean energy system solution provider for energy transition program in industrial & process plants to decarbonize their energy systems.
- We have extensive experience in modular plant design & fabrication since 2013,
- Green hydrogen production project development since 2020.
- Negotiations with offtakes of green hydrogen production for energy transition since 2022.
- Advancing forward to provide actionable green hydrogen clean energy systems to decarbonize industrial and process plant since 2022.
- We are committed to support plant owners & stakeholders to develop innovative actionable solutions to decarbonize their existing plant energy systems accelerating their energy transition journey.
- We support the development of green hydrogen energy system projects utilizing renewables, green hydrogen & green hydrogen derivatives (like green ammonia, e-methanol, e-methane) for green hydrogen turbine, green ammonia genset & power plant, fuel cell and boiler co-firing to decarbonize plant operations.
- With the strong support of our network of international green hydrogen technology partners and international specialist supply chain, we partner with international and local project developers bringing international financing partners and local engineering teams to develop the green hydrogen clean energy system for your project.

EPC-M GROUP



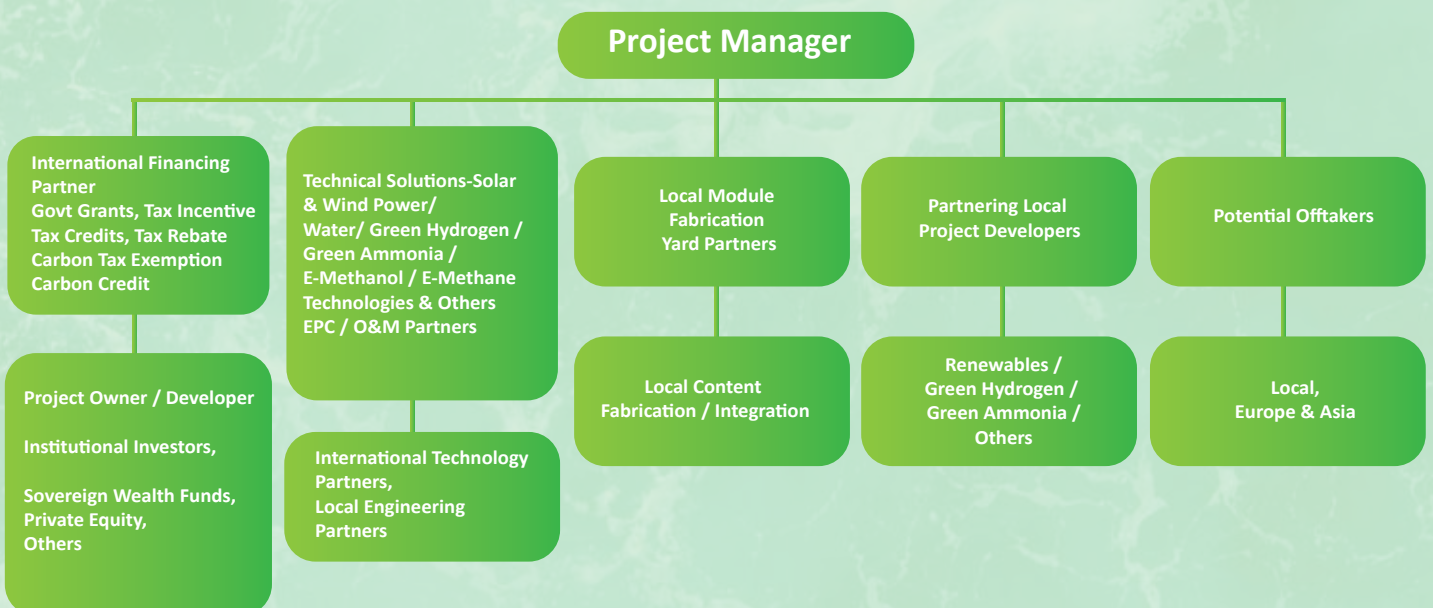
EPC-M Green Hydrogen Clean Energy System

Our Technology Experts & Specialists

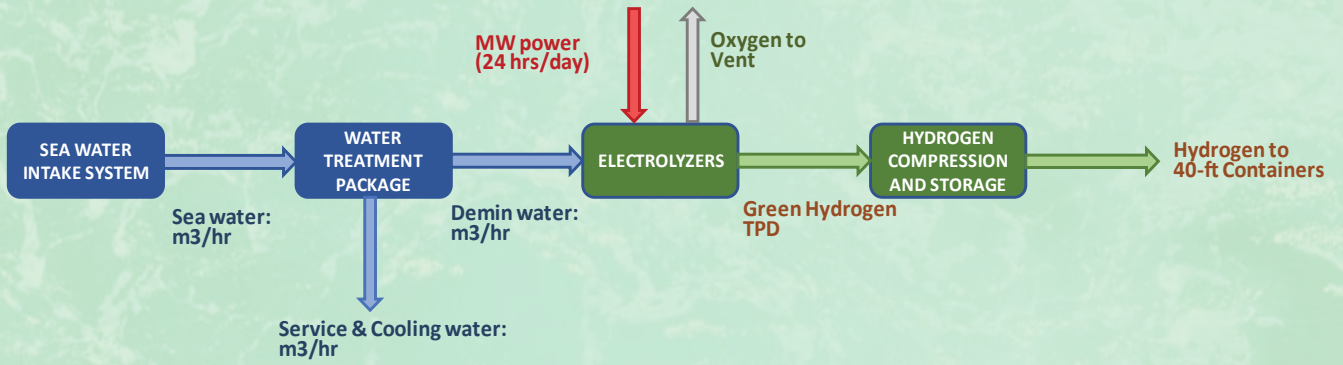


EPC-M Supports Green Hydrogen Clean Energy Systems for Energy Transition Project Investments Through Technology Partnership & Project Financing

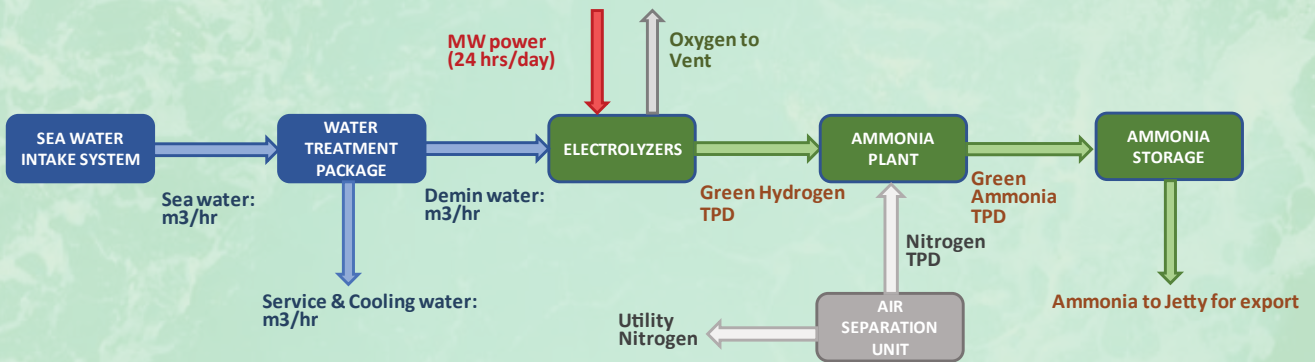
Our Project Structure



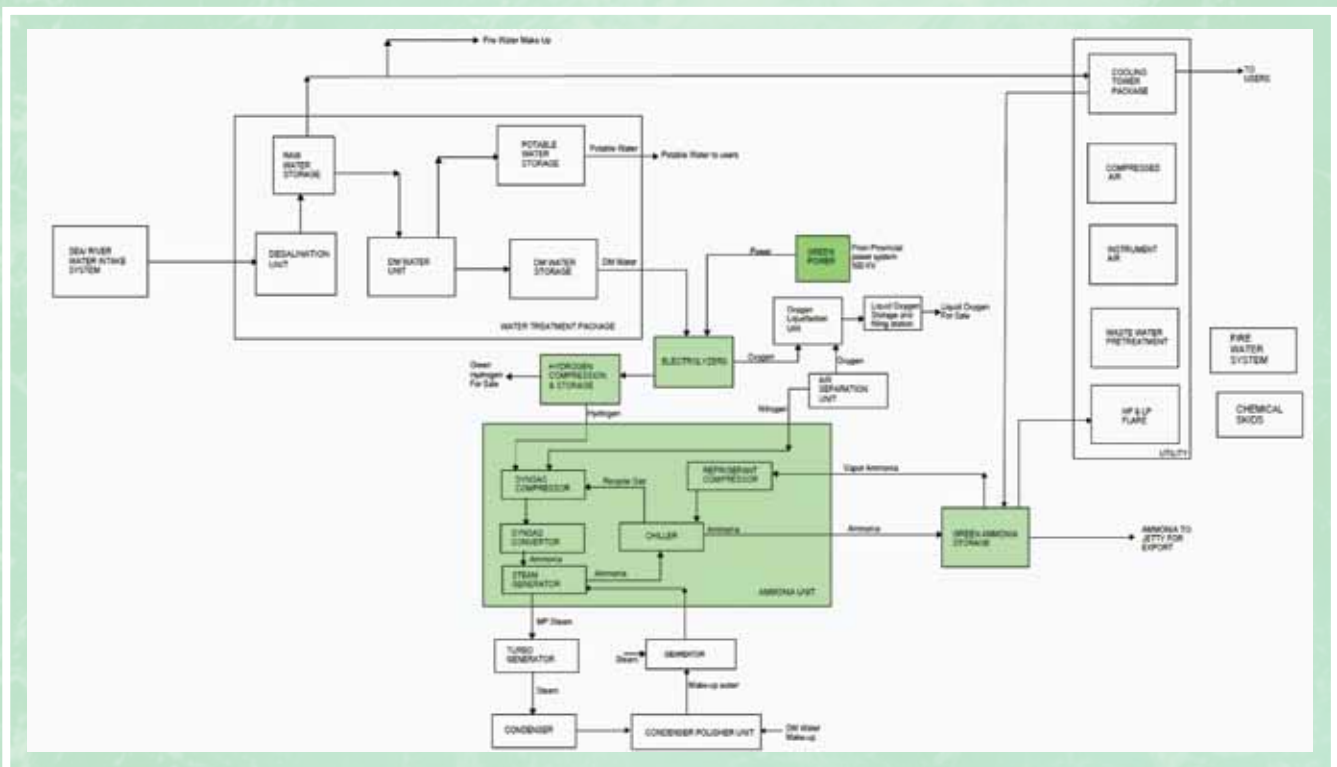
Simplified Hydrogen Block Flow Diagram



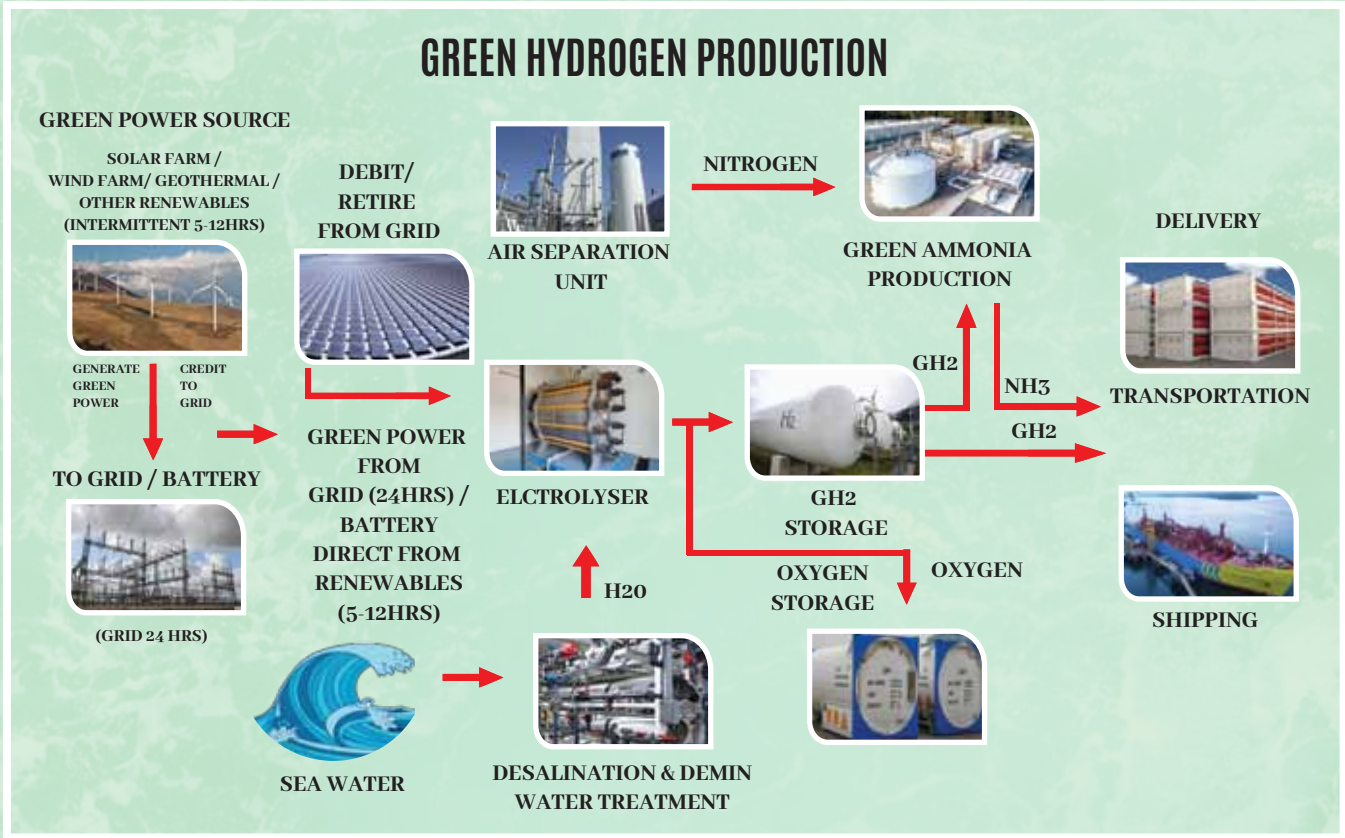
Simplified Ammonia Block Flow Diagram



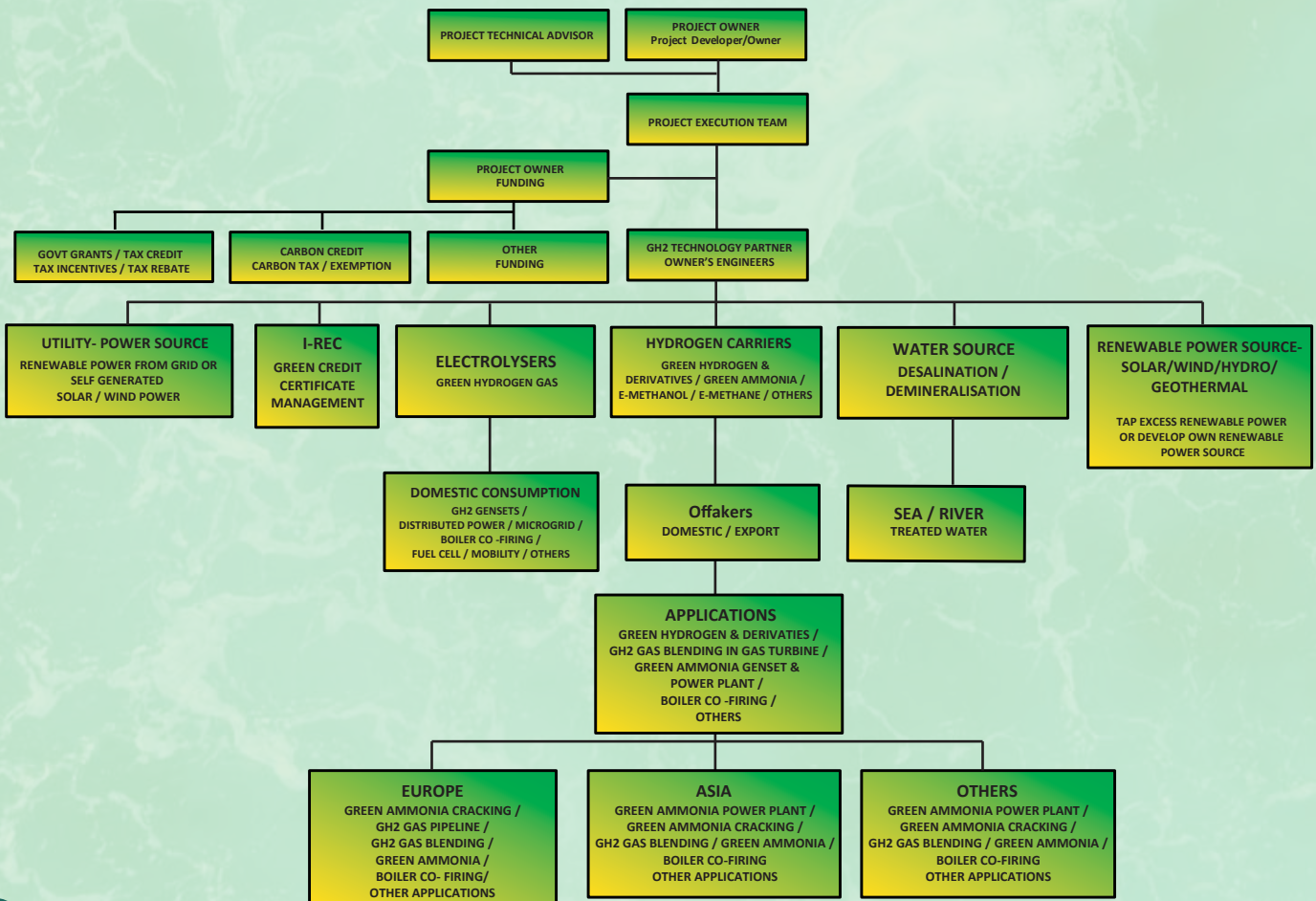
Block Flow Diagram Of Hydrogen & Ammonia Production



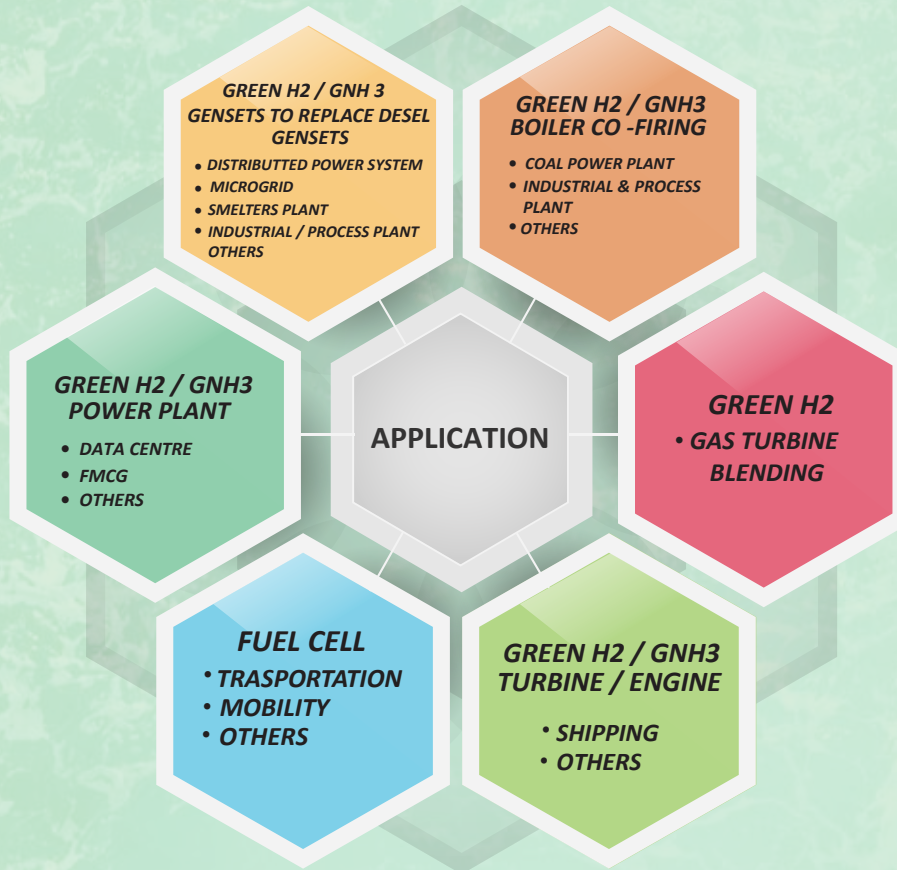
GREEN HYDROGEN PRODUCTION PROCESS



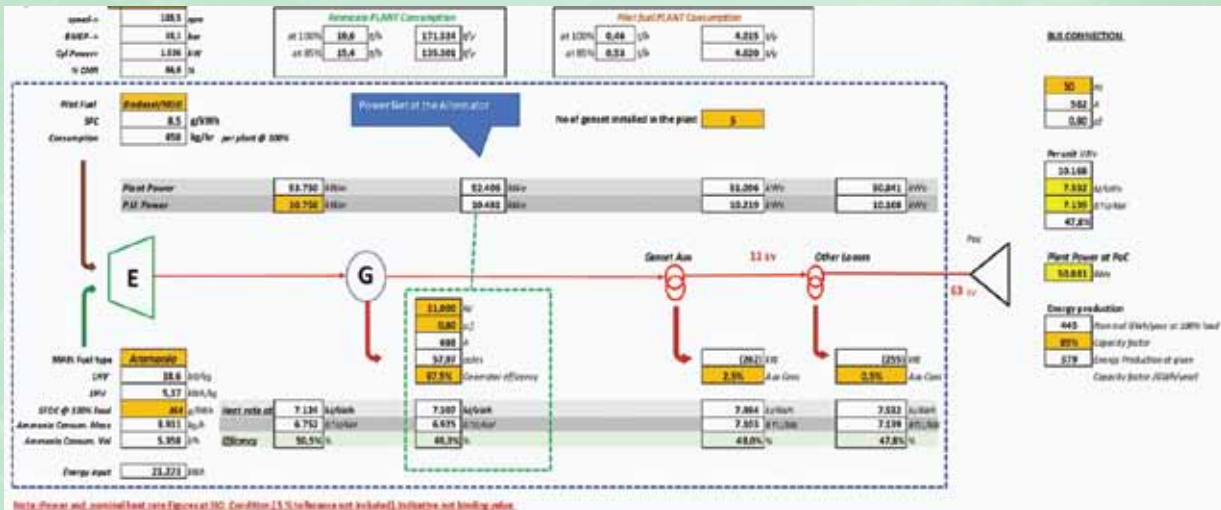
Green Hydrogen Project Ecosystem



Green Hydrogen Clean Energy System Application



50Mw Green Ammonia Genset Fuel And Efficiency Scheme



Green Hydrogen & Green Ammonia Actionable Solutions

- Green Hydrogen / Green Ammonia Genset**
- Green Ammonia Genset
 - Green Ammonia Power Plant
 - Green Ammonia Floating Power Plant
 - Green Hydrogen Blending with Natural Gas for Turbine

- Boiler Co-Firing**
- Coal Power Plant Boiler
 - Diesel-Fired Boiler
 - Process Plant Boiler
 - Industrial Plant Boiler

Smaller Electrolysers Are Skid Mounted

Division	Specification	H2 Generator Model No. (PEM Electrolyzer System)					
		H2 Gen 100	H2 Gen 200	H2 Gen 500	H2 Gen 1000	H2 Gen 2000	H2 Gen XMW
PEM Stack	Rated Power	50kW	100kW	300kW	500kW	1MW	2MW
Hydrogen Production	Volume (Nm ³ /hr) @ system outlet	10	20	60	100	200	400
Water Consumption (Liter/hr)	Tap Water for DI Water	25	50	140	240	480	1,000
	DI Water	11	22	66	110	220	440
Utility (Option)	DI Water (Conductivity)	0.05 ~ 0.1 μ S/cm (Up to 6barg)					
	Cooling Water (kg/h) [based on closed loop]	6,400	12,800	38,000	64,000	128,000	256,000
	Chilled Water (kg/h) [based on closed loop]	90	180	530	880	1,750	3,500
Installation Footprint	Installation Footprint (m ²)	28	28	31	31	62	62
	Containerized Size	30ft x 1ea	30ft x 1ea	40ft x 1ea	40ft x 1ea	40ft x 2ea	40ft x 2ea

Smaller Green Ammonia Plant Are Skid Mounted



Innovative Solutions

EPC-M Group works with stakeholders to come up with innovative solutions for accelerating the energy transition journey utilizing renewable energy and green hydrogen & its derivatives for local and export & developing local green hydrogen eco-systems.

With the support from the network of the green hydrogen industry and good relationships with offtakers, vendors, contractors, equipment specialists, technology holders, logistics, transportation and supply chain, we are set to provide engineering, procurement and construction management services.

With the core competencies in green hydrogen energy systems, we partner with professional technology experts and specialist teams for green hydrogen ecosystems, to meet project requirements.

The renewable energy, green hydrogen energy system and its derivatives like green ammonia are the foundation and backbone of green hydrogen ecosystems to accelerate reduction of greenhouse gas emissions.

The Potential Of Green Hydrogen Market In The World

The primary demand for hydrogen today is for petroleum refining and ammonia production. However, hydrogen can be used across multiple sectors to enable zero or near-zero emissions in other chemical and industrial processes, integrated clean energy systems and transportation. Emerging hydrogen markets within these sectors include data centers, ports, steel manufacturing, medium and heavy-duty trucks.

There is a huge green hydrogen demand from developed countries now, especially in Germany, Europe, Japan, South Korea, Singapore and more.

But the vast economical land, suitable sites and natural resources are found in less developed countries like Indonesia, Vietnam, Africa and others.

Due to the limitations of proven technologies commercially available today, to meet the immediate needs:

- Countries like Indonesia, Vietnam and Bangladesh are the most likely candidates to supply the green hydrogen needs of Japan, Korea and Singapore.
- Countries in Africa and Egypt will be the likely candidates to supply green hydrogen to Germany and Europe.

Also green ammonia and other Liquid Organic Hydrogen Carrier (LOHC) can be used as hydrogen carriers from Asia to Europe, or from Africa to Asia.

These are great opportunities and the Green hydrogen production projects bring much value, creating jobs, bringing technologies, helping to reduce CO2 Emissions and supporting renewable energy projects.

Holistic Approach To Energy Transition Solutions

To accelerate decarbonization transition journey, utilizing renewable energy, Green hydrogen & derivatives for export and developing local green hydrogen ecosystem

- We develop projects for renewable energy, green hydrogen ecosystems, distributed power systems and microgrid solutions, green hydrogen and green ammonia production with local project developers/partners working together with government agencies to address energy transition issues and to move towards environmentally friendly and sustainable solutions.
- In partnership with international green hydrogen technology companies, supply chain & financiers, we support the projects through feasibility studies, developing solutions for end-product with offtakers, to accelerate the project financing, technology selection and project development process, leading to financial closing and project skid or modular construction.

EPC-M Group has a holistic approach incorporating the whole ecosystem of green hydrogen including:

- Renewable energy (like solar, wind, hydro-power, geothermal and others), green hydrogen production, green ammonia, e-methanol, e-methane production, storage, various shipping options using different green hydrogen carriers and green hydrogen derivatives.
- Distributed power, microgrid and other applications.
- Blending green hydrogen to existing gas-fired power plants.
- Export of green hydrogen from less developed countries to more developed countries.
- Working with potential international offtakers from Europe and Asia for the green hydrogen production.

We also work with local project developers to create opportunities for developing and executing the project with maximum local content, bringing vast resources, job creation, skills upgrading and local workforce support.

Energy transition can only accelerate with self-motivated, self-driven and win-win solutions, with benefits for all stakeholders and to propel the industrial zones and local economy towards net zero. It involves several government agencies, updating and gaining their support to endorse and support the green hydrogen clean energy system project development and implementation. At times providing government grants, tax incentives, tax rebate, tax credits, carbon credits, carbon tax exemption and others.

In so doing, EPC-M Group also helps the local market build their local green hydrogen industrial infrastructure and export of green hydrogen.

Green Hydrogen Project Development Investment Plan

Stage 1-Maximising the resources of excess Renewable Energy

- To invest in green hydrogen production plant for export and local consumption.
- To develop green hydrogen ecosystems through distributed power, blending green hydrogen to gas power plants and boiler co-firing.
- Bringing additional income from overseas for the country for the export of green hydrogen to develop the green hydrogen ecosystem locally.
- Creating more demand for local new renewable projects to come online.

Stage 2-Then to develop and own renewable power source together with green hydrogen production, when the local green hydrogen consumption increases to commercial level.

Green Hydrogen/Green Ammonia Project Development Stages

Green Hydrogen / Green Ammonia Project Development-Stage 1						
Stage 1	Geo-politics	Government Investment Board	Govt Approvals, Incentives & Preferential Treatment	Selecting Green H2 Plant Site	National Grid	Remarks
Checklist	Country policy ready for green hydrogen export or domestic consumption	Understanding national green hydrogen strategy, priority & regulations	Priority, preferential treatment, investment & tax incentives for green hydrogen investment	Selecting & partnering local industry for plant site location	Excess renewables availability	Updating government agencies to understand and accept the concept. Needs time to get acceptance
Green Hydrogen/ Green Ammonia Project Development-Stage 2						
Stage 2	Renewables	Local Strong Partner	Stakeholders	Technology Partner	Feasibility Studies	Remarks
Checklist	Working groups	Need local partner who understands national green hydrogen strategy, priority & regulations	International and local project developers interest to be stakeholder	Selecting & partnering international technology companies	Form green hydrogen work groups	Designing the right project development strategy
Green Hydrogen/ Green Ammonia Project Development-Stage 3						
Stage 3	Technology Selection	Costing & Budget	Maximum Local Content	Local Skid/Module Fabrication	Off-taker Product Preference	Remarks
Checklist	The right green hydrogen technology selection depends on Offtaker end product preference	Technology & supply chain costing & budgeting.	Skid or modular design project execution planning	Creating local Job opportunities and technology transfer	Offtaker or user end product receiving infrastructure, project execution plan, pricing & funding	Technology & costing
Code Certification						
Green Hydrogen/ Green Ammonia Project Development-Stage 4						
Stage 4	Off-Taker	Finalizing Product Delivery, Transportation & Shipping	Delivery, Transportation & Shipping Technology	Off-taker Receiving, Storage & Distribution	Off-take Agreement	Remarks
Checklist	Off-taker end-product preference & receiving infrastructure & logistics	Selecting the optimal delivery & shipping configurations	Selecting & deploying technology to be used for delivery, transportation & shipping	Designing solution for offtaker for receiving, storage & distribution	Finalize supply agreement with offtaker	Finalizing agreement with offtaker
Green Hydrogen/ Green Ammonia Project Development-Stage 5						
Stage 5	Funding	FEED	EPC	Green Hydrogen/Green Ammonia Production & Delivery	Transportation & Delivery	Remarks
Checklist	Finalize funding term-sheet & agreement. financial closing	Complete front end engineering design	Start engineering procurement construction	Green hydrogen / green ammonia production & delivery	Transportation & shipping	Project execution & supply of green hydrogen / green ammonia

EPC-M Green Hydrogen/Derivatives & Renewable Energy Experience List

Green Hydrogen and Green Ammonia

Indonesia

- 35,000 tpa (tons per year) green hydrogen production & storage.

Our team and technology partner performs plant site identification, determining green hydrogen plant configuration, assessing land parcel and site feasibility, capex & opex estimation and levelised cost of hydrogen (LCOH) calculation for the plant.

- Renewable power source from solar, wind, geo-thermal and hydropower mix from the grid with renewable certificates.

Vietnam

- 180,000 tpa (tons per year) green ammonia production & storage.
- Our team and technology partner performs green hydrogen plant configuration, assessing land parcel and site feasibility, capex & opex estimation and levelised cost of hydrogen (LCOH) calculation for the plant.
- Renewable power source from solar, wind, hydropower mix from the grid with renewable certificates.

Renewable Energy

Uganda

- Completed feasibility study relating to the development of a proposed 50MWp.
- With the potential to upscale capacity to 200MWp.
- For ground-mounted solar pv power plant.

Project Development Key Considerations

Renewable Green Power Generation

Green Hydrogen Production Plant

Green Hydrogen Logistics, Transportation & Shipping

Offtake End Product Requirements

Distributed & De-centralized Power systems

Applications: Green Hydrogen / Ammonia Gensets, Boiler Co-Firing,
Green Hydrogen Blending with Existing Natural Gas To Feed Power Plants

The EPC-M Group

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