

IHI Group's Efforts to Build an Ammonia Value Chain

IHI

November 2023

IHI Corporation

IHI Corporation Company Profile



Year of establishment

1853

170 years anniversary !!



Number of employees
(consolidated)

28,801



Revenue(Consolidated)

US\$ 96.636 bil. (@¥140)

(fiscal year 2022)





Committed to helping our clients meet their carbon reduction goals



Engineering

We provide a full range of engineering and design services using cutting edge technology to provide the best option for the duration of the project lifecycle.

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Procurement

We procure equipment, materials and services from around the world, ensuring the highest standards for quality are maintained and meeting the complex demands of the project schedule.

[DISCOVER NOW](#)



Construction Management

We safely deliver construction services, whether direct-hire or through subcontractor management, offering our clients a single-source solution for the construction of their facilities.

[DISCOVER NOW](#)



Project Management

The heart and soul of our projects lies within the expertise of our project management team. Our team acts as the central facilitator between all project participants, providing effective execution strategy, supporting our clients and focusing on both short and long-range project goals.

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Commissioning

To achieve successful start-ups and sustained operations, we utilize highly specialized teams to manage the relationships of all project delivery resources and stakeholders from design to initial start-up.

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Consulting

We leverage our expertise to provide problem-solving, innovation and alternative solutions in all the markets we serve. Our spirit of collaboration brings a fresh perspective to our clients' current challenges.

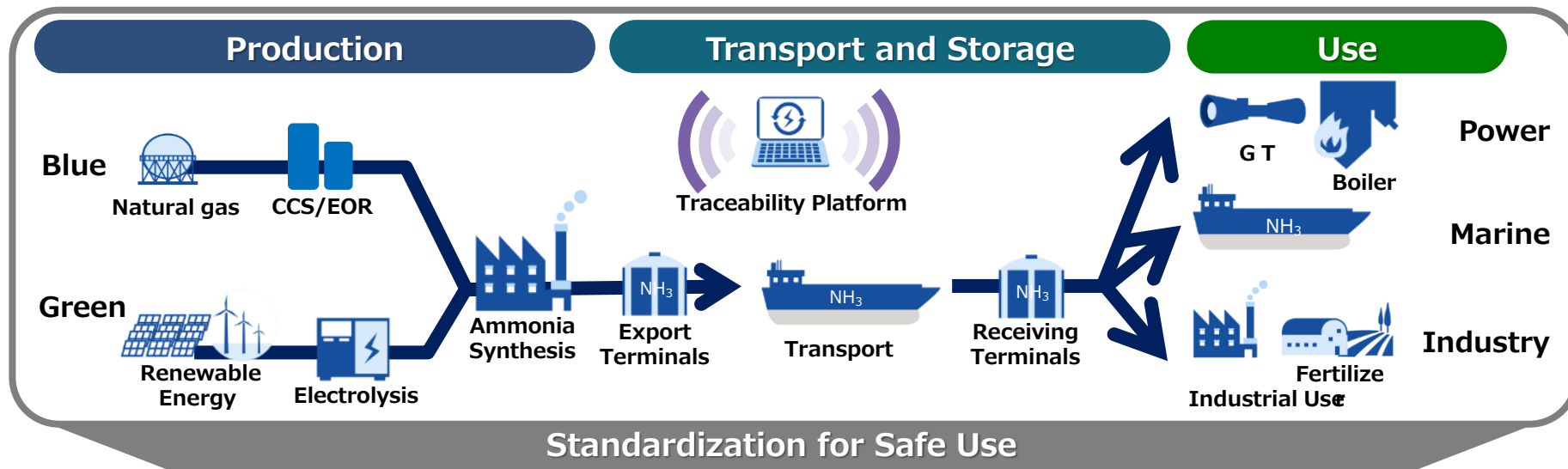
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Serving various energy markets:

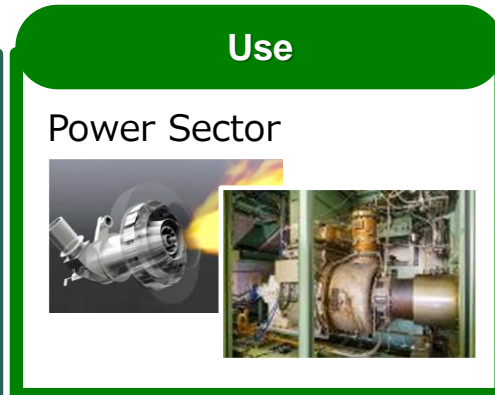
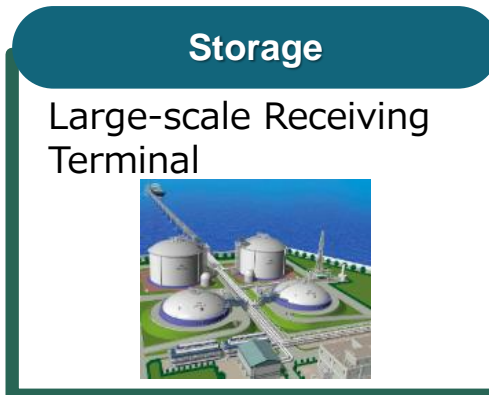
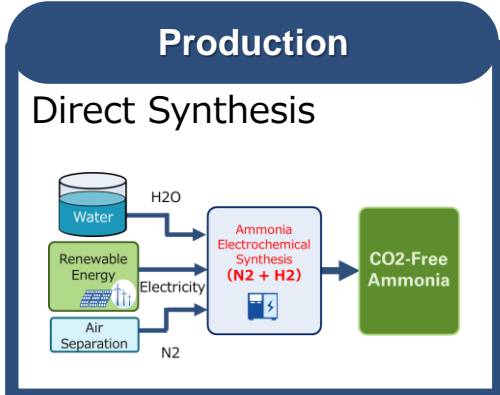
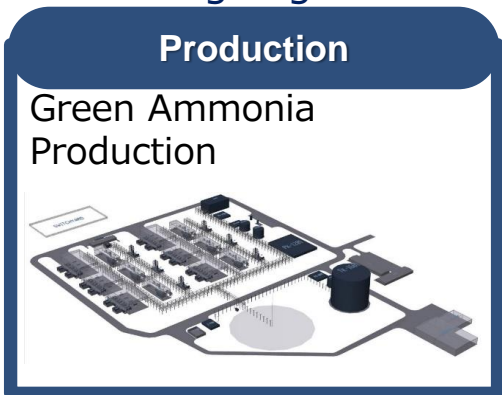
- Clean Energy
- Carbon Capture & Utilization
- Thermal Energy Storage
- Syngas and Derivatives
- LNG
- Midstream
- Petrochemicals and Polymers
- Steam Generation

Specializing in Feasibility Studies, Pre-FEED, FEED, Detailed Engineering Design and Owner's Engineer Services

Building Fuel Ammonia Businesses Through New Value Chains



➤ IHI's ongoing activities



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Large-scale Ammonia Receiving Terminal

IHI Starts Developing Large Ammonia Receiving Terminal to Help Establish Large Ammonia Supply Chain

- Oct. 5, 2021 -

Press Release



Global Activities for Ammonia Firing (in India)

IHI and Partners to Explore Ammonia Firing at Indian Thermal Power Plant as Part of Japanese National Project

◆ Project Outline <NEDO JPNP93050>

Conducting the market research in India and studying the technical and economic feasibility of initiating 20% ammonia firing by demonstration at the existing boiler (supported by NEDO)

◆ Goal

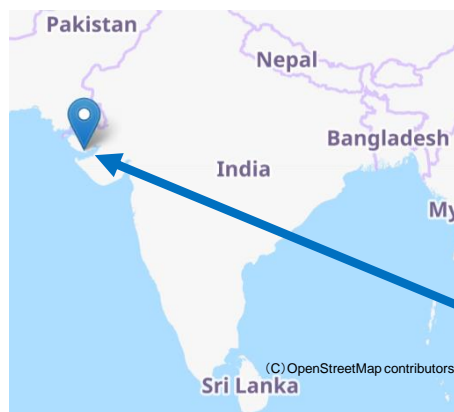
Prove the potential of ammonia firing technologies at an existing facility (Other OEM manufactured boiler)

◆ Schedule

- FY2022~FY2024 (Basic study & Feasibility study)
- After being evaluated for business by external experts
FY2024~around FY2027 (Demonstration)

◆ Plant where the demonstration carried out

Adani Power Limited's Mundra Power Plant Unit 1



Mundra Power Plant



https://www.ihico.jp/en/all_news/2021/resources_energy_environment/1197687_3360.html

[OpenStreetMaphttps://www.openstreetmap.org/?mlat=22.8227777777778&mlon=69.5527777777778&zoom=5#map=4/22.19/55.63&layers=T](https://www.openstreetmap.org/?mlat=22.8227777777778&mlon=69.5527777777778&zoom=5#map=4/22.19/55.63&layers=T)

https://www.mofa.go.jp/np/nsp/page1e_000402.html

Global Activities for Ammonia Firing (in Indonesia)

IHI Initiates Southeast Asia's First Ammonia Firing Pilot Facility at Operational Power Plant

◆ Project Outline

Technical and economic feasibility study through ammonia firing with fossil fuels at an operating unit in Indonesia, supported by The Association for Overseas Technical Cooperation and Sustainable Partnerships (AOTS) and AEM-METI Economic and industrial Cooperation Committee (AMEICC)

◆ Goal

To prove the potential of ammonia firing technologies at an existing facility (other OEM's boiler) and the feasibility of deploying a range of facilities for ammonia firing, and foster the swift adoption of fuel ammonia

◆ Schedule

FY2022

◆ Plant where the demonstration carried out

PNP's Gresik Thermal Power Plant

(*) PT PLN Nusantara Power (PNP):

a wholly owned subsidiary of PT Perusahaan Listrik Negara (PLN), Indonesia's state-owned electric power company



PNP's Gresik Thermal Power Plant

Fuel Ammonia Utilization in Coal-Fired Power

IHI Mono-Fires Ammonia with Low Nitrogen Oxide Emissions in Breakthrough toward Commercial Use at Power Plant Boilers

- May 17, 2022 -

Press Release



Gas Turbine using 100% Liquid Ammonia

株式会社IHI原動機
IHI Power Systems Co., Ltd.

**CO₂-free power generation achieved with
the world's first gas turbine using 100% liquid ammonia
–Reduction of over 99% greenhouse gases during combustion–**

- Jun 16, 2022 -

Press Release



JPNP21020

Gas Turbine using 100% Liquid Ammonia

GE and IHI Sign Memorandum of Understanding to Develop Gas Turbines that Can Operate on 100% Ammonia

- Jan 18, 2023 -

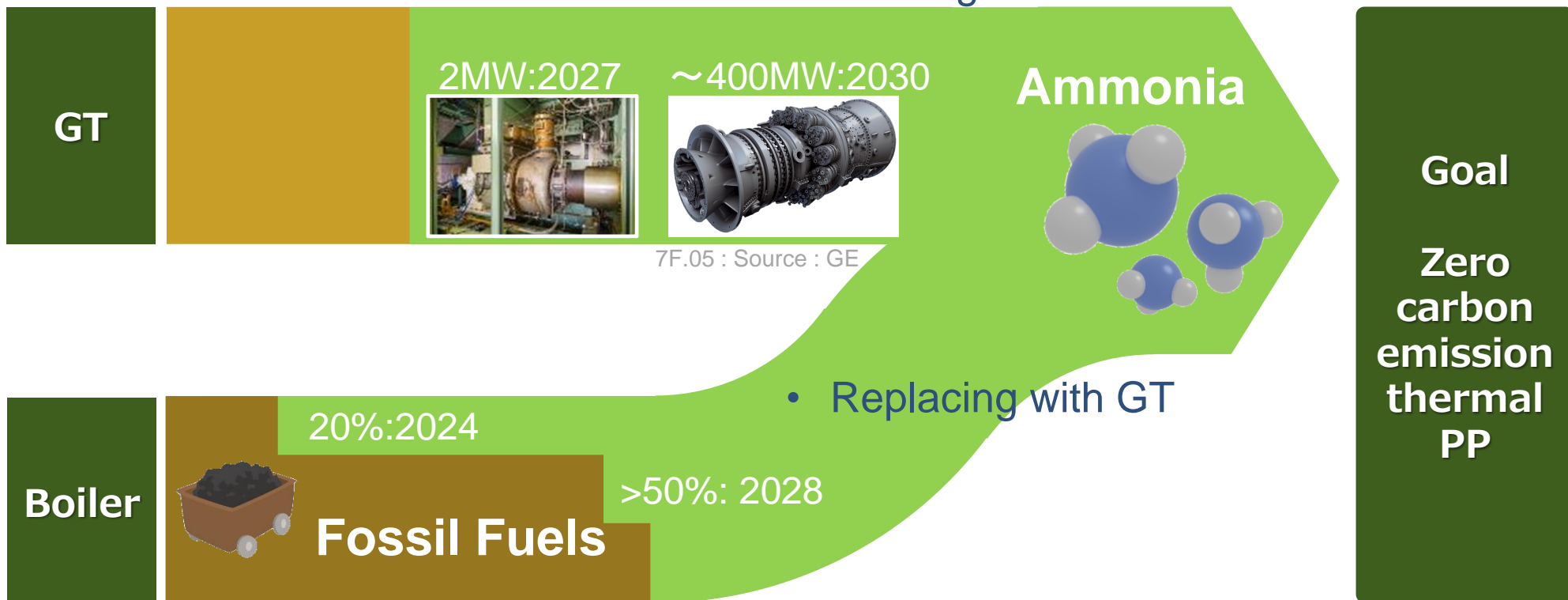
Press Release



7F.05 : Source: GE

IHI's Decarbonization Roadmap in Power Sector

- Retrofit of Ammonia firing



- Stepwise increase of co-firing ratio toward zero CO₂ emission



Ammonia-Fueled Engine

Maritime Consortium Successfully Completes Ammonia Co-Firing Test Using Cutting-Edge Ammonia-Fueled Engine

– Towards the Realization of GHG Reduction through the Use of Fuel Ammonia in a Domestic Ship Engine –

株式会社IHI原動機
IHI Power Systems Co., Ltd.

- May. 16, 2023 - Press Release



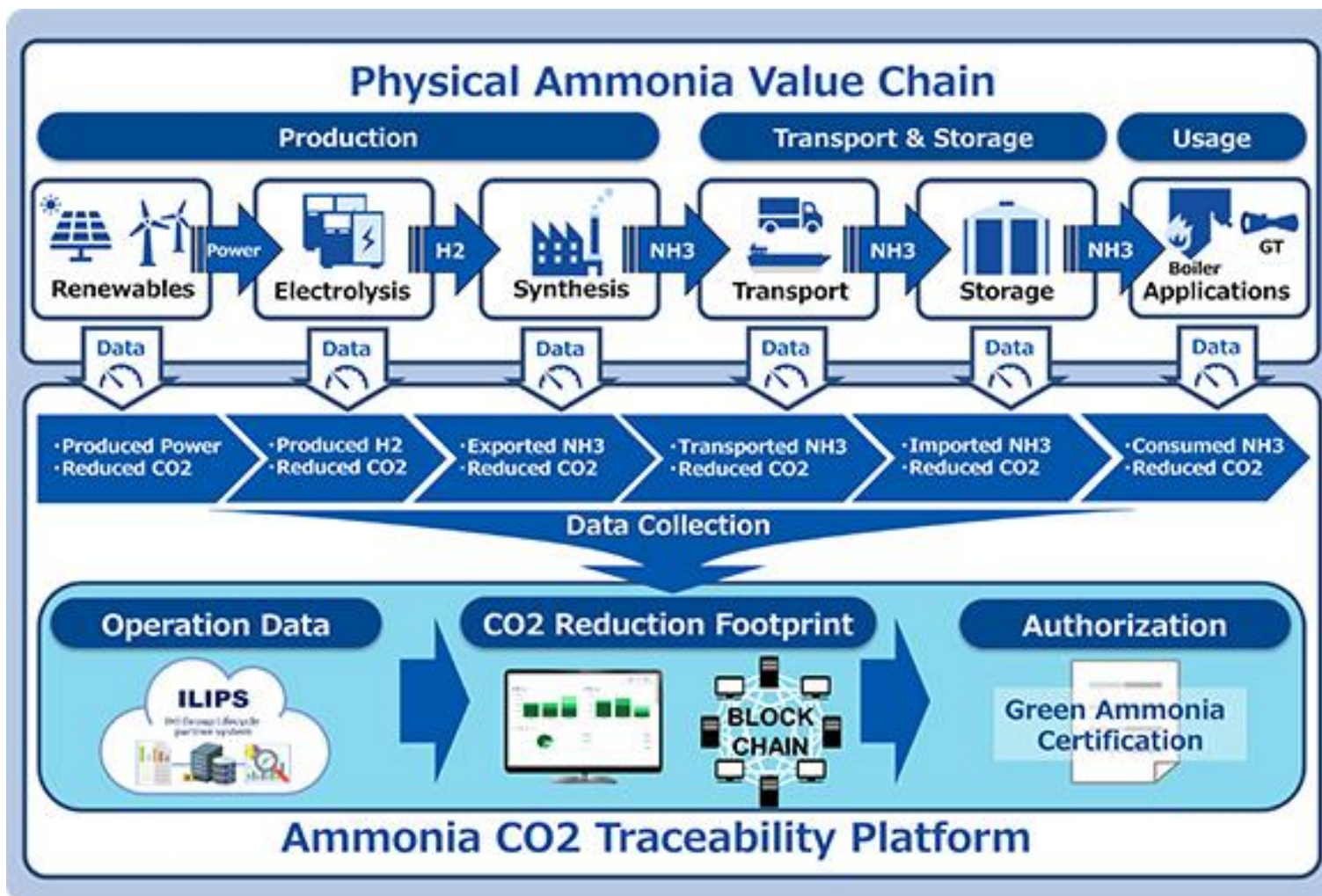
NEDO:JPNP21014

Establishing Ammonia CO2 Traceability Platform

IHI Begins Demonstrating Platform Leveraging Blockchain Technology to Quantify Carbon Dioxide Emissions Across Ammonia Value Chain

- Oct. 31, 2022 -

Press Release



IHI
Realize your dreams