JOGMEC

IEF Thought Leaders' Roundtable Transport Sector Sustainability:
Outlooks on Energy Demand and Sustainable Fuels

SESSION 2: Scaling Sustainable Fuels through Clean and Efficient Technologies

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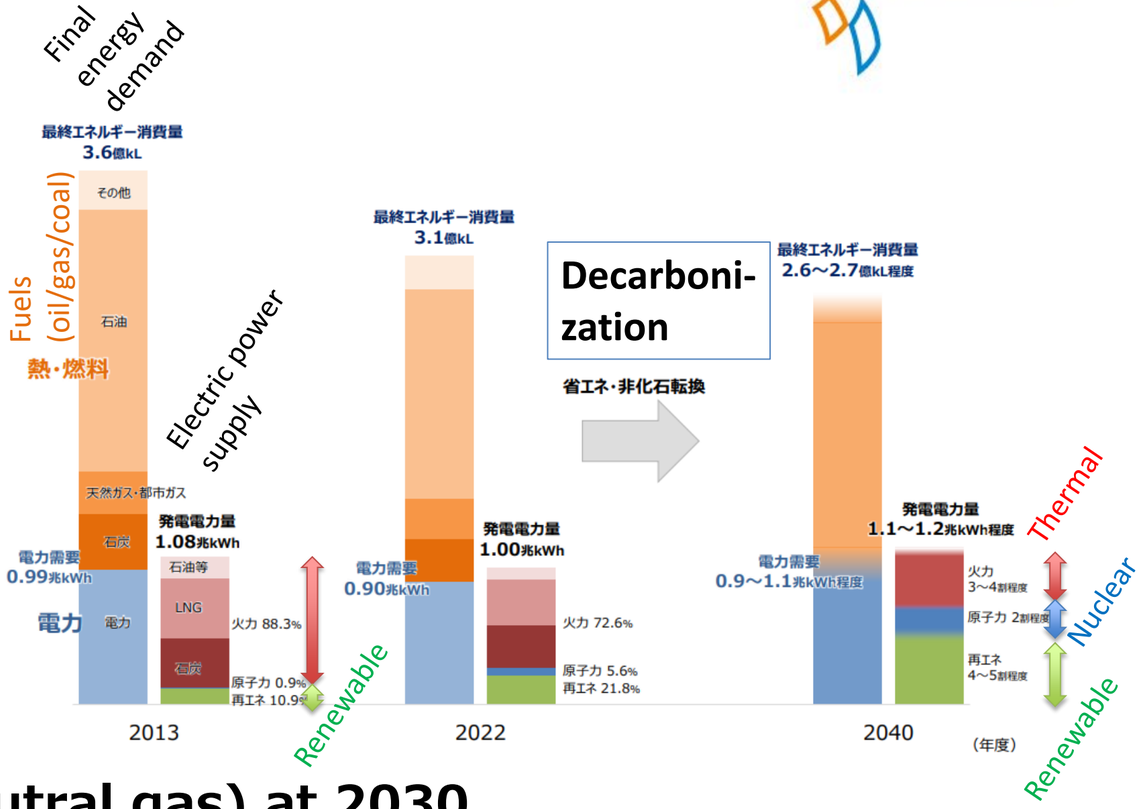
7th Strategic Energy Plan – Draft by METI (Dec. 2024)

- ✓ **Supply side**
  - ✓ **Decarbonization of electric power supply**
    - ➢ **40-50% renewable, 20% nuclear@2040**
  - ✓ **Hydrogen and Anmonia:**
    - ➢ **1% of power generation mix in FY2030.**
    - ➢ **3 MMTPA H_2** incl. **3 MMTPA NH_3 in 2030,**
      - ➢ JPY 30/Nm^3-H_2@2030
    - ➢ **12 NNPTA H_2**
    - ➢ **20 MMTPA H_2** incl. **30 MMTPA NH_3 in 2050**
      - ➢ < JPY 20/Nm^3-H_2@~2050)
  - ✓ **Synthetic methane**
    - ➢ **'30s: fundamental technologies,**
      - ➢ **1% of utility gas (part of 5% carbon neutral gas) at 2030**
    - ➢ **'40s: Mass production technologies**
  - ✓ **Bio fuel and e-fuels:**
    - ➢ **10% conc. low carbon gasoline supply by 2030, 20% conc. by 2040** (limited region)
    - ➢ **SAF@2030 covers 5% of GHG emission of 2019**
    - ➢ **Bio-diesel**
    - ➢ **e-gasoline (automobile)/methanol (maritime)/e-SAF (aviation)**



https://www.enecho.meti.go.jp/en/category/brochures/pdf/japan_energy_2023.pdf

Status of decarbonization technologies in transportation sector – METI 2021 and 2024

	Passenger vehicle	Commercial vehicle	Auto Bus	Maritime	Aviation	Railway
CO2 emission (2018)	102 MMTPA	77 MMTPA	4 MMTPA	11 MMTPA	11 MMTPA	1 MMTPA
Current status of decarbonization strategy	Commercialization of EV and FCV	Demonstration of EV and FCV	Partly commercialization of EV and FCV	R&D stage	R&D stage	Commercialization of battery train
		Demonstration for commercialization		FS of FCV vessel FCV/EV/H2/H2NH 3 ICV Commercialization of zero emission vessel by 2028	Electrification and H2 craft Bio fuel	
	RD of other technologies that can be retrofitted to current ICV system (synthetic fuels etc.)					
Decarbonization approach	**Electrification with decarbonization of electricity supply** Carbon neutral fuels Mass production of battery technologies, improvement of performa			**Innovation Mandatory**		Effort for liferation

SAF: 200 MTPA reduction
JPY 34T in coming 10 year

Manufacturing
1.7 MTPA
reduction
JPY 4T in
coming 10
year

SAF: 2
MTPA
eduction
PY 1T in
oming 10
year

Modified from https://www. energy/pdf/030_01_00.pdf
https://www.meti.go.jp/shingikai/sankoshin/seizo_ /015_02_00.pdf

Options and Pros/Cons ~ Technical challenge

Battery

Proven
Flexibility

Heavy
Metal supply

Long history
of usage

Safety issue
NOX N2O

Ammonia

Transportation:
Scattered all over
Personalized
Used in remote/distant location
Not centralized/connected

Maximum effort to utilize current supply value

Hydrogen
IC

Hydrogen
FC

Partly
Proven

H2 Supply
chain

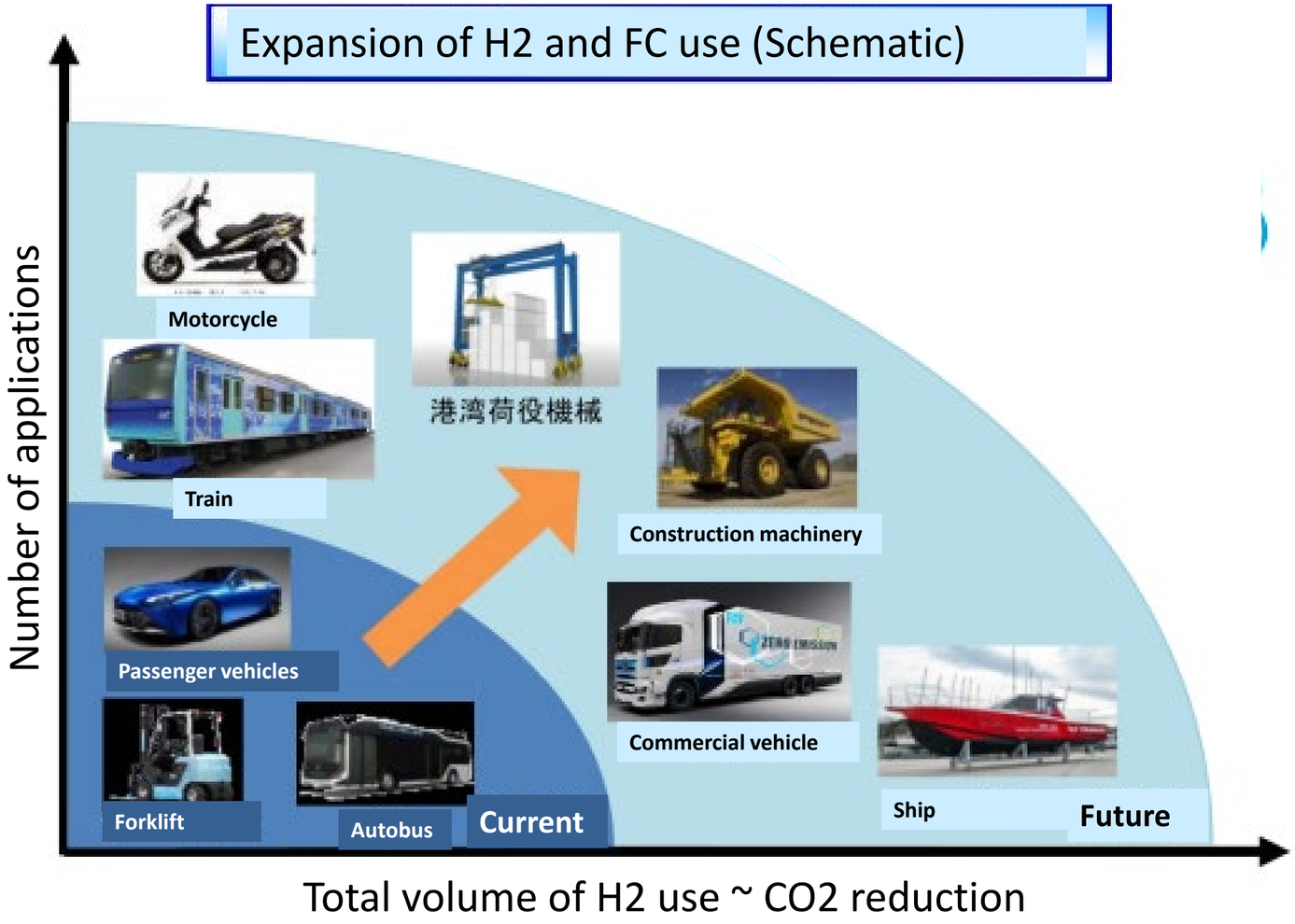
Minimum
modification

Cost esp. H2
supply

Bio fuel

E-fuel

Hydrogen for transport: Issues to be solved



1.Reduction of manufacturing costs: The production costs of fuel cells and hydrogen tanks are high

2.Infrastructure development: Hydrogen system including stations/pipeline/ vessel/vehicle/tank.

3.Reduction of refueling time: hydrogen refueling takes longer

4.Ensuring safety: Hydrogen is stored at high pressure, so safety technologies to reduce the risk of leaks and explosions are crucial.

Addressing these challenges requires technological innovation as well as cooperation between governments and companies.

https://www.enecho.meti.go.jp/en/category/brochures/pdf/japan_energy_2023.pdf

Maritime: H2 FC vessels

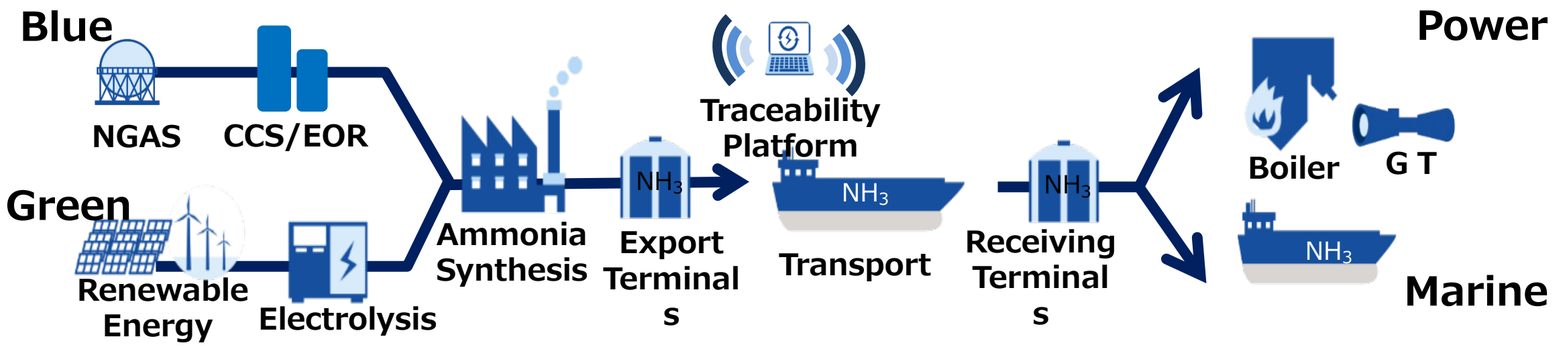
【HANARIA】 Motena-sea
248 ton 33 x 10 m　draft: 1.4 m
Max speed ~10.5 knots
Commercially used in Moji port (Kyushu Japan) as a cruise ship
Selectable from H2 Fuels cell/Battery/Bio diesel

【MAHOROBA】 Iwatani Corp.
177 ton 37 x 8 m　draft: 1.4 m
Max speed ~10.5 knots
Transportation for Japan Expo 2025 in Osaka
Fuels cell

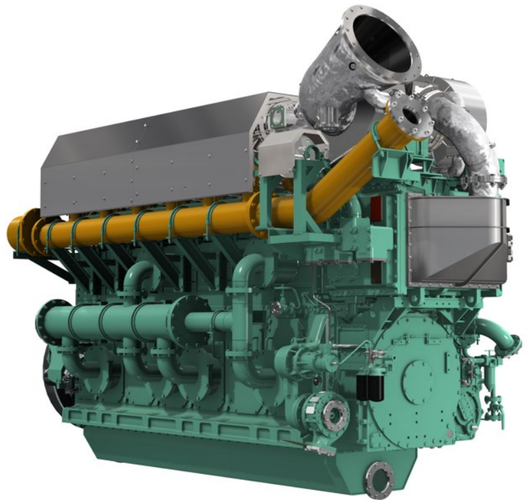
https://www.enecho.meti.go.jp/en/category/brochures/pdf/japan_energy_2023.pdf

Ammonia Fueled Tugboat

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



Courtesy of IHI and IHI Power System Inc.



Ammonia firing four-stroke dual fuel engine (28ADF, 2,200PS)

NYK Line

Ammonia-fueled tugboat Sakigake

- The world's first commercial-use ammonia-fueled tugboat was delivered to the Port of Yokohama in August 2024
- Max. heat rate of 95% NH3 co-firing ratio and GHG reductions over 90%.
- NH3 and N2O are sufficiently removed by the exhaust gas after-treatment system
- The world's first classification approval by Class NK and IMO NOx certification

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

Technology Roadmap of Ammonia Fueled Engine

Green Innovation Fund / Next-generation Ship Development Project

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

A-Tug (Ammonia Fueled Tug- Boat)

ClassNK Nippon Kaiji Kyokai: Safety assessment, Fundamental research for guidelines, Support for regulation clearance

Item	Assignment	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Main Engine	株式会社IHI原動機 IHI Power Systems Co., Ltd. IHI Power System	4-stroke engine development & fabrication, shop trial etc.			Delivery			
Ship Design & Buildings 2 units	NYK LINE NYK Line	Hull Design, buildings, sea trial etc.						
Operation	NYK LINE NYK Line	Regulation clearance, formulate operation manuals etc.				Demonstration & Commercialization		

Land Use

AFAGC (Ammonia Fueled Ammonia Gas Carrier Vessel)

ClassNK Nippon Kaiji Kyokai: Safety assessment, Fundamental research for guidelines, Support for regulation clearance

Item	Assignment	FY21	FY22	FY23	FY24	FY25	FY26	FY27
Main Engine	J-ENG Japan Engine Corporation	2-stroke engine development & fabrication, shop trial etc.					Delivery	
Aux. Engine	株式会社IHI原動機 IHI Power Systems Co., Ltd. IHI Power System	4-stroke engine development & fabrication, shop trial etc.						
Ship Design & Buildings	NSY Nihon Shipyard	Hull Design, buildings, sea trial etc.						
Operation	NYK LINE NYK Line	Regulation clearance, formulate operation manuals, business model evaluation etc.					Demonstration & Commercialization	

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Financial Support to E-fuel Projects in the USA by JOGMEC

- **HIF Global LLC: one of the leading E-fuel companies located in Houston, USA**
  - ✓ 36 Million dollar will be invested through Idemitsu Efuel America Corp. (IEAC)
- **Infinium Holdings, Inc.: World's largest eSAF production facility in Texas, USA.**
  - ✓ JOGMEC and Mitsubishi Corp. participate in the Series C round of Infinium Holdings, Inc. for second commercial-scale facility.

➢ Thank you


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Leading the Way for
Next-Generation Technologies fo
a Carbon-Neutral Society


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検索
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チャンネル登録者数 4430人
登録済み
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