IEA and IAE Hydrogen in the Energy System Decarbonization

# International Hydrogen Supply Chain and Gas Turbine Demonstrations

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#### Dr. Motohiko Nishimura

**Executive Officer** 

**Deputy General Manager, Hydrogen Strategy Division** 

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Motohiko Nishimura has been Executive Officer, Deputy General Manager of Hydrogen Strategy Division since April 2021.

He joined Kawasaki Heavy Industries, Ltd. in 1987 and was engaged in design, research and development on power plant, thermal-hydraulics and combustion.

He was appointed as Senior Manager of Thermal Technology Department in 2010 and led R&D on energy plant and system, reciprocal engine, jet engine and so on, including the super charged engine of Ninja H2R.

Then he became Senior Manager of Hydrogen Project Department in 2013 and has been working on business development for hydrogen energy supply chain.

He has also served on CO2-free Hydrogen Energy Supply Chain Technology Research Association (HySTRA) since 2016.



# INITIATIVE BY GLOBAL COMPANIES

## Hydrogen Council

- A global CEO-level initiative with a united vision and long-term ambition for hydrogen to foster the energy transition.
- Composed of 123 leading companies from energy, transportation, manufacturing industry, trading and financial sectors.
- Launched during the 2017 World Economic Forum in Davos



## CONCEPT OF A CO<sub>2</sub>-FREE HYDROGEN CHAIN

#### Producing country (Australia, · · · )

#### Utilizing country (Japan)



Powering your potential

# **Pilot Project Structure**

Kawasaki is working with a number of partners on the pilot project supported by the governments of Japan and Australia.



\*NEDO : New Energy and Industrial Technology Development Organization

# STATUS OF THE PILOT DEMONSTRATION PROJECT

#### Hydrogen Production (Australia)

Latrobe Valley, Victoria Managed by J-Power and J-Power Latrobe Valley



#### Maritime Transportation



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#### Land Transportation and Liquefaction(Australia)



Unloading and Storage





### STATUS OF THE PILOT DEMONSTRATION PROJECT: HYDROGEN PRODUCTION Hydrogen Production (Australia)

Latrobe Valley, Victoria



J-Power and J-Power Latrobe Valley achieved High purity, 99.999%, hydrogen made from Victorian Coal.

Ceremony was held at Latrobe Valley on 12th, March, 2021 for this monumental world's first success.





## Hydrogen Gas Turbine

#### (Kobe Port Island)





Powering your potential

## Heat and Power Delivery Demonstration



Energy delivery capability
Electric Power : Approx. 1,100 kW
Heat : Approx. 2,800 kW

Heat and power supply at the urban area using a hydrogen fueled gas turbine has been achieved in April 2018 (World first!).



# SCALING UP OF HYDROGEN TRANSPORTATION AND UTILIZATION





# APPROVAL IN PRINCIPAL FOR LARGE-SCALE TRANSPORTATION OF LIQUEFIED HYDROGEN

Kawasaki Develops Cargo Containment System for Large Liquefied Hydrogen Carrier with World's Highest Carrying Capacity—AiP(Approval in Principal) Obtained from ClassNK, April 2021.





Large liquefied hydrogen carrier (cargo carrying capacity: image of  $40,000 \text{ m}3 \times 4 \text{ tanks}$ )



# Hydrogen Supply Chain for Decarbonization

## Stable Supply

Hydrogen from fossil fuel linked with CCS will realize vast and affordable energy supply

Contribute energy security

## Environmental

■ No CO<sub>2</sub> emissions when used

## Economy

- Decarbonization brings Industrial growth
- Hydrogen production started from fossil fuel shifted to the renewables in the future
- $\rightarrow$  Creating job opportunity

→ "Carbon Neutrality"

→ Sustainability

## Clean Hydrogen implementation in Japan

Start from 420,000 ton/year in 2030 200 billions ton/year in 2050

## FURTHER DEVELOPMENT OF HYDROGEN-RELATED PRODUCTS/BUSINESSES





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