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Way to Decarbonization

Kawasaki Hydrogen Road

Toward large volume hydrogen utilization essential for decarbonization

Energy system only with renewables and battery storage has a limit for energy scale, facility cost and applications.

Liquefied hydrogen enables large amount, long-distance, long-term transportation and storage of energy and connects multiple sectors.

With extremely wide range of industries involved in hydrogen supply chain and demand field, hydrogen is highlighted worldwide due to creating a virtuous cycle for environment and economy.

Kawasaki Heavy Industries contributes to achievement of decarbonization as the sole company in the world that owns the whole hydrogen supply chain technology for production, transportation, storage and utilization.

Products of Kawasaki Heavy Industries

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Ship & Offshore
Structure



Rolling Stock



Aerospace Systems



Energy System &
Plant Engineering



Motorcycle & Engine



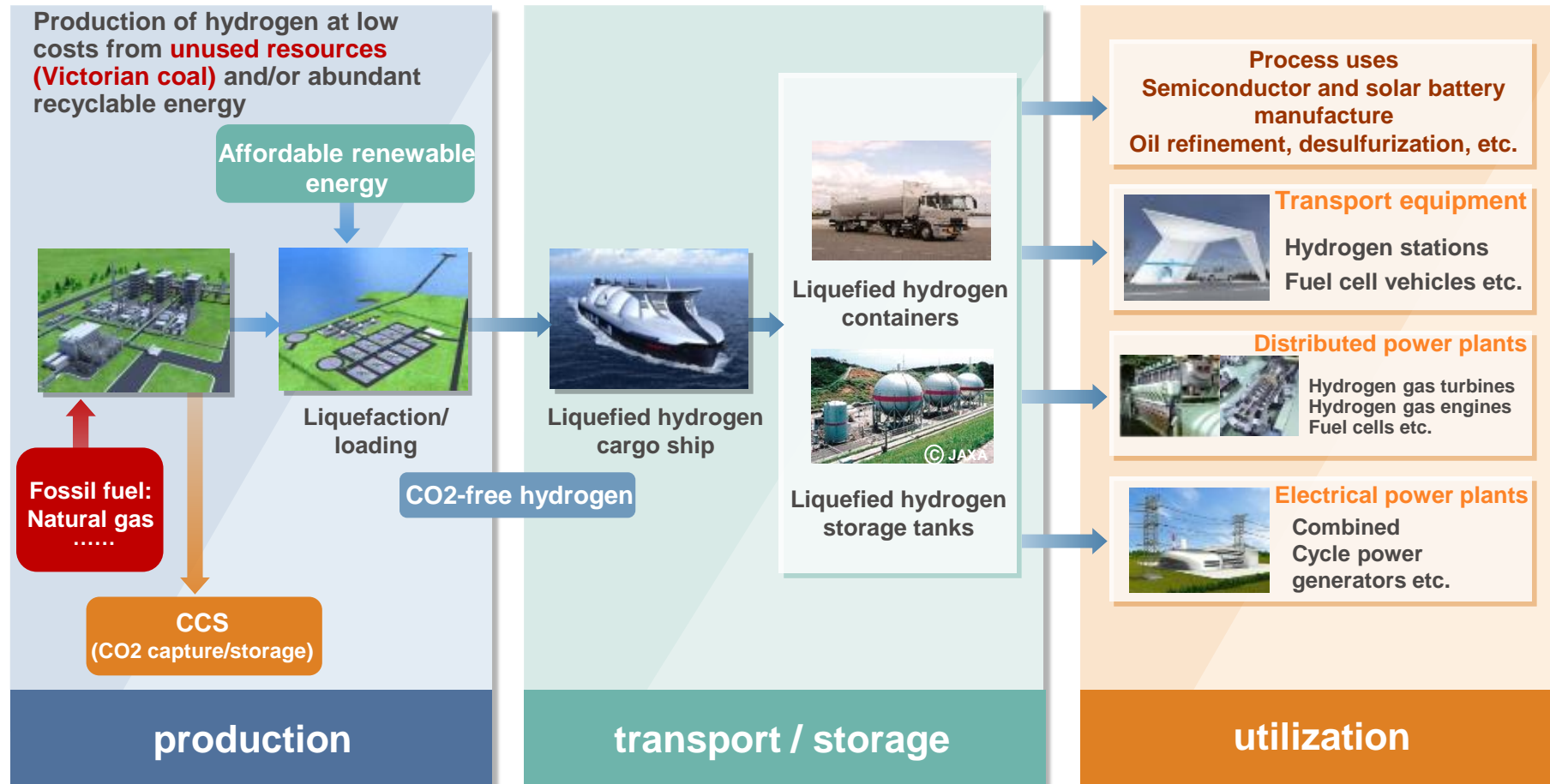
Precision Machinery & Robot

Concept of CO₂-free Hydrogen Chains

Stable energy supply while suppressing CO₂ emissions

Producing country (Australia, . . .)

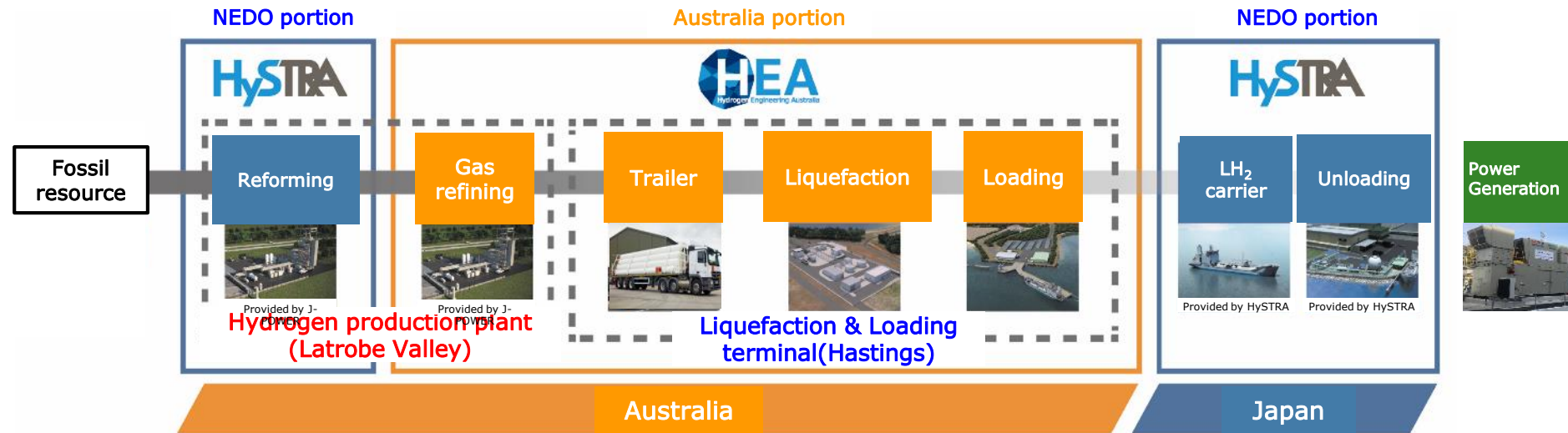
Utilizing country (Japan)



Pilot Project Structure

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



CO₂-free Hydrogen Energy Supply-chain
Technology Research Association

Iwatani, Kawasaki, Shell Japan, J-Power, Marubeni,
ENEOS, KLINE

Supported by NEDO

*NEDO : New Energy and Industrial Technology Development
Organization

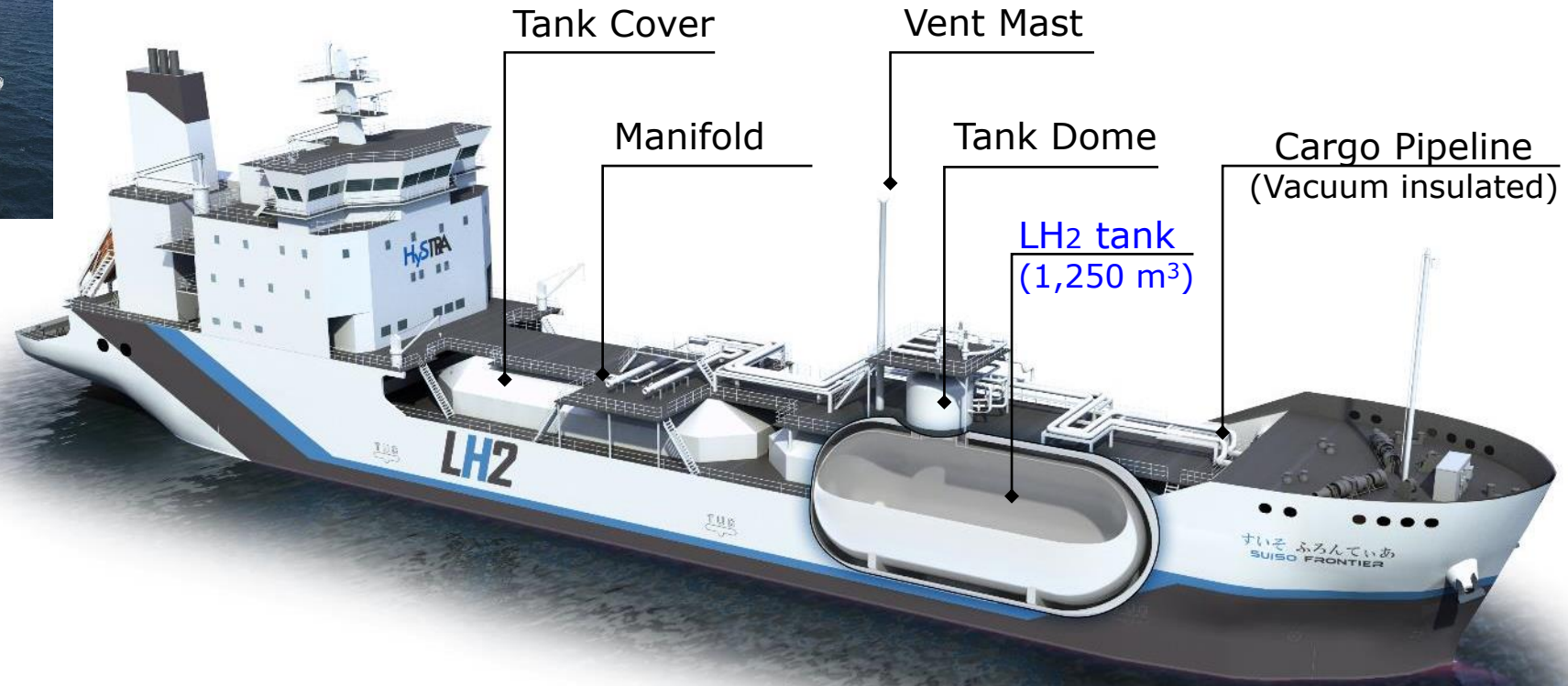


Hydrogen Engineering Australia

Kawasaki, J-Power, J-Power group, Iwatani,
Marubeni, Sumitomo, AGL

Liquefied Hydrogen Carrier "Suiso Frontier"

Suiso: Hydrogen in Japanese



Length	116 m	Speed	13 knot
Width	19 m	Draft	4.5 m
Max crew	25 person	Propulsion	Diesel electric

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LH₂: Liquefied Hydrogen

LH2 Receiving Terminal

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LH2: Liquefied Hydrogen



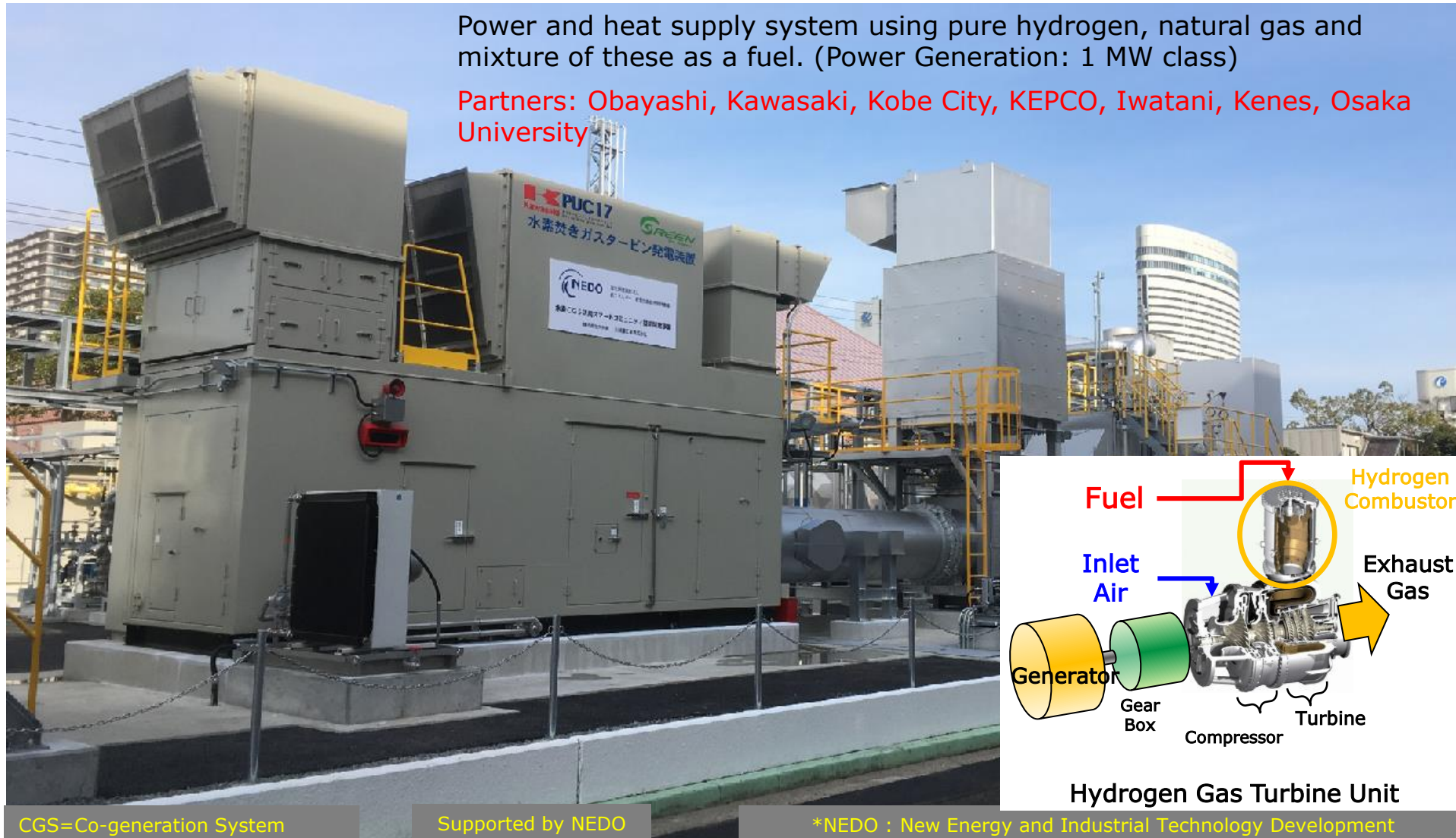
Hydrogen Gas Turbine

(Kobe Port Island)

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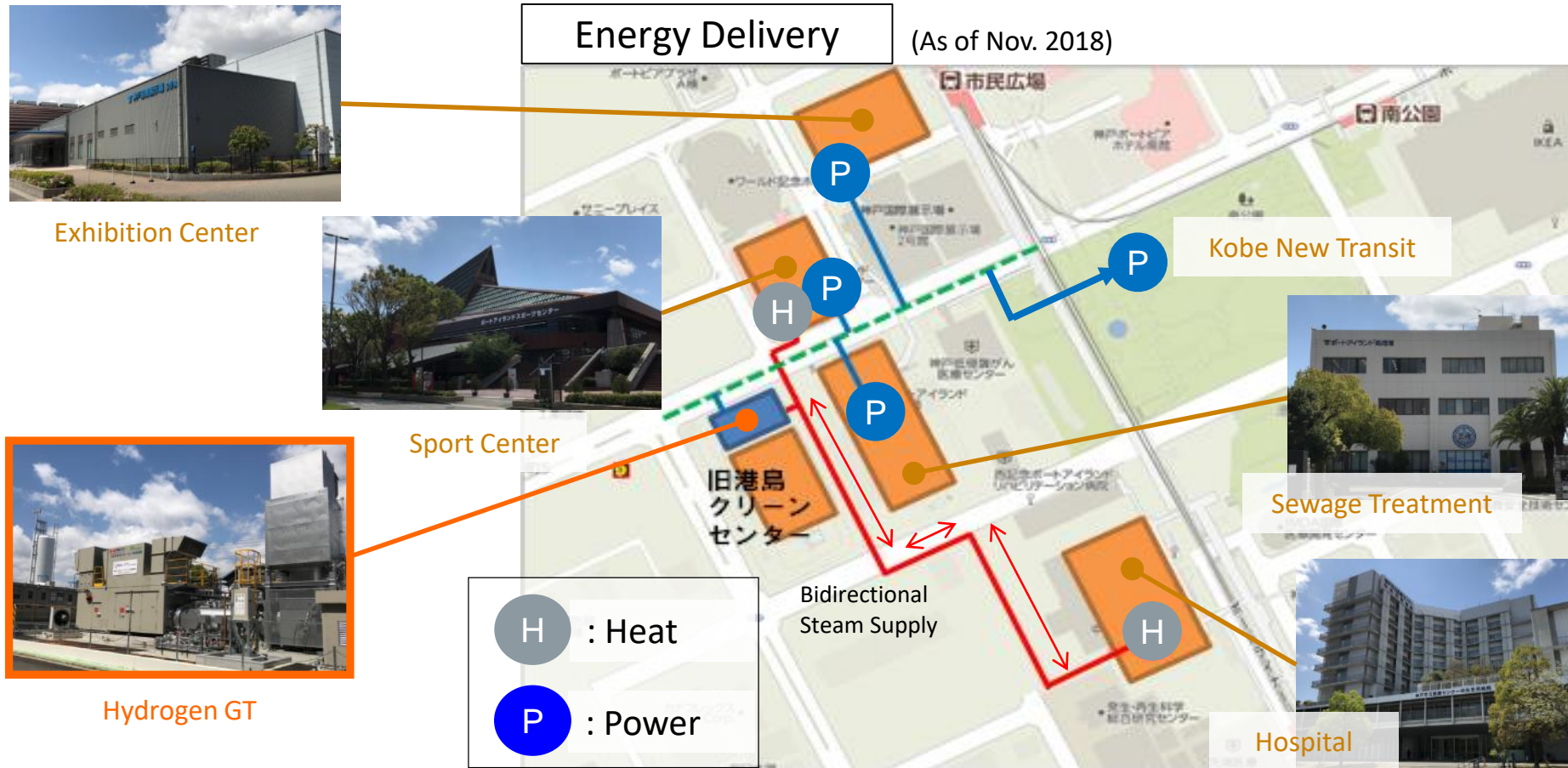
Power and heat supply system using pure hydrogen, natural gas and mixture of these as a fuel. (Power Generation: 1 MW class)

Partners: Obayashi, Kawasaki, Kobe City, KEPCO, Iwatani, Kenes, Osaka University



Heat and Power Delivery Demonstration

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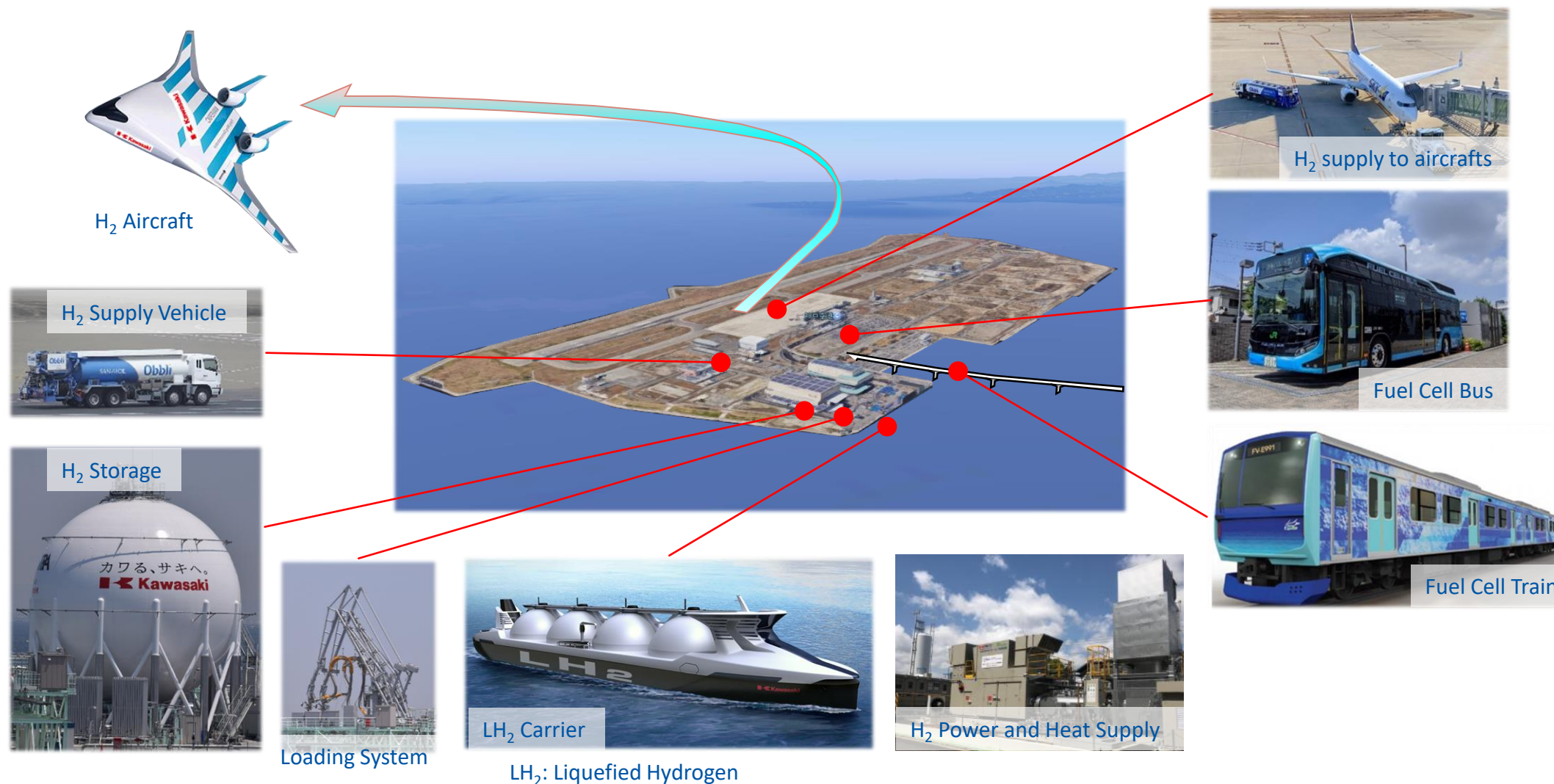


■Energy delivery capability
 Electric Power : Approx. 1,100 kW
 Heat : Approx. 2,800 kW

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

Hydrogen(H₂) Infrastructure at an Airport

The airport will be a hub of clean energy and economy



Hydrogen Supply Chain for Decarbonization

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1 Stable Supply

- Hydrogen from fossil fuel linked with CCS will realize vast and affordable energy supply → Contribute energy security

2 Environmental

- No CO₂ emissions when used → "Ultimate clean energy"

3 Improvement of Industrial Competitiveness

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

4 Clean Hydrogen implementation in Japan

- Start from 420,000 ton in 2030 → 200 billions ton in 2050

Thank You

