

LNG Producer-Consumer conference 2019

Session 2 Role of LNG in Achieving SDGs

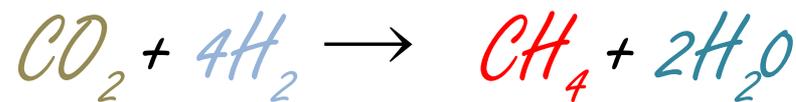
~Potential for LNG to contribute to achieving global climate change targets~

Hitz

Hitachi Zosen



Role of methanation technology from CO₂ and green hydrogen for decarbonized Society



Tadashi Shibayama

Managing Director

General Manager

Machinery Business Headquarters

26 Sep.2019 International Convention Center "Pamir"

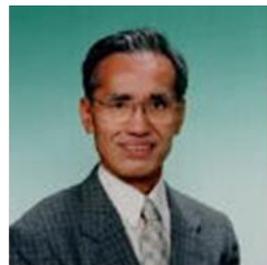
Grand Prince Hotel Takanawa

Confront global environmental issues !

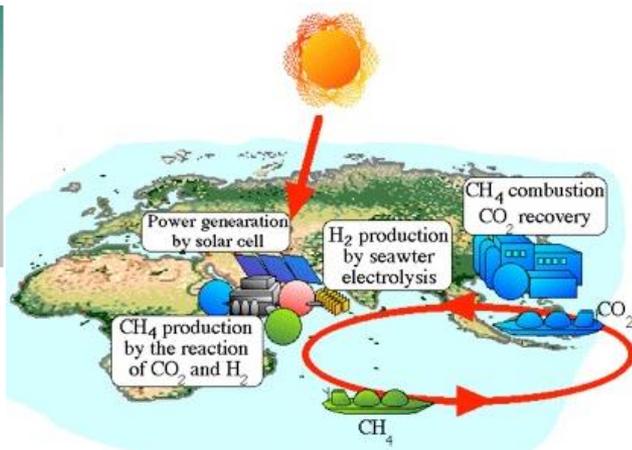
Sustainable development goals : SDGs
We Hitachi Zosen Group will contribute to the achievement of SDGs as a social provider for the realization of recycling society by tackling this global problem with our business of energy and water.



Methanation Technology



Global CO₂ Recycling
Advocator
Emeritus Prof.
Koji Hashimoto
Tohoku Univ



Proprietary Catalyst Material



Exclusive reactor technology
for the methanation process

Methanation Reactor



Prof. Hashimoto proposed
Global CO₂ Recycling System
26 years ago,
Hitachi Zosen have
collaborated with his group to
develop new materials such as
Methanation catalysts so as to
realize his idea.



Demonstration plant organized
by NEDO in INPEX Nagaoka
Works 2019



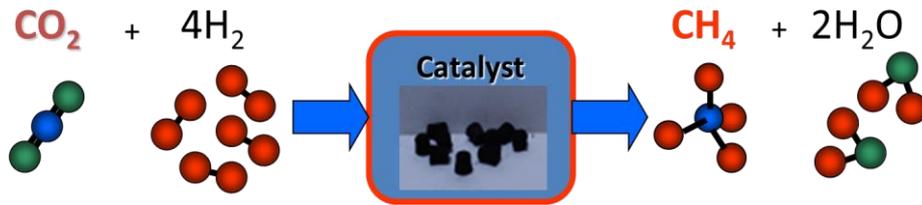
Integral reactor for the design
data in Hitz Kashiwa Works
2012

Reducing CO2 emission by carbon recycling

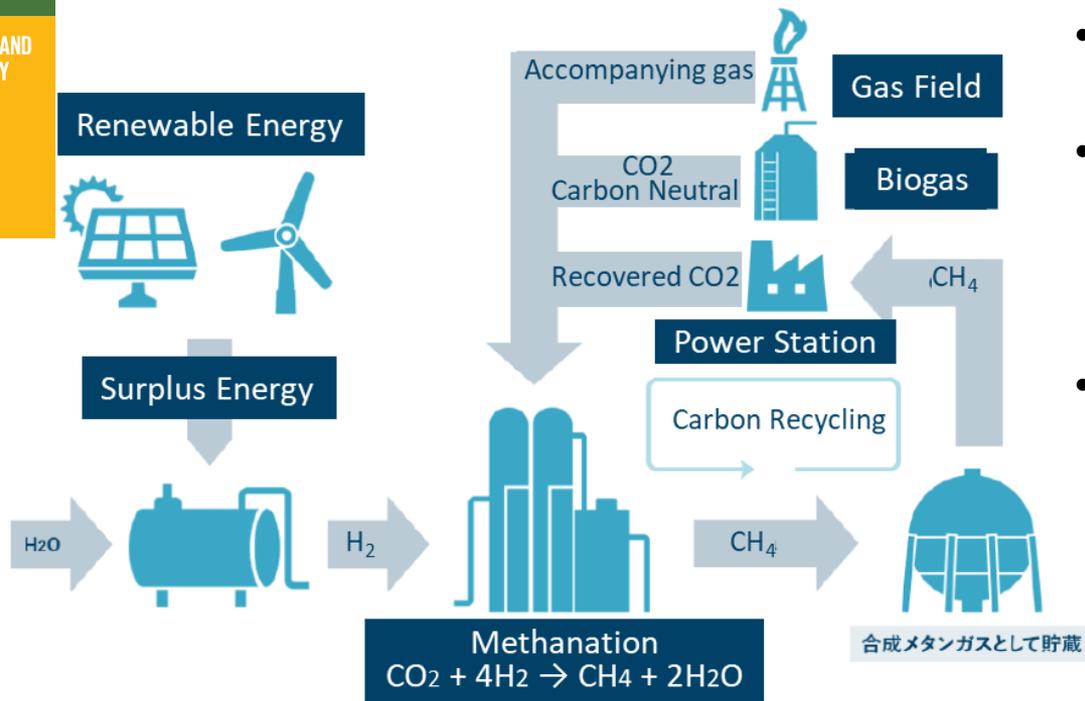
13 CLIMATE ACTION



7 AFFORDABLE AND CLEAN ENERGY



- CO2 recycling → effective on reducing CO2 emission.
- Methane can be used alternative fuel of fossil.
- Methane can utilize all the natural gas infrastructure such as storage, transport and utilization.
- This technology is easily spread since it is not high technology even though developing countries.



IMO Accelerates Climate Action

IMO Adopted;
GHG Zero Emission for
international shipping by 2100.

Decarbonized Fuel is required

Our idea

- CO₂ can be transported instead of ballast water.
- Move it to place with high potential and low cost for Renewable energy .
- Convert to methane and use it as alternative fuel of fossil.

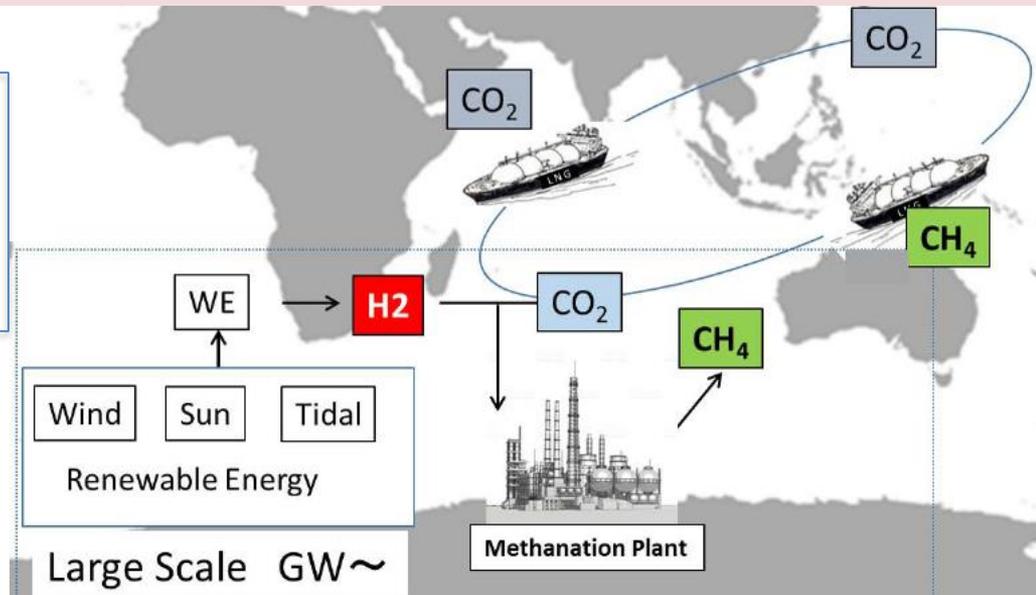
Dual Fuelled Engine

Hitz will contribute to reduce CO₂ emission of international shipping with our technology for dual fuel engines.



Hitz Ariake Works

MAN ES ME-GI Win-GD X-DF



CO₂ Reduction 72.3%

Coal fired power generation → CO₂ → CH₄ → Gas fired power generation

CO₂ emission factor

Coal fired 940g-CO₂/kWh

Gas fired 361g-CO₂/kWh

Coal-fired CO₂ is captured,
methanized and used for gas-fired
power

$$940 \text{ g CO}_2 \div (1 + 2.60) \text{ kWh} \\ = 261 \text{ g-CO}_2/\text{kWh}$$

$$261 \div 940 \times 100(\%) = 27.7\% \\ \rightarrow 72.3 \% \text{ Reduction}$$

