

PROMOTE ENERGY INNOVATION (MESSAGE FROM G20 ENERGY AND ENVIRONMENT MINISERS MEETING)

Agency of Natural Resources and Energy,
Ministry of Economy, Trade and Industry (METI), Japan

Key messages from Argentina

- i. There are different possible national paths for “energy transitions”, and each G20 member has a unique and diverse energy system.
- ii. Energy transitions shall play an essential element of long-term development strategies that should combine economic growth with decreasing greenhouse-gas (GHG) emissions.
- iii. Innovation is a key driver of any types of energy transitions and G20 shall foster international cooperation for innovation

“G20 MM on Energy Transitions and Global Environment for Sustainable Growth”

(June 15-16, 2019, Karuizawa, Japan)



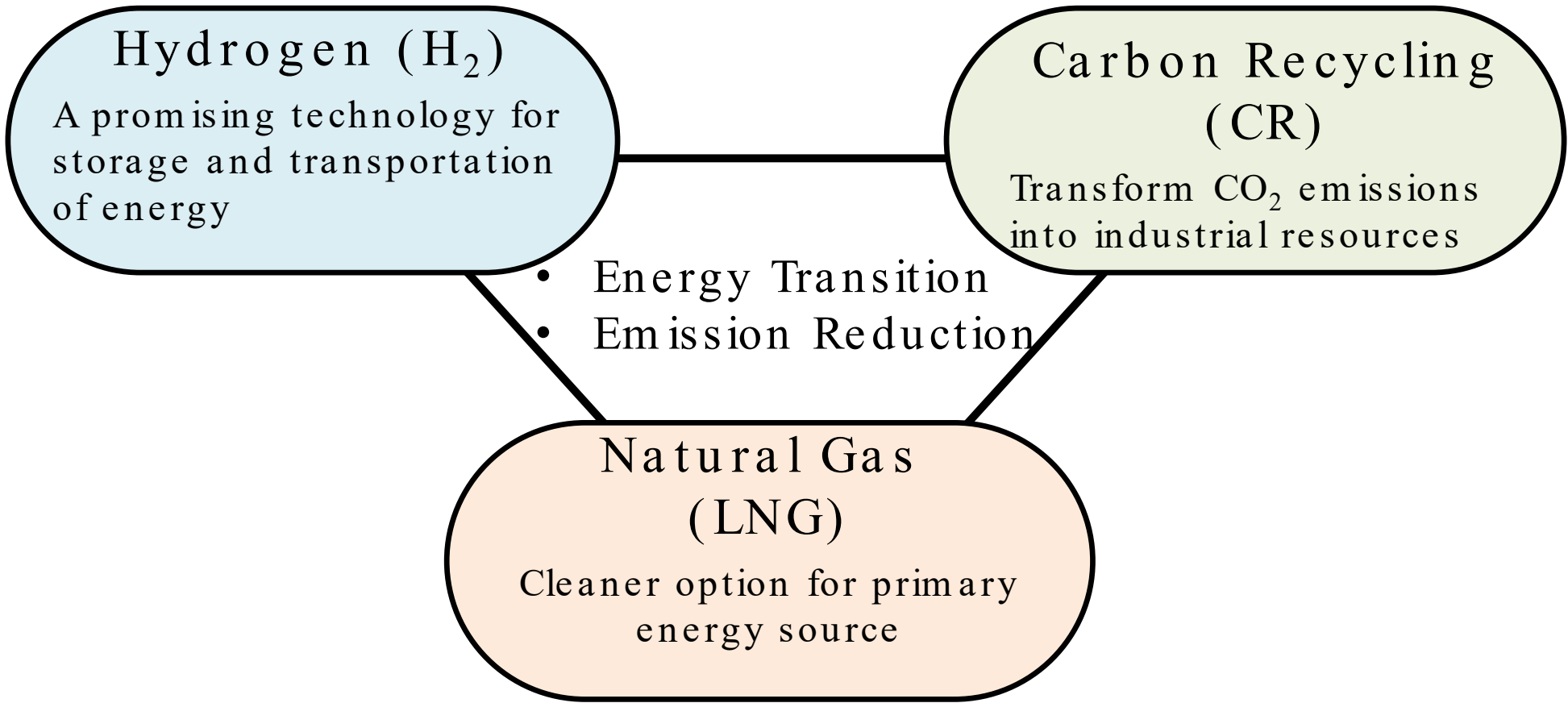
- “3E + S”, namely, “Energy Security, Economic Efficiency, Environment” should be improved simultaneously, without compromising Safety,.
- Further technology breakthrough is needed to create a virtuous cycle of environment and economic growth.
- Ministers agreed on “G20 Karuizawa Innovation Action Plan on Energy Transitions and Global Environment for Sustainable Growth” specifies actions to achieve such key innovations.

Key Actions to Follow-up Karuizawa Action Plan

- Organize annual conference of **RD 20 (Research and Development 20)** to stock-take wide varieties of energy related innovations.
- **Mobilize private sector finance to support energy innovations**
- Strengthen **international cooperation on hydrogen and CCUS including CR.**
- Enhance **energy efficiency**, including well-to-wheel analysis in transport, as there is a possibility that the world relies on fossil fuels much longer than expected.
- Continuously make efforts to promote, and mobilize private sector investments for:
 - Low-carbon energy sources,
 - System integration of renewable energy,
 - Cleaner use of fossil fuels, including transition within fossil fuels,
 - **Healthy growth of international LNG market,**
 - Decommissioning and final disposal of radioactive nuclear waste,
 - Improvement of energy access

Aims of the Three Ministerial-Level Conferences

- Promote and facilitate technology development and international policy collaboration on energy
- Achieve smooth energy transition and CO₂ emission reduction



Schedule of the Three Ministerial-Level Conferences

Date and Venue	Morning	Afternoon
<p>Sep 25 Hotel New Otani Tokyo Japan</p>	<p>2nd Hydrogen Energy Ministerial Meeting</p>	
		<p>1st International Conference on Carbon Recycling</p>
<p>Sep 26 Grand Prince Hotel New Takanawa Japan</p>	<p>8th LNG Producer-Consumer Conference</p>	

Japan's Previous Contribution Since 2017

References

H₂

Develop H₂ Supply Chain

- Japan-Brunei: Produce hydrogen from off-gas from wells and transport it by chemical tanker
- Japan-Australia: Produce hydrogen from brown coal and transport it by liquefied H₂ carrier

CR

Promote Research of Carbon Recycling Technologies

- Methanation: Producing Methane from CO₂ with green hydrogen
- Calcium Carbonates: Made CaCO₃ from Captured CO₂ and Fly Ash (Ca) from Coal Fire Power Plant

LNG

Seko Initiative (announced in Oct. 2017)

- US\$10Billion investment in LNG related projects
- Train 500 key officials and personnel from various countries

Developing H₂ Supply Chain

References

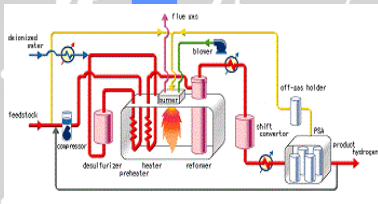
Japan-Brunei Pilot Project (2020-)

Participants: Chiyoda Corp., NYK Line, Mitsubishi Corp. and Mitsui & CO., LTD

Off-gas from wells



Steam Methane Reforming



Hydrogenation*
(Toluene → Methylcyclohexane)



Chemical Tanker



Dehydrogenation*
(Methylcyclohexane → Toluene)



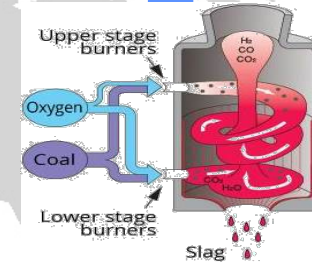
Japan-Australia Pilot Project (2020-)

Participants: Kawasaki Heavy Industries, Ltd., Electric Power Development Co., Ltd., Iwatani Corp., and Shell Japan Limited

Brown Coal + CCS



Gasification



Liquefied H₂ Carrier*



Unloading Facility*



* Image

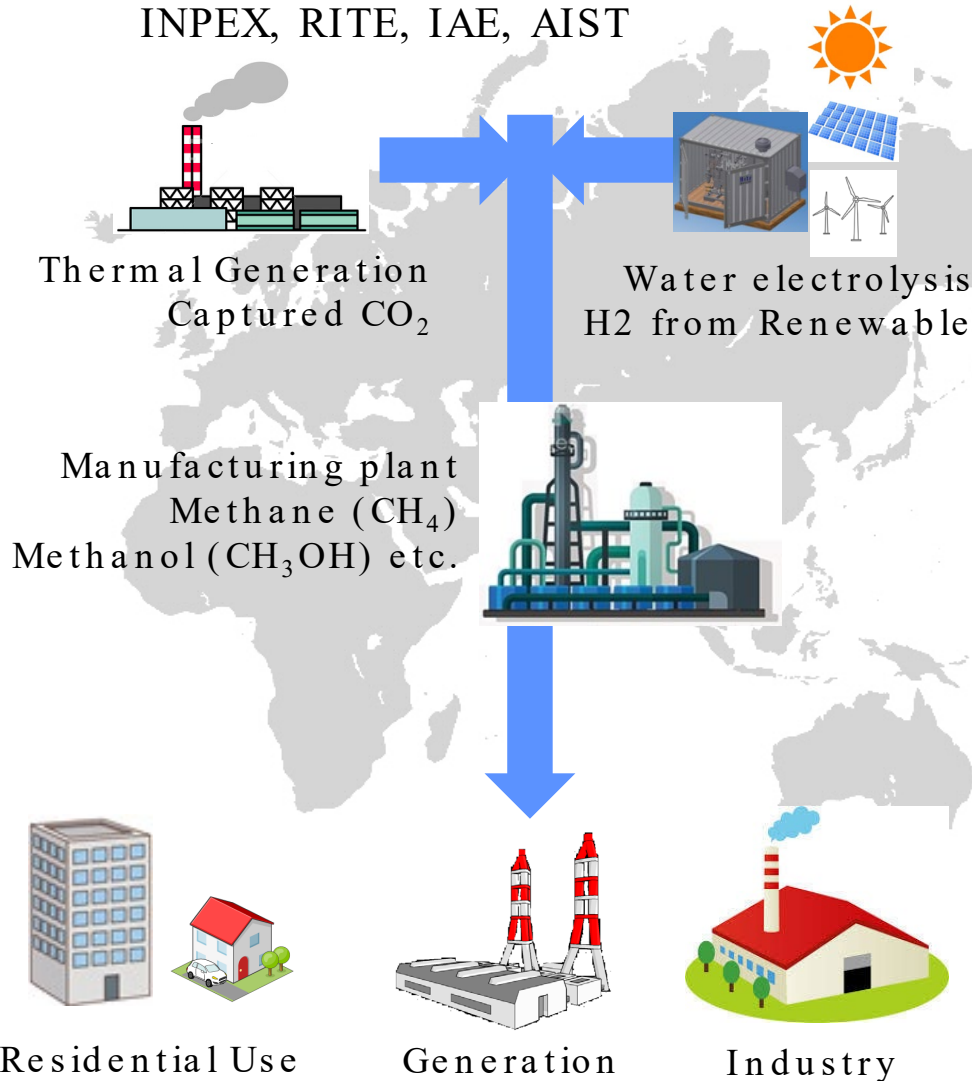
Total Project Cost: \ 24 Billion (around \$220 million)

Promote Research on CR Technologies

References

Methanation

Participants: Hitachi Zosen, JFE, INPEX, RITE, IAE, AIST



Calcium Carbonates

Participants: JCOAL, Wyoming Infrastructure Authority, Columbia University, GreenOre Clean Tech LLC



Support Healthy Growth of LNG Market (Seko Initiative)

- Finance □ Commitment of over \$10billion investments □
→ \$9.7billion by 4 initial projects
- Capacity Building (Training 500 personnel by 2022)
→ 356 as of July, 2019



Arctic 2

- Gydan Peninsula, Russia.
- Capacity: 19.8mtpa
- Participants: Novatek, Total, Mitsui Co., JOGMEC, JBIC, NEXI etc.



LNG Canada

- Kitimat, BC Prov., Canada
- Capacity: 14mtpa
- Participants: Shell, Petronas, Mitsubishi Corp., JOGMEC etc.

Mozambique

- Afungi Peninsula, Cabo Delgado province, Mozambique
- Capacity: 12mtpa
- Participants: Anadarko, Mitsui Co., JOGMEC etc.



Jawa 1 LNG to Power

- Jawa Island, Indonesia
- Capacity: 1,760 MW
- Participants: Pertamina, Marubeni, Sojitz, MOL, JBIC, NEXI etc.



Capacity Building (Participants from 20 Countries)

Bangladesh, Iraq, India, Indonesia, Kazakhstan, Libya, Mexico, Mozambique, Myanmar, Pakistan, Philippine, Qatar, Russia, Saudi Arabia, Sri Lanka, Tanzania, Thailand, UAE, Uzbekistan, Vietnam

Thank you for your kind attention!