

Hydrogen Energy Supply Chain (HESC) Project

November 2020

Rationale for a Japanese hydrogen strategy

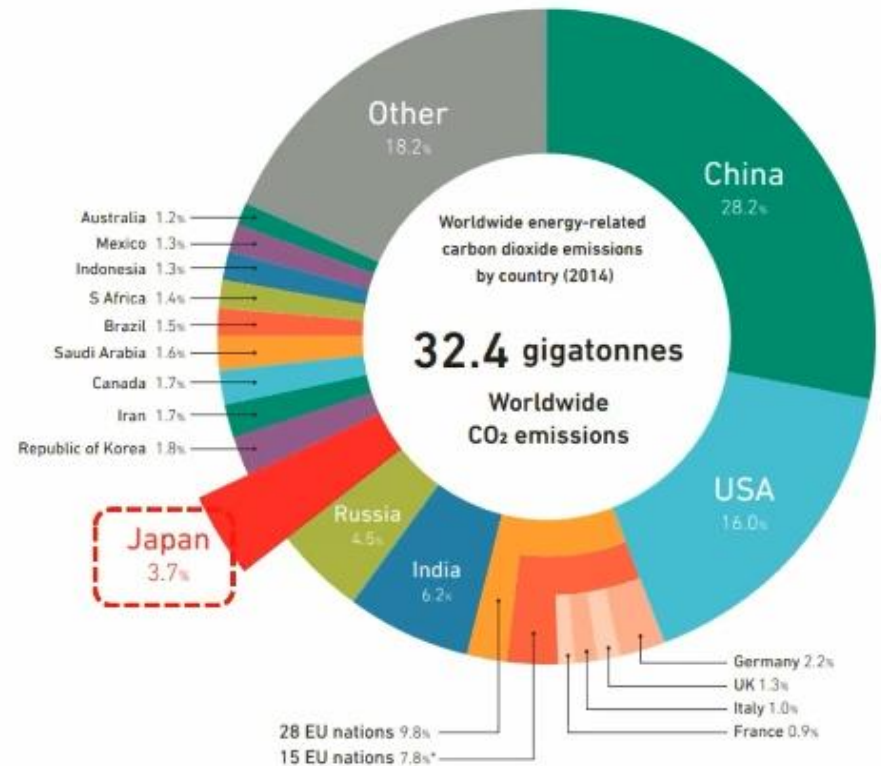
- Japan is facing real challenges regarding energy security and emissions reductions, subsequent to the Fukushima nuclear accident in 2011 and Paris climate targets
- Japan depends on overseas fossil fuels for ~94% of its primary energy supply¹ and accounts for ~3.7% of worldwide CO₂ emissions²

6-7%

Japan's energy self-sufficiency rate (2nd lowest among OECD countries)¹

94%

Japan's dependence on overseas fossil fuels for its primary energy supply¹



Source: Annual report on the environment in Japan 2017 – Ministry of the Environment, Japan

¹ Basic Hydrogen Strategy, Ministry of Economy, Trade and Industry (METI)

² Annual report on the environment in Japan 2017 – Ministry of the Environment, Japan

Concept of CO2-free Hydrogen Chains

Stable energy supply while suppressing CO2 emissions

Producing country

Production of hydrogen at low costs from **unused resources** and/or abundant recyclable energy

Affordable renewable energy



Liquefaction/
loading

Fossil fuel:
Natural gas
Coal...

CCS
(CO2 capture/storage)

CO2-free hydrogen

production



Liquefied hydrogen
cargo ship



Liquefied hydrogen
containers



Liquefied hydrogen
storage tanks

transport / storage

Utilizing country (Japan)

Process uses
Semiconductor and solar battery
manufacture
Oil refinement, desulfurization,
etc.



Transport equipment

Hydrogen stations
Fuel cell vehicles etc.

Distributed power plants



Hydrogen gas turbines
Hydrogen gas engines
Fuel cells etc.

Electrical power plants



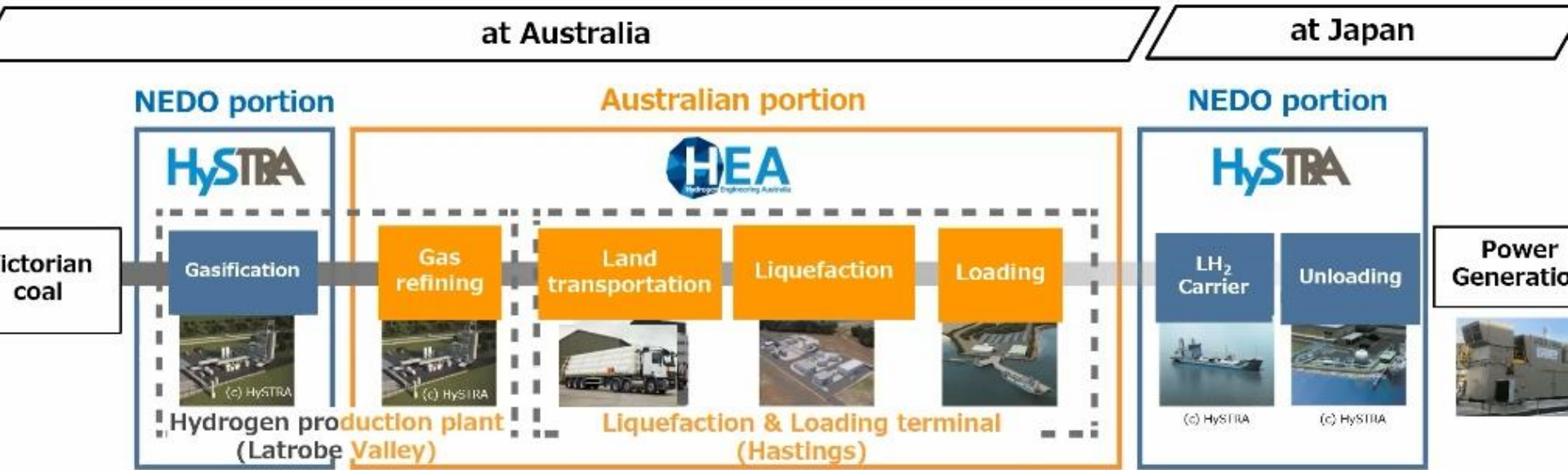
Combined
Cycle power
generators etc.

utilization

Hydrogen Energy Supply Chain (HESC) Pilot Project Overview



Reputable partners are working on a pilot project supported by the Governments of Japan, Australia and Victoria.



NEDO portion - project member



Australian portion - project member



HESC Project Partners for Pilot Phase



Australian Funded Portion

Grant Recipient: Hydrogen Engineering Australia (HEA)



Iwatani Marubeni



Sumitomo Corporation



The Australian consortium will demonstrate the gas refining, transport, liquefaction, storage and loading in Australia.

Japanese Funded Portion

Subsidy Recipient: CO2-free Hydrogen Energy Supply Chain Technology Research Association (HySTRA)



Iwatani



Marubeni



The Japanese consortium will be responsible for gasification (hydrogen production) in Australia, shipping the liquefied hydrogen to Japan, unloading and storage in Japan.

AGL Loy Yang, Latrobe Valley
Victoria, Australia

SC1-A – Brown coal
gasification*
(Japanese funded
portion)

SC2 – Gas Refining



SC3 – Transport
(pressurised truck)



BlueScope WesternPort
Port of Hastings
Victoria, Australia

SC4 – Hydrogen
liquefaction

SC5 – Hydrogen
loading terminal



SC6 – Liquid hydrogen carrier
(Japanese funded portion)



Brown Coal
exported to
Japan

Japan



SC1-B – Brown coal gasification
(20t/d EAGLE II facility)
(Japanese funded portion)

Japan

SC7 – Liquid hydrogen
unloading base
(Japanese funded
portion)



*Japanese funded portion is supported by NEDO

Prospect for Commercial Project

Latrobe Valley –
Victoria, Australia

SC1 – Brown coal
gasification

SC2 – Gas Refining

SC3 – Transport
(H2 pipeline)

Port location to be confirmed –
Australia

SC4 – Hydrogen
liquefaction

SC5 – Hydrogen loading
terminal

CO₂

SC6 – Liquid hydrogen carrier

Japan

SC7 – Liquid hydrogen
unloading base





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**Coal Gasification and Gas-refining Plant
at the Latrobe Valley**



**Hydrogen Liquefaction and Storage Plant
at Hastings**

HESC Pilot Project Progress – Kobe, Japan



Liquefied Hydrogen Carrier – SUIISO FRONTIER



Launch ceremony in December 2019



Storage tank installation into the carrier in March 2020



Liquefied Hydrogen Receiving Terminal at Kobe