

The First Step Towards a "Hydrogen Society" in the Kansai Region

Introducing two large-scale projects designed to demonstrate the potential for creating, transporting, storing, and using hydrogen in society.

The Union of Kansai Governments

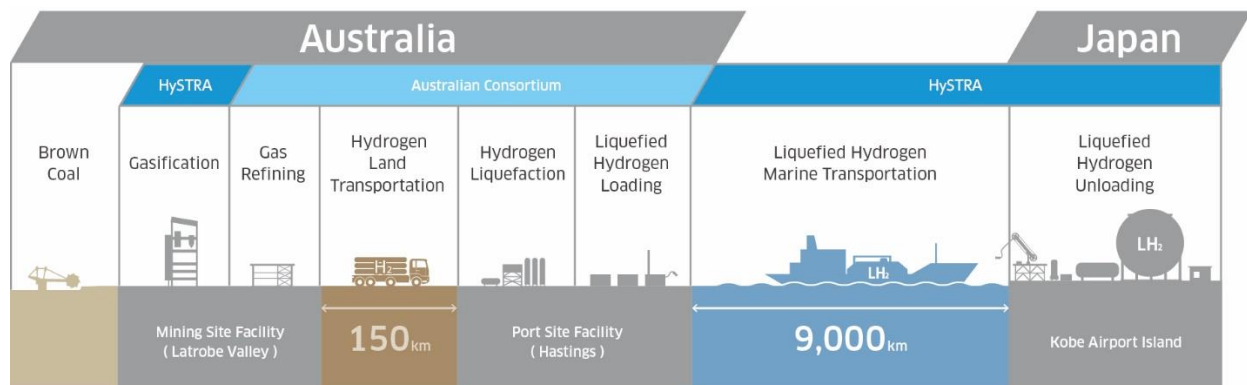
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In the Kansai region, large-scale demonstration projects are being carried out to "create, transport, store, and use" hydrogen. Two of them will be introduced here.

(1) The Australia-Japan hydrogen supply chain establishment pilot project

Japan is dependent on foreign countries for energy, and in order to spread the use of hydrogen domestically, it is necessary to import large quantities from abroad.

Therefore, the world's first technological proof-of-concept "hydrogen supply chain" commenced in 2020. Here, CO₂-free hydrogen is produced in Australia from unused lignite coal (with carbon dioxide by-products stored underground), converted into liquefied hydrogen suitable for transportation, and transported in large quantities to Japan for consumption.



Hydrogen production supply chain schematic, © HySTRA

This pilot is a NEDO (New Energy and Industrial Technology Development Organization)-subsidized project initiated by the CO₂-free Hydrogen Energy Supply-chain Technology Research Association (HySTRA), a technology research association comprised of the following business entities: Kawasaki Heavy Industries, Electric Power Development Co., Ltd., Iwatani Corporation, Shell Japan Limited, Marubeni Corporation, ENEOS Corporation, and Kawasaki Kisen Kaisha, Ltd.



Latrobe Valley, Victoria, © HySTRA



Brown coal hydrogen production plant, © HySTRA

HySTRA will gasify brown coal in Australia's Latrobe Valley to extract hydrogen. When the system exits this preliminary pilot phase, the CO₂ generated by gasification will be separated, recovered, and stored underground to reduce greenhouse gas emissions. The gasification and refining facilities will process two tons of brown coal per day to produce 100 Nm³ of hydrogen per hour.

Liquefied hydrogen carrier

The produced hydrogen is converted from a gas into a liquid state by cooling to -253°C and then transported to Kobe, Japan, 9,000 kilometers away, by the "SUIISO FRONTIER" liquefied hydrogen carrier.



Storage and unloading facilities

The liquefied-hydrogen carrier will enter the hydrogen receiving terminal at Kobe and use a specialized loading arm system to transfer its payload to land-based hydrogen storage tanks. A temperature of -253°C will be maintained throughout transportation and storage.



Liquid hydrogen receiving terminal (the Port of Kobe), © HySTRA

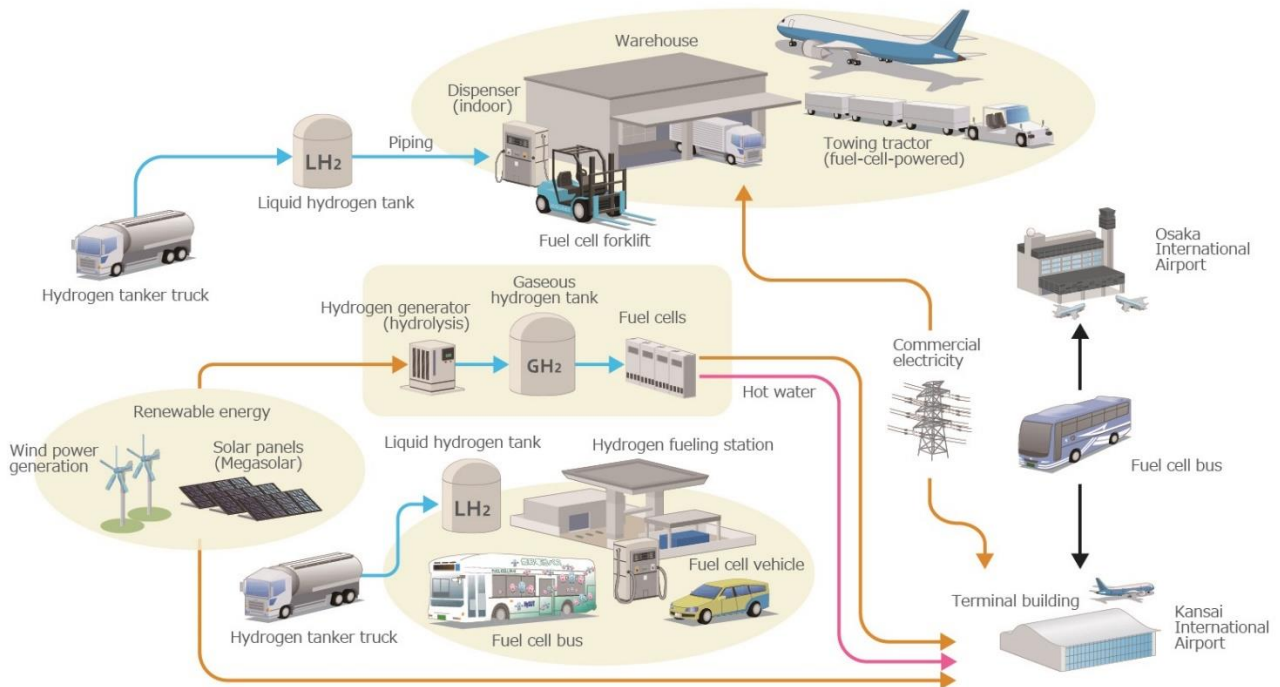
(2) The Hydrogen Grid Project at Kansai International Airport and Osaka International Airport

Kansai Airports Group, which operates Kansai International Airport (KIX), Osaka International Airport (ITAMI), and Kobe Airport (KOBE), aims to transform its airports into “environmentally advanced airports” boasting world-class safety and eco-friendliness. In the 2014 fiscal year, Kansai Airports, in cooperation with its partners, launched the Hydrogen Grid Project—the first project in Japan to demonstrate the large-scale introduction and deployment of hydrogen energy at an airport.



KIX’s hydrogen station started commercial operations in 2016, making it the first of its kind at a Japanese airport, with ITAMI following suit in 2019. Currently, four fuel-cell vehicles (FCVs) are operational at KIX, with one installed at ITAMI. In 2015, the trial operation of fuel-cell forklifts (FCFLs) began in KIX’s international cargo area. In 2017, KIX saw the installation of Japan's first hydrogen refueling facility for industrial vehicles, and now, there are 22 FCFLs in operation at KIX.

KIX Hydrogen Grid(Concept) FC = Fuel Cell Heat grid Electricity grid H₂



The first step towards the future

The Union of Kansai Governments (UKG) has devised the "Kansai Hydrogen Supply Chain Initiative" to realize the creation of a “hydrogen society,” something that is essential for achieving carbon neutrality. We hope that these pilot projects will serve as a model for drawing out the potential of hydrogen energy, not only in Japan, but also throughout the rest of the world.