

Feasibility Study for Hydrogen Production (Organic Chemical Hydride Method) and Storage, Transportation, Utilization in Saudi Arabia

JCCP and Saudi Aramco jointly implemented the Feasibility Study for Hydrogen Production (Organic Chemical Hydride Method) and Storage, Transportation, Utilization in Saudi Arabia over a period of two years, from fiscal 2011 to 2012.

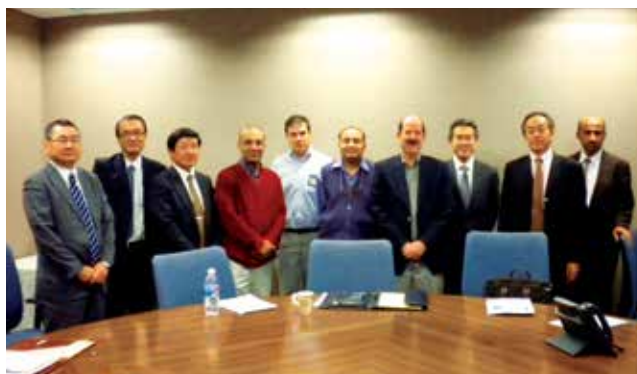
1. Background

Combating global warming through CO₂ reduction is an important issue in Japan. As a measure for addressing this issue, policies are being implemented to promote the dissemination of hydrogen fuel cell vehicles that do not release CO₂.

Japan has succeeded in developing and commercializing a technology for long-distance mass transportation of hydrogen for the first time in the world. It is garnering particular attention for its organic chemical hydride method, which adds hydrogen to aromatics to convert it to a saturated ring compound (organic chemical hydride) so that the hydrogen can be transported in liquid state at ordinary temperatures and pressures. Since this method utilizes existing infrastructure and know-how for the storage and distribution of oil products, it has the potential to become a promising energy transportation method in the near future.

Meanwhile, in oil-producing countries, various sources of hydrogen are available, including hydrogen produced from fossil resources such as naphtha and natural gas, hydrogen generated from associated gases that have been used as fuel up to now and by-product hydrogen from refineries. When using these hydrogen sources, the CO₂ generated in the process of producing hydrogen from fossil materials could be efficiently treated by carbon capture and storage (CCS) and enhanced oil recovery (EOR) technologies.

By utilizing clean hydrogen as a new energy product, Japan could make a significant contribution to preventing global warming, as well as expand energy options in



With members of Saudi Aramco

society after the Great East Japan Earthquake in 2011.

By the same token, oil-producing countries could engage in the export of new energy products that contribute to global warming prevention, and could also deepen cooperative relationships with Japan, as the realization of hydrogen production from solar energy and other alternative energy sources in the future would allow them to export energy using the same infrastructure on a permanent basis.

2. Overview

- 1) Implementation period: April 1, 2011 – March 31, 2013 (two years)
- 2) Overseas counterpart: Saudi Aramco
- 3) Participating companies: Chiyoda Corporation
- 4) Activities: The following studies were conducted to examine the business feasibility of efficient hydrogen production in oil-producing countries, the organic chemical hydride production process, and hydrogen supply to Japan.
 - (1) Study on the hydrogen production process (hydrogen production using fossil fuels and renewable energy sources)
 - (2) Study on business feasibility related to the hydrogen storage and transportation technology

- based on the organic chemical hydride method
- (3) Study on the utilization of hydrogen (large plants, hydrogen stations)
 - (4) Conceptual design of a plant (case study)

3. Observations

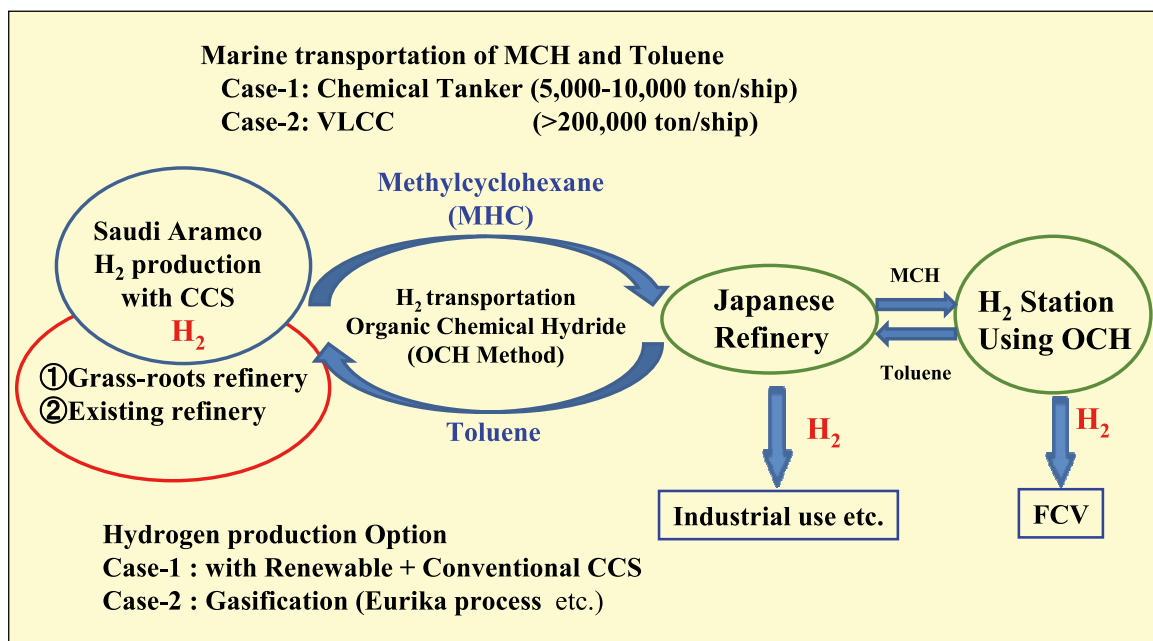
Through this study, Japan's advanced technologies in the relevant field were introduced, the potentials

of hydrogen as a new energy source were jointly examined by the parties involved, and the feasibility of commercializing the relevant technologies was verified. In this respect, the study had significant meaning, and has helped strengthen the relationship of trust between members of Saudi Aramco and JCCP.

JCCP hopes to further deepen ties between Saudi Arabia and Japan in the future through technical cooperation such as this study.

<by Toshifumi Amemiya, Technical Cooperation Dept.>

Organic hydride supply chain



Source: Chiyoda Corporation