



National Research and Development Agency,  
 New Energy and Industrial Technology Development Organization (NEDO)  
 Advanced Hydrogen Energy Chain Association  
 for Technology Development (AHEAD)  
 Chiyoda Corporation  
 Mitsubishi Corporation  
 Mitsui & Co., Ltd.  
 Nippon Yusen Kabushiki Kaisha

## **The World's First Global Hydrogen Supply Chain Demonstration Project**

The four companies listed below, headquartered in Yokohama and Tokyo, are pleased to announce the creation of the “Advanced Hydrogen Energy Chain Association for Technology Development (AHEAD)”<sup>\*1</sup> and the launch of the world’s first Global Hydrogen Supply Chain Demonstration Project.

<b>Chiyoda Corporation</b>	President:	Mr. Masaji Santo
<b>Mitsubishi Corporation</b>	President:	Mr. Takehiko Kakiuchi
<b>Mitsui &amp; Co., Ltd.</b>	President:	Mr. Tatsuo Yasunaga
<b>Nippon Yusen Kabushiki Kaisha</b>	President:	Mr. Tadaaki Naito

The project, a subsidized “Technology Development Project to establish Hydrogen Society/Technology Development for the Utilization of Large Scale Hydrogen Energy”, is funded by the National Research and Development Agency, the New Energy and Industrial Technology Development Organization (NEDO), and demonstrates “The Hydrogen Supply Chain utilizing the Organic Chemical Hydride Method”.

### **Project Outline**

- 1. Project Description**

The construction of a Global Hydrogen Supply Chain Demonstration Plant comprising a Hydrogenation Plant in Negara Brunei Darussalam and a Dehydrogenation Plant in Kawasaki’s coastal region of Japan using Chiyoda’s SPERA Hydrogen® Technology<sup>\*2</sup>. Hydrogen will be procured in Brunei and transported by ship to Kawasaki, Japan in liquid form at ambient temperature and pressure. Hydrogen gas will then be extracted from the liquid in Kawasaki and supplied to consumers.
- 2. Project Scale**

Supply of 210 tons (max) of Hydrogen in 2020, equivalent to filling 40,000 Fuel Cell Vehicles.
- 3. Hydrogen Supply**

Hydrogen will be produced by Steam Reforming from the processed gas derived from the Natural Gas Liquefaction Plant of Brunei LNG Sdn. Bhd. (Headquarters: Lumut, MD: Mr. Thomas Jenke)
- 4. Hydrogen Demand**

Fuel for the Keihin Refinery Thermal Power Plant, an affiliate of TOA OIL Co., Ltd. (Headquarters: Kawasaki, President: Mr. Hiroto Tamai). TOA OIL Co., Ltd. is owned by SHOWA SHELL SEKIYU K. K. (Headquarters: Tokyo, President and Group CEO: Mr. Tsuyoshi Kameoka).
- 5. Project Duration**

Construction : August 2017 – December 2019  
 Operation : January 2020 – December 2020

## Project Positioning

The project will be constructed considering the Phase II of the “Strategic Road Map for Hydrogen and Fuel Cells”, issued by Japan’s Ministry of Economy, Trade and Industry (METI) in 2014 and revised in 2016, and aims to realize Global Hydrogen Transport and Supply Technology for full-scale Hydrogen Power Generation around 2030. This Hydrogen Demo project is a stepping stone for commercialization of projects post 2020.

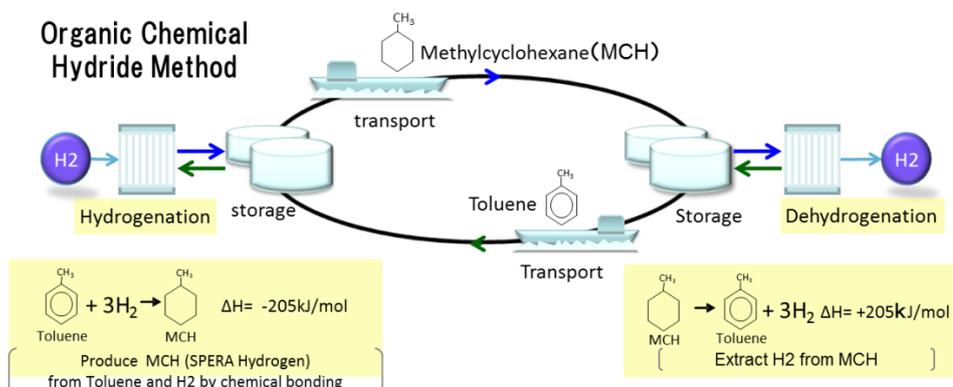
The technology utilizes Hydrogen for CO<sub>2</sub> free power generation, which can contribute to fulfill the December 2015 COP21 Paris Agreement requiring greenhouse gas reductions to combat global warming.

### \*1 Overview of “AHEAD”

Name: Advanced Hydrogen Energy Chain Association for Technology Development  
Address: 4-6-2, Minatomirai, Nishi-ku, Yokohama, Japan  
President: Mr. Hideki Endo  
(General Manager, Hydrogen Supply Chain Development Unit  
Chiyoda Corporation)  
Association Member: Chiyoda Corporation, Mitsubishi Corporation, Mitsui & Co., Ltd.  
Nippon Yusen Kabushiki Kaisha  
Establishment Date: 3 July 2017  
Research Partner: MITSUBISHI HITACHI POWER SYSTEMS LTD.  
Development Bank of Japan Inc.

### \*2 Chiyoda’s SPERA Hydrogen® Technology

Chiyoda’s SPERA Hydrogen® Technology utilizes the Organic Chemical Hydride Method. In the supply country, Hydrogen, chemically fixed to Toluene, is converted into Methylcyclohexane (MCH), a liquid at ambient temperature and pressure, by hydrogenation reaction for storage and transport. In the consumer country, Hydrogen is extracted from MCH by dehydrogenation reaction and supplied as hydrogen gas.



## Images



Brunei Hydrogen Production & Hydrogenation Plant



Kawasaki Dehydrogenation Plant

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