

# HySUT



**The Association of Hydrogen  
Supply and Utilization Technology**

<http://hysut.or.jp>

## Overview

Official Name: The Association of Hydrogen Supply and Utilization Technology (HySUT)

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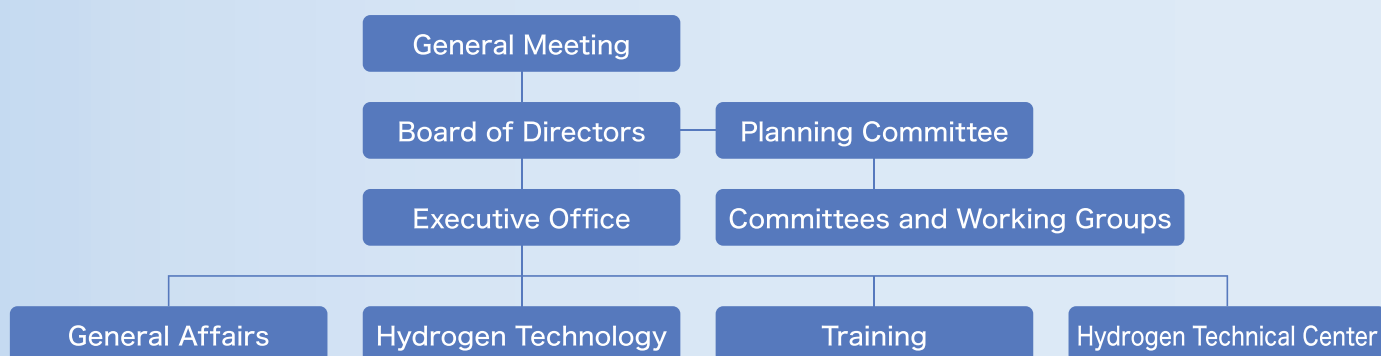
Membership: 45 companies and 2 organizations (as of February 2020)

Mission:

We aim to ensure the stable supply and safe distribution of hydrogen, improve user satisfaction, and contribute to the development of the hydrogen energy industry by taking a comprehensive approach and engaging in such activities as technological development, surveys and research, education and outreach on the supply and the utilization of hydrogen energy.

**Industry organization specializing in hydrogen fueling infrastructure  
for mobility such as fuel cell vehicles**

## Structure



## Membership

**45 companies and two organizations (as of February 2020)**

**Energy supply/ Hydrogen  
refueling station (HRS)  
operation**  
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Idemitsu Kosan Co., Ltd.; Iwatani Corporation; Osaka Gas Co., Ltd.; Cosmo Oil Co., Ltd.; Saibu Gas Co., Ltd.; JXTG Nippon Oil & Energy Corporation; Tokyo Gas Co., Ltd.; Toho Gas Co., Ltd.; Air Liquide Japan G.K.; Air Water Inc.; Oita EBL Hydrogen Station Co., Ltd.; Sala Energy Co., Ltd.; Shikoku Taiyo Nippon Sanso Co., Ltd.; Shizuoka Gas Co., Ltd.; Seiryu Power Energy Co., Ltd.; Takamatsu Teisan Co., Ltd.; Tomoe Shokai Co., Ltd.; Toyota Tsusho Air Liquide Hydrogen Energy Corporation; Nippon Mobile Hydrogen Station Services, LLC; Japan H2 Mobility, LLC; Nemoto Tsusho Inc.; Hiroshima Toyota Trading Co., Ltd.; Hiroshima Toyopet Co., Ltd.; Fukushima Hydro Supply Co., Ltd.; Mie Hydrogen Station, LLC; Yamamoto Oil Co., Ltd.

**Engineering/  
Machinery**  
14

Kawasaki Heavy Industries, Ltd.; Kobe Steel, Ltd.; Taiyo Nippon Sanso Corporation; Nippon Steel Pipeline & Engineering Co., Ltd.; Chiyoda Corporation; The Japan Steel Works, Ltd.; Mitsubishi Kakoki Kaisha, Ltd.; KITZ Corporation; Tatsuno Corporation; Tokyo Boeki Mechanics Ltd.; Tokiko System Solutions, Ltd.; Valqua, Ltd.; Fujikin Incorporated; Enable Inc.

**Automotive** 5

Toyota Motor Corporation; Nissan Motor Co., Ltd.; Honda Motor Co., Ltd.; Suzuki Motor Corporation; Toyota Industries Corporation

**Trade Organization** 2

Japan Petroleum Energy Center (JPEC); The Japan Gas Association (JGA)



## History

- Jul 2009: Founded as The Research Association of Hydrogen Supply/Utilization Technology (HySUT).
- Aug 2009: Started the Hydrogen Highway Project, which operated three pilot HRS for FCVs and FC buses in the metropolitan area, and the Hydrogen Town Project, which supplied hydrogen to stationery FCs by pipeline. Both projects were supported by the Ministry of Economy, Trade and Industry (METI) and completed in Mar 2011.
- Jun 2011: Started the JHFC3 Project under the New Energy Development Organization (NEDO) to demonstrate hydrogen technology to the general public; three retail HRS were built (see photos below) based on data from the pilot HRS. Completed in Feb 2014.
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Kaminokura



Ebina-Cho



Toyota Eco-ful Town
- Jun 2013: Started the Hydrogen Utilization Technology R&D Program under NEDO for hydrogen quality, metering, refueling and hose. Completed in Feb 2018.
- Jun 2014: Started the same program for infrastructure safety. Completed in Feb 2018.
- Apr 2015: Launched the Support Program for Retail HRS to Stimulate Demand for FCVs.
- Dec 2015: Started the Hydrogen Utilization Technology R&D Program under NEDO for safety operation. Completed in Feb 2018.
- Apr 2016: Reorganized as the Association of Hydrogen Supply and Utilization Technology (HySUT). Became the Japanese member body of ISO/TC197 Hydrogen technologies.
- Nov 2016: Joined the Yamanashi Pref. P2G Technology Development Project under NEDO.
- Dec 2017: Opened the Hydrogen Technical Center in Kofu, Yamanashi Prefecture.
- Jun 2018: Started the R&D Program for HRS under NEDO.

## Activities

### ①Technology Research and Development

#### NEDO Projects

- R&D of next-generation HRS and filling technologies for the full-scale penetration phase
- R&D of long life, high-pressure hydrogen components such as seals and fittings
- Promotion and development of international standards under ISO/TC197 for HRS systems and hydrogen quality
- R&D for standardization and modularization of HRS

#### Hydrogen Technical Center (HTC)

- R&D site for HRS technologies
- Education and training



Hydrogen dispenser testing apparatus

### ②Support and Reliability Improvement of HRS

- Support programs for retail HRS (operation subsidies, reliability data collection)
- Safety and security activities such as data analysis, troubleshooting and risk prediction in conjunction with the above
- Education and training on HRS operation

### ③Guidelines for HRS Technology

- Publication and maintenance of the HySUT Guidelines for quality control, metering, filling performance, testing setups and hydrogen-powered industrial truck (HPIT) filling

### ④International Standard Harmonization

- Activities as a country member body of ISO/TC197

### ⑤Public Relations

- Outreach activities including exhibitions and trade shows

# Hydrogen Technical Center (HTC)

## Purpose

Commissioned by NEDO, Hydrogen Technical Center (HTC) was constructed in Kofu City, Yamanashi Prefecture for the purpose of facilitating the development of new hydrogen technologies in an actual service environment. Testing can be performed as a complete HRS or on a section or component-basis for better safety and security as well as enhanced operation and management approaches.

HTC is a so-called testing HRS. There are a number of commercial HRS in Japan, but they cannot use a newly-developed component or fueling protocol unless its safety has been verified. There were also some events that occurred at retail HRS that had not been foreseen from the laboratory tests. Thus the importance of field testing was recognized, which has led to the development of HTC. HTC will facilitate a broader availability of commercial HRS and the advancement of hydrogen technologies.

## Testing at HTC

**Component testing:** performance tests in the hydrogen service environment

**Protocol testing:** testing of newly-developed filling protocols

**Validation of optimized systems:** testing of value-engineered HRS specifications

**Education & training:** training programs for HRS supervisors and operators

## Specifications

Equipment	Specification
Hydrogen supply	Hydrogen gas cylinder bundle (19.6 MPa) x3
Compressor	Capacity: 340 Nm <sup>3</sup> /h Pressure: 87.5 MPa
Pressure vessels	Max. operating pressure: 87.5 MPa 300L x 6 (Type3) 200L x 1 (Type2)
Dispenser	Two units Max. operating pressure: 87.5 MPa



## Features of HTC

- Capable of fueling at 87.5 MPa, the maximum filling pressure under the international standard, which is not available at any Japanese commercial HRS.
- Able to fill not only vehicles but also containers. Retail HRS are not allowed to do so by regulation.
- Performs durability testing in a real service environment; not laboratory simulations.
- Multiple filling control strategies are supported including direct filling as well as JPEC-S 0003.
- Variable compressor discharge helps to determine the optimum capacity specification of a given HRS based on its expected hydrogen demand.

## Location

**Address:** 3157 Shimomukouyama-cho, Kofu City, Yamanashi Prefecture

**Access:**

- **By train:** Get off at Kofu Station, JR Chuo Main Line; 30 minutes by taxi from Kofu Station.
- **By car:** Take the Chuo Expressway; 5 minutes from Kofu Minami Exit.