

# JXTG's Effort toward the Realization of Hydrogen-based Society

May 8, 2018

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New & Renewable Energy Company

JXTG Nippon Oil & Energy Corporation

**JXTG** Nippon Oil & Energy Corporation

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# **1. JXTG's Hydrogen Business**

## **2. Public and Private Initiatives toward Establishing a Hydrogen-Based Society**

## **3. Knowledge Dissemination and Enlightening Activities Related to Hydrogen Energy**

# Overview of JXTG Group

## JXTG Holdings

Listed subsidiaries  
NIPPO/TOHO TITANIUM

### JXTG Nippon Oil & Energy



Domestic fuel oil sales share

**50%**

\*FY2016, JXTG Holdings estimations

Paraxylene supply capacity

**3.62** million tons/year

\*As of end of March 2017

### JX Nippon Oil & Gas Exploration



Crude oil and natural gas equity-entitled production volume

**130** thousand

barrels/day

\*Crude oil equivalent (FY2016 results)

### JX Nippon Mining & Metals



Equity-entitled copper mine production

**200** thousand tons/year

\*Amount of copper contained in copper concentrate (FY2016 results)

Refined copper production capacity

**920** thousand tons/year

\*Equity basis as of March 2017

# Unlocking a New Era as a Comprehensive Energy Company

Our energy businesses span the entire value chain, from the upstream to downstream segments.

Upstream

Downstream

## JX Nippon Oil & Gas Exploration

Crude oil and natural gas development



## JXTG Nippon Oil & Energy

Oil refining and production



Sales



Petrochemical products (Paraxylene)



Coal



Natural Gas



Electricity



Hydrogen



# Characteristics of Fuel Cell Vehicles (FCVs)

- Fuel cell vehicles (FCVs) don't emit CO2 at the time of driving, so they are called the "ultimate EcoCars."
- They were launched in 2014. In Tokyo Metropolis, some fuel cell buses (FC buses) are already operated in the route bus network.



# JXTG's Lineup of HRSs

Various types of hydrogen refueling stations (HRSs) are being deployed according to conditions of each location.

## ■ Integrated



Hydrogen Station alongside Dr. Drive self-service Ebina Chuo Service Station in Kanagawa



Hydrogen Station alongside Dr. Drive self-service Kamiida Service Station in Yokohama

## ■ Standalone



Yokohama Tsunashima Hydrogen Station

## ■ Mobile



Yokohama Osanbashi Hydrogen Station

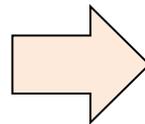
# HRSs Integrated with Service Stations

We totally support customers' car lives in terms of both stable hydrogen supply and automobile-related services, taking advantage of **our largest service station network in Japan.**



Gasoline and Diesel Fuel

Oil Refineries, etc.



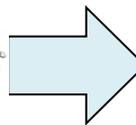
Gasoline and Diesel Fuel

Hydrogen



Hydrogen

Hydrogen Production and Shipping Center in Yokohama

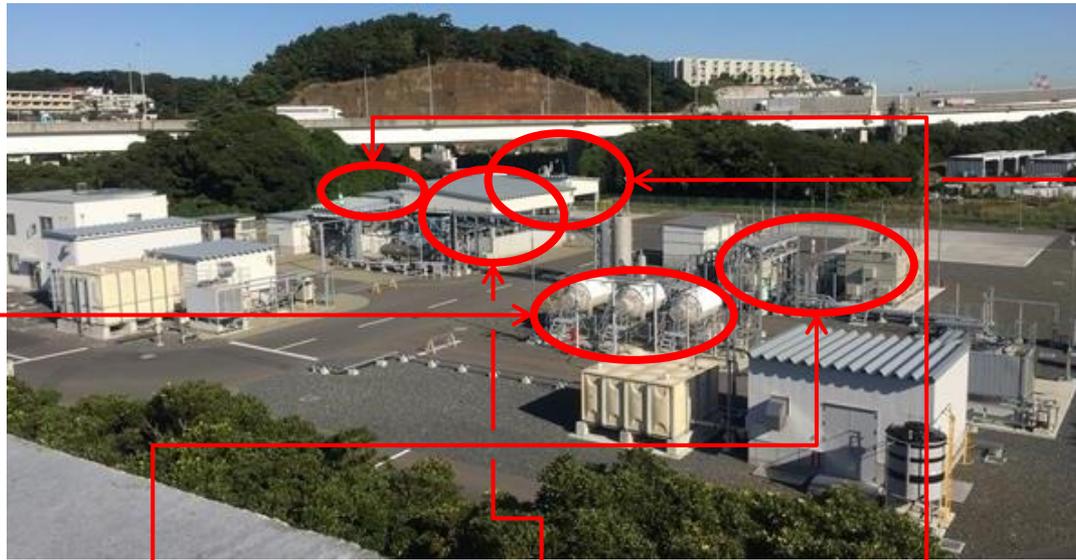


Car Maintenance

We provide total supports to customers' car lives, from supply of fuels, such as gasoline and hydrogen, to car maintenance.

# JXTG's Large Hydrogen Supply System

We opened “**Hydrogen Production and Shipping Center**” in Naka-ku, Yokohama in March, 2016, which supplies hydrogen to HRSs located in the Tokyo Metropolitan Area and mobile HRSs.



LPG

(Feedstock for hydrogen production)



Hydrogen production unit



Compressor



Hydrogen tanks



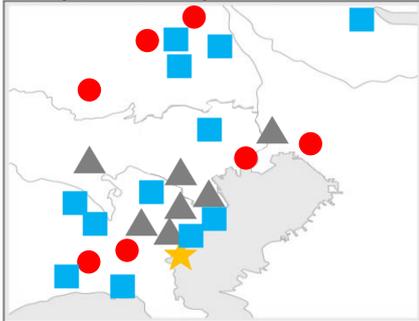
Shipping

# JXTG's HRS Network

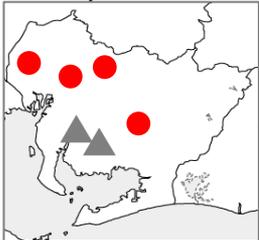
JXTG owns and operates 40 HRSs in four metropolitan areas (total number in Japan, including other companies': 100 HRSs).

⇒ We have the largest share (40%) of HRSs in Japan (as of the end of April, 2018).

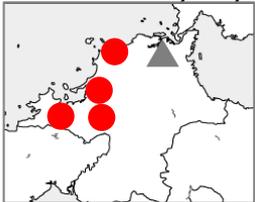
Tokyo metropolitan Area: 26



Chukyo Area: 6



Northern Kyusyu Area: 5



● : Integrated



Gasoline pumps and hydrogen dispenser located at the same station

▲ : Standalone



Only hydrogen dispenser

■ : Mobile

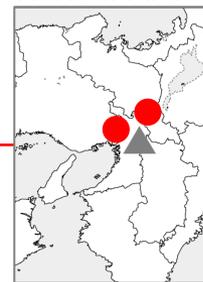


Trucks that have a compressor, hydrogen tanks and dispenser

★ : Hydrogen Production and Shipping Center



Kansai Area: 3



# Challenges for FCV and HRS dissemination

Public and private sectors are working on issues to promote FCVs and HRSs in cooperation.

## FCVs

- Mass production and cost reduction of vehicles
- Further extension of cruising range
- Introduction of models for volume zone

etc.

## HRSs

- Reduction of hydrogen supply cost
- Cost reduction(CAPEX/OPEX)
- Strategic hydrogen station development

etc.

## Both

- Promoting citizen's understanding and regional cooperation
- Regulatory reform

Source: We prepared the figure above based on the "Basic Hydrogen Strategy."

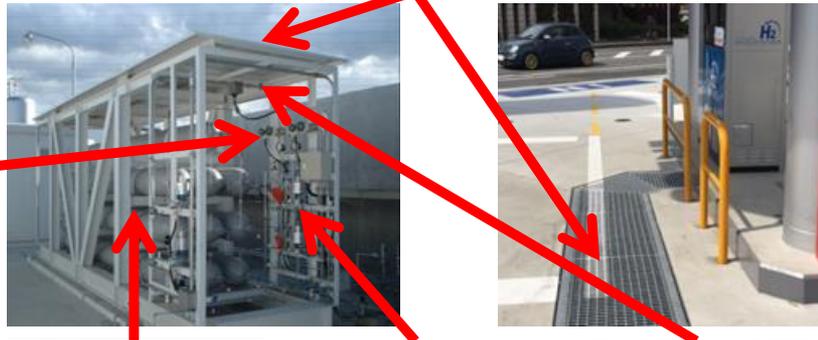
# Safety measures of HRSs

JXTG has accumulated expertise in hydrogen safety for over ten years.

Basic features and policies to ensure the safety operation of HRSs :

- (1) Prevention of hydrogen leakage and early detection
- (2) Preventing contamination in case of leakage to avoid fire
- (3) To have fire mitigation measures in place

Open structure

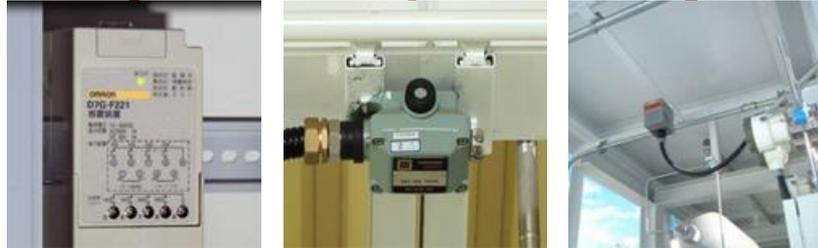


Emergency Stop valve

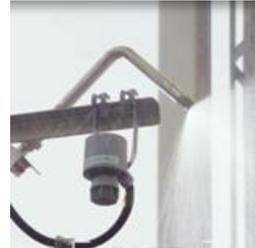
Safe distance



Safety wall



Sensors



Sprinkler



Station operators who passed the legal qualifying examinations on high pressure gas safety

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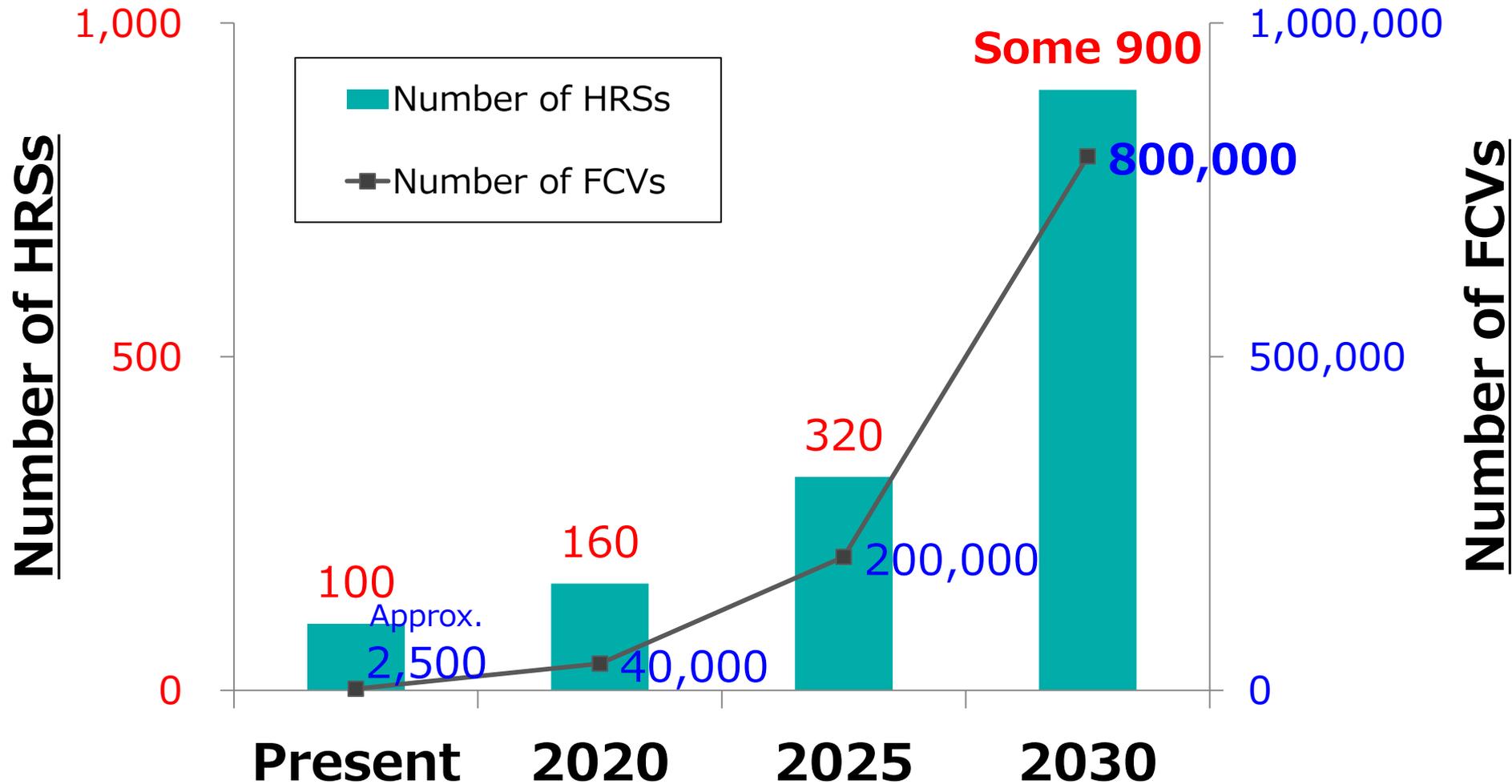
1. JXTG's Hydrogen Business

2. **Public and Private Initiatives toward Establishing a Hydrogen-Based Society**

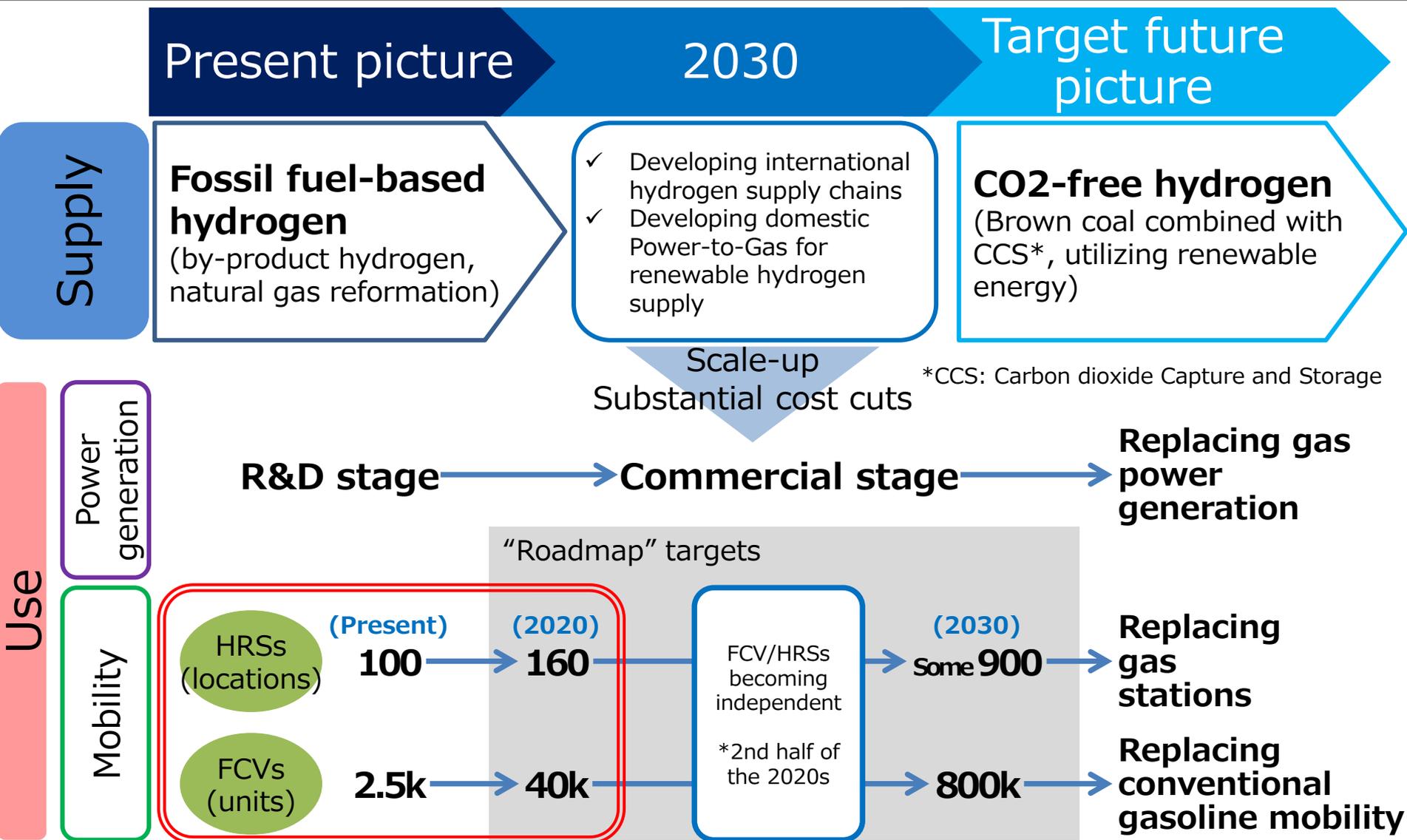
3. Knowledge Dissemination and Enlightening Activities Related to Hydrogen Energy

# “Strategic Road Map for Hydrogen and Fuel Cells” by METI

Targets for the dissemination of FCVs and the construction of HRSs were set.



# Points of the "Basic Hydrogen Strategy" (as formulated by METI in December, 2017)



Source: We prepared the figure above based on the "Basic Hydrogen Strategy."

# Overview of a New Company to Provide for a Full-Fledged HRS System

A new company has been established not only to support widespread use of FCVs and strategic construction of HRSs in Japan, but also to give indirect supports to station businesses so that they will become autonomous.



Infrastructure  
Developers



Automakers



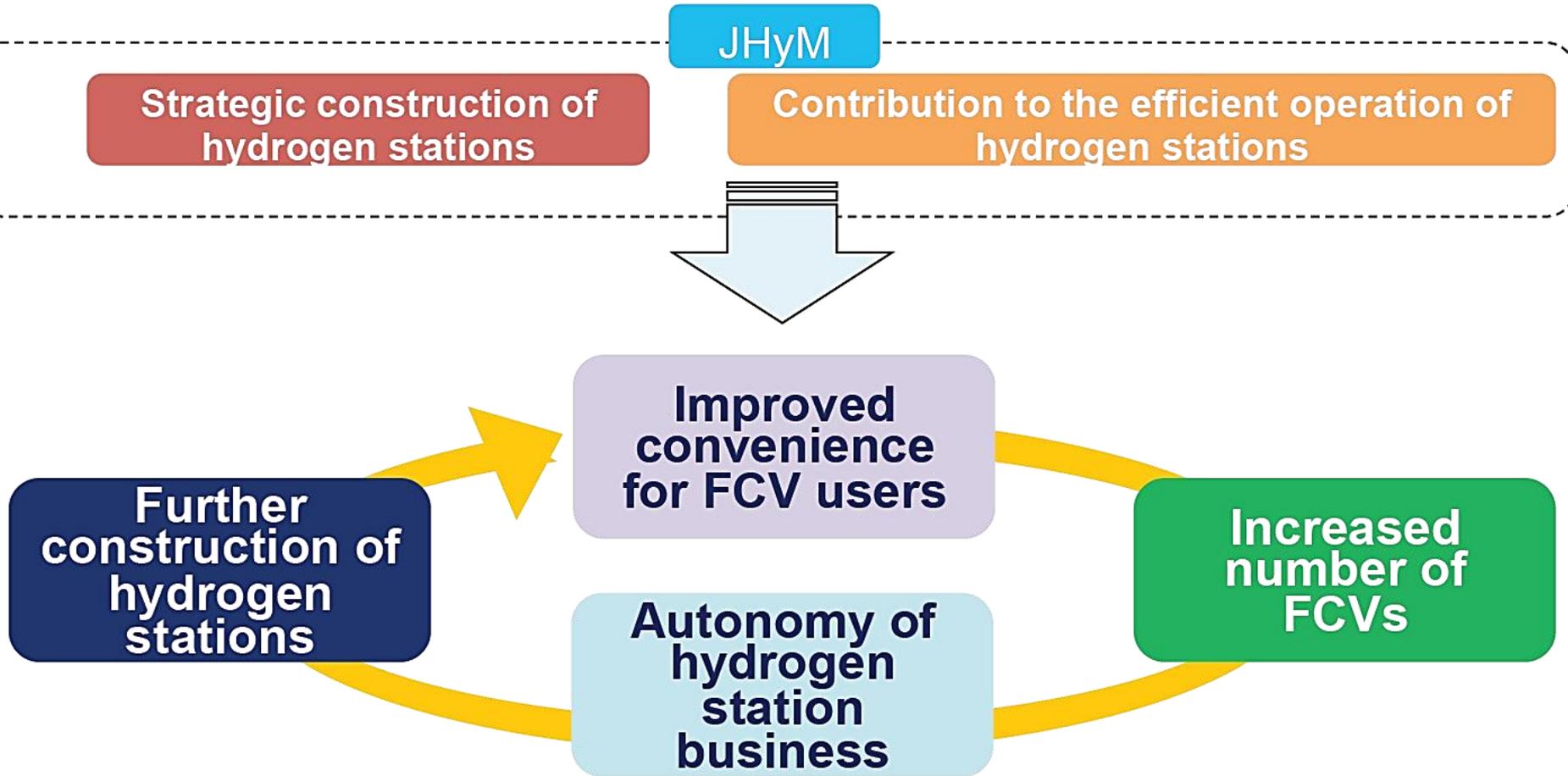
Investors, etc.



source: Press conference presentation material by JHyM

# JHyM's Activities and Merits

It aims to accelerate development of HRSs and stabilize their business operation so as to establish a viable HRS network.



source: Press conference presentation material by JHyM

# Hydrogen Council

To realize a hydrogen-based society, we will participate not only in domestic activities, but also in global cooperative activities.

## What is Hydrogen Council?

- The first initiative set up by global CEOs in the world to promote a role to be played by hydrogen technology in global energy transition.
- It was launched at the World Economic Forum held in Davos, Switzerland in early 2017.
- Its member companies earn a combined revenue of 1.6 trillion euros a year, and employ a total of more than 2.5 million people across the world.

## Hydrogen Council



## STEERING MEMBERS (24 companies)



## SUPPORTING MEMBERS (15 companies)



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# Organization of Experience and Study Events

- It is essential for operating HRSs that residents in neighboring areas understand and accept them.
- We organize experience tours and other events in collaboration with local municipalities to develop residents' sense of familiarity with hydrogen.

# Opening of a Show Room

We opened a show room named “**suiso terrace**” at Yokohama Tsunashima Hydrogen Station (in Kohoku-ku, Yokohama) in March 2017, with the concepts of “**seeing**” and “**experiencing**”.



**Address:** 4-3-9 Tsunashimahigashi  
Yokohama Kohoku-ku,  
Kanagawa

**Hours:** Tuesdays/Thursdays 1 p.m. – 4 p.m.  
Saturdays 10 a.m. – 4 p.m.

**Closed:** Sundays, Mondays,  
Wednesdays, Fridays,  
National holidays

**Admission:** Free  
**Website**  
**(in Japanese):** <https://www.noe.jxtg-group.co.jp/business/hydrogen/suisoterrace/>

# Thank for your kind attention



**Enegori-kun (The mascot of JXTG)**