

Tokyo Metropolitan Government's Efforts to Expand and Promote the Use of Hydrogen Energy

Bureau of Industrial and Labor Affairs
Tokyo Metropolitan Government
(Hereafter TMG)

Visions for 2050 and Actions toward 2030

Goals for 2050

● Green Hydrogen

Make full use of Green Hydrogen to support the mass introduction of renewable energy



Green Hydrogen Facility
© Toshiba Energy Systems & Solutions Corporation

● Hydrogen Powered Transport

Use green hydrogen to fuel large vehicles such as ships, aircraft, and so on



Image of a hydrogen aircraft
© Kawasaki Heavy Industries, Ltd.

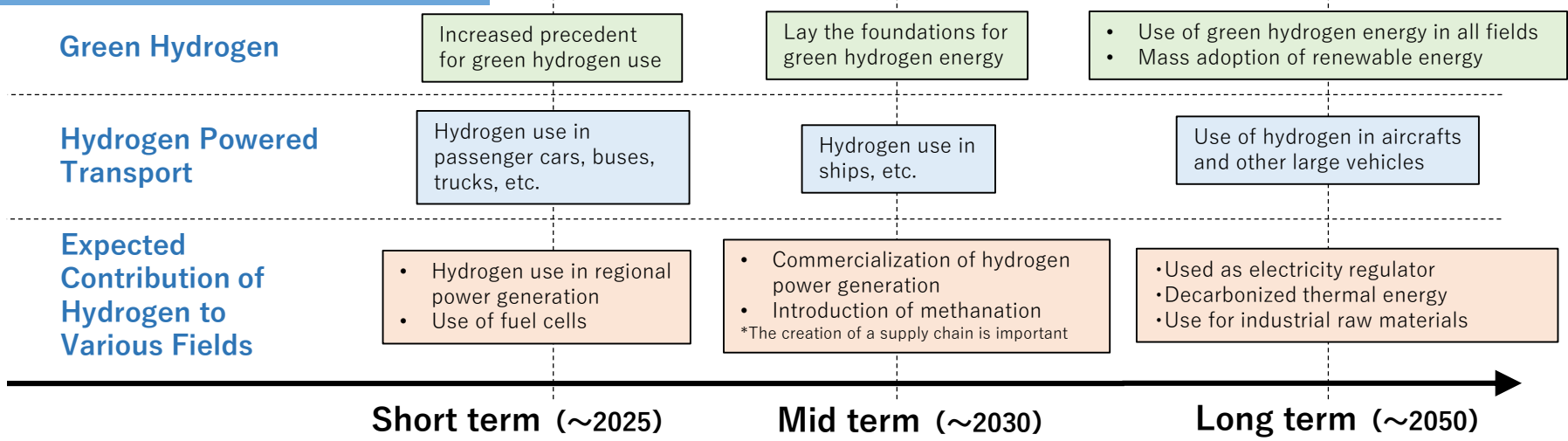
● Expected Contribution of Hydrogen to Various Fields

Use green hydrogen for power generation, heat demand (e.g. methanation), and industrial raw materials



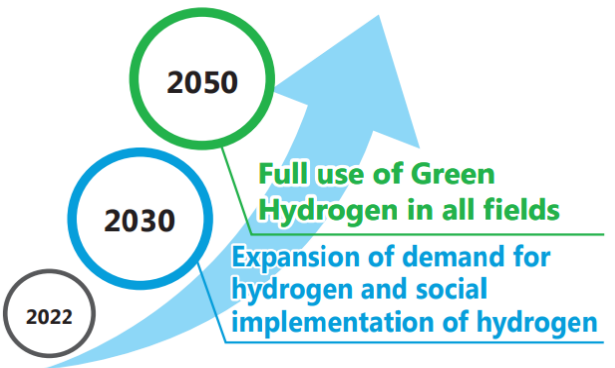
Image of verification equipment
© Mitsubishi Heavy Industries, Ltd

Mid-Long Term Outlook

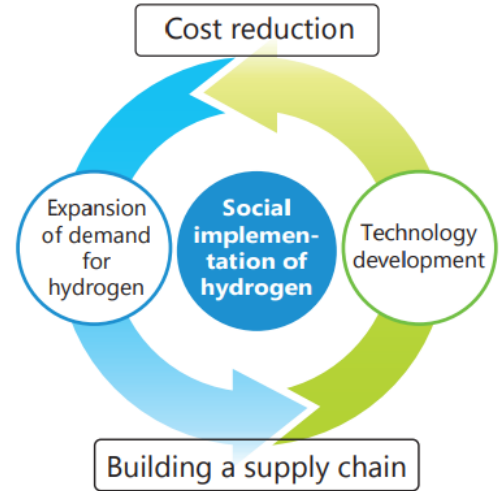


Visions for 2050 and Actions toward 2030

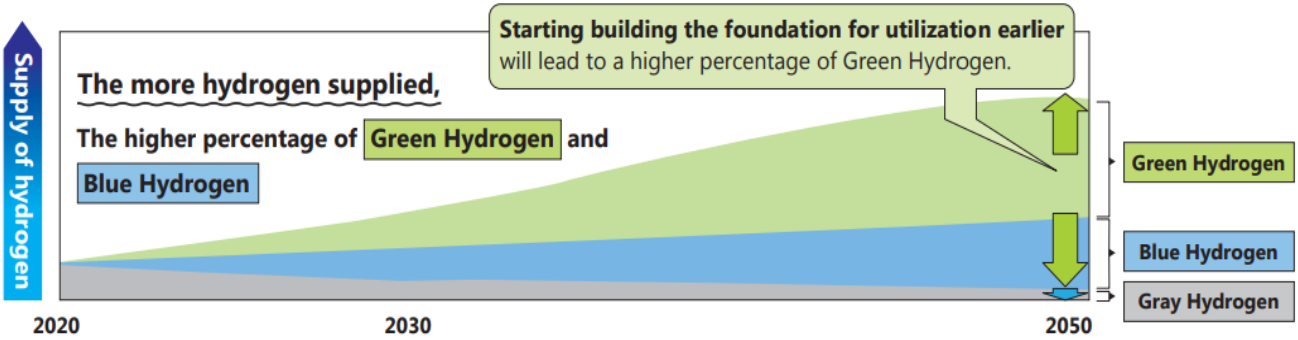
- By 2050, in a decarbonized society, green hydrogen will be used in all sectors and contribute to further decarbonization in transportation etc.
- By 2030, we aim to establish a foundation for the full-scale use of green hydrogen, and expand demand for the fuel as well as its implementation in society.



Technological Development, Cost Reduction, Construction of a Supply Chain for a Virtuous Cycle



■ Image of expansion of Green Hydrogen



Source: Global Hydrogen Review 2021, IEA

Introducing our Initiatives

Transport Sector

Promotion of the following:

- The development of hydrogen stations
- The introduction of fuel cell vehicles
- The introduction of fuel cell buses
- Early introduction of fuel cell trucks
- Project for fuel cell garbage trucks
- The introduction of fuel cell forklift trucks

Green Hydrogen

- Laying the foundations for green hydrogen use
 - Collaboration with Yamanashi Prefecture
 - Utilization in TMG facilities (generate precedent)
- Holding the Tokyo Green Hydrogen Roundtable
- HENCA Tokyo 2023 : Hydrogen Forum
- Use of hydrogen at the Tokyo 2020 Games
- Promote hydrogen production and the necessary equipment

Generate Momentum

- Collaboration to promote and educate the public
- Formulation of the Tokyo Hydrogen Vision
- Launched the Tokyo Hydrogen Navi, a special website

FY 2023 Topics

Holding ceremonies and events related to hydrogen

Fuel Cell Light Truck Launch

- On May 15, the Tokyo Project - Fuel Cell Light Truck Launch was held to mark the start of the introduction of fuel cell light trucks.



Ceremony for starting the use of Green Hydrogen from Yamanashi

- On May 25, the use of Green Hydrogen produced in Yamanashi Prefecture was started for the fuel cell installed at Tokyo Big Sight, which became the first TMG facility to use the hydrogen.



Ceremony for starting the use of Green Hydrogen from Yamanashi
Governor of Yamanashi Prefecture, Governor of Tokyo

Partnership agreement signed by Kawasaki City, Ota Ward, and TMG

- On June 1, an agreement was concluded to enable the three parties to work together and expand the use of hydrogen, which is an effective means of maintaining and strengthening industrial competitiveness, stabilizing the supply of energy, and realizing carbon neutrality.



Mayor of Kawasaki City, Governor of Tokyo, Mayor of Ota Ward

Hydrogen Forum : HENCA Tokyo 2023

- On November 14th, a new international conference will be held to further advance the construction of an international hydrogen supply chain.

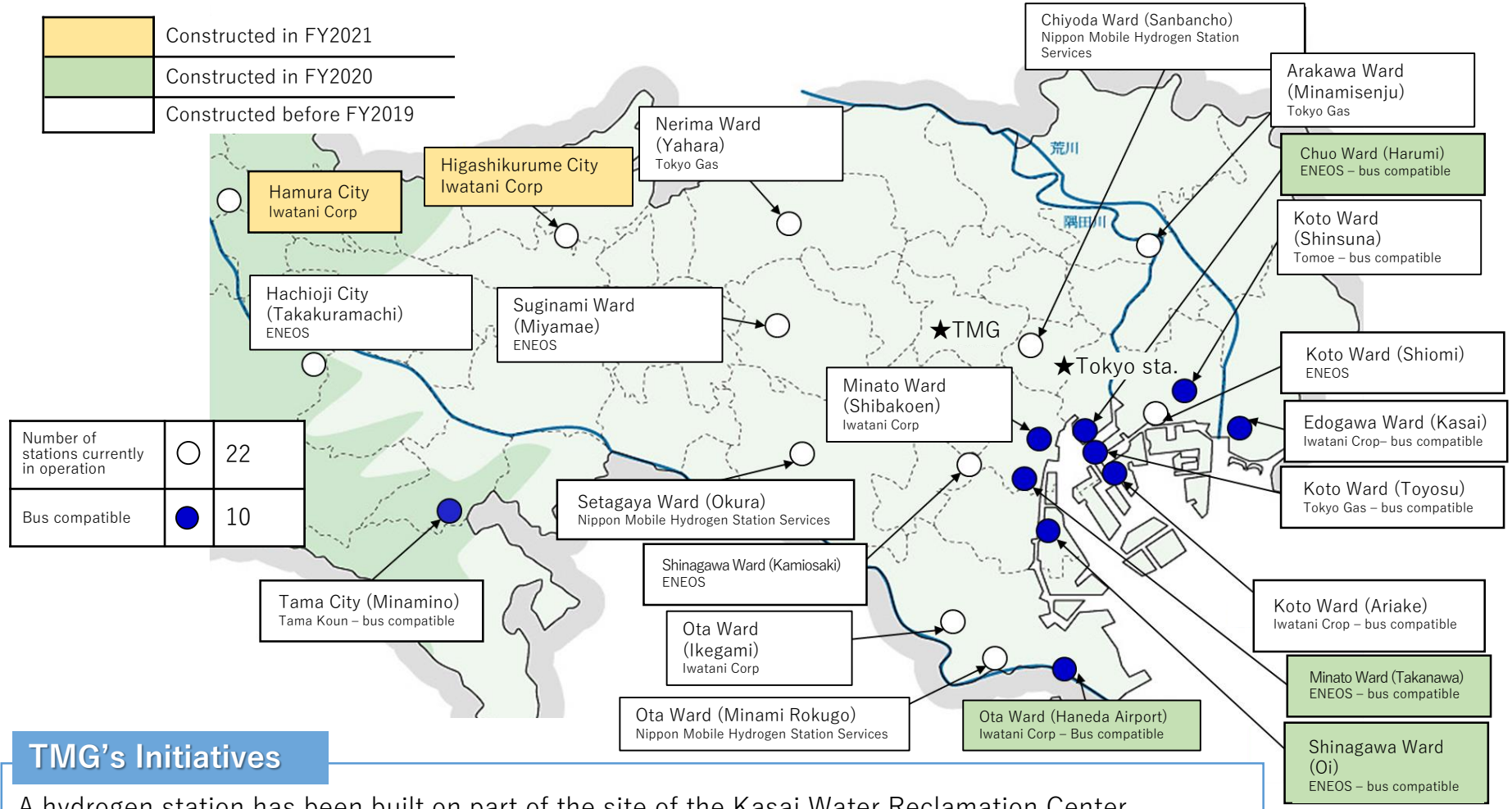
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Hydrogen use in the Transportation Sector

Installation of hydrogen refueling stations in Tokyo

As of June 2023, there are 23 hydrogen stations, 10 of which are bus-compatible



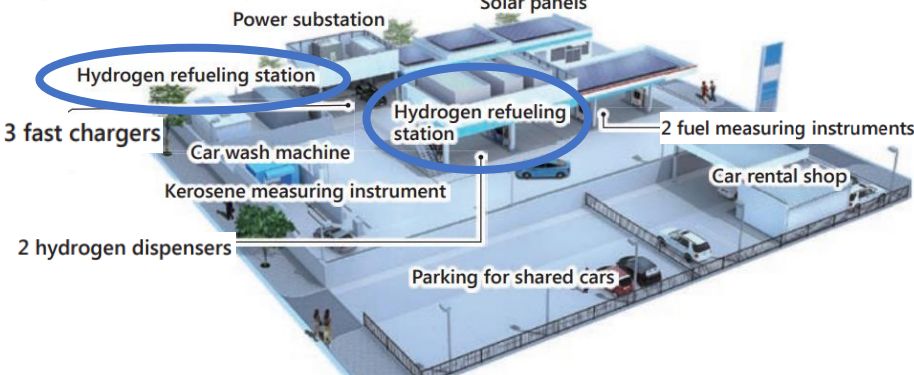
TMG's Initiatives

A hydrogen station has been built on part of the site of the Kasai Water Reclamation Center (under the jurisdiction of the Bureau of Sewerage).

Hydrogen use in the Transportation Sector

Support for multi-energy stations (As of February, 2023)

Image of multi-energy station



Support for environmentally friendly multi-energy stations, including the installation of hydrogen stations, quick-charging facilities, and renewable energy facilities

Support projects for the introduction of hydrogen stations for small and medium sized gas stations: 1) accepting inquiries for opening a hydro station, 2) offering study sessions on how to obtain qualifications, 3) seminars etc.

Subsidies for the Management Expenses of Hydrogen Stations

Items	Eligible recipient	Subsidy amount
Hydrogen station management expenses	Big enterprises	Max. 5 million JPY
	SMEs	Max. 10 million JPY
Bus compatible (1 equipment system)	Big enterprises	Max. 10 million JPY
	SMEs	Max. 20 million JPY
Bus compatible (2 equipment system)	Big enterprises	Max. 20 million JPY
	SMEs	Max. 40 million JPY

Subsidies for the Land Expenses of Hydrogen Stations

hydrogen station land expenses	Big enterprises	80% (TMG solo subsidy) *current portion is 25%
	SMEs	100% (TMG solo subsidy) *current portion is 25%

Subsidies for the Establishment of Hydrogen Stations

Items	Eligible recipient	Subsidy amount
Become bus compatible	All kinds of enterprises	100% up to 1 billion JPY *when combined with national subsidy
Repairing/ expansion costs to become bus compatible	All kinds of enterprises	Max. 400 million JPY
Subsidy rates of 80% applies to big enterprises and 100% to small and medium enterprises(SMEs) for all the items below (TMG solo subsidy):		
Non bus compatibility related costs	Big enterprises	Max. 174 million JPY (model case)
	SMEs	Max. 290 million JPY (model case)
Small stations	Big enterprises	Max. 20 million JPY
	SMEs	Max. 50 million JPY
Installation of barrier walls	All kinds	Max. 30 million JPY
Removal/ relocation of existing facilities	All kinds	Max. 30 million JPY
Support for operational losses due to conversion/ installation	All kinds	Max. 5 million JPY
Installation of next generation canopies	All kinds	Max. 100 million JPY
Land development in unserved areas	All kinds	Max. 200 million JPY

Promotion of hydrogen use in the transport field

Expanded use of fuel cell vehicles

Goal

Phasing out the sale of new gasoline-only passenger cars in Tokyo: 100% by 2030

*** 1,539 fuel cell vehicles (FCVs) were owned as of the end of March 2023.**

Source: Statistics of Automobile Inspection & Registration Information Association

Subsidy projects

● Project to expand the use of fuel cell vehicles

○ Targets: Fuel cell vehicles

○ Subsidy: **1.1 million yen** for FCVs with a vehicle-to-load function or 1.0 million yen for FCVs without a vehicle-to-load function

(Additional 250,000 yen if 100% renewable electricity contract is concluded or solar power generation equipment (2 kW) is installed)

* Another subsidy is available for vehicles from automobile manufacturers that have a certain level of sales of ZEVs and others.

● Project to introduce ZEVs to car sharing and rental services

○ Targets: Fuel cell vehicles introduced for car sharing or rental services

○ Subsidy: **2.0 million yen** for FCVs with a vehicle-to-load function or 1.9 million yen for FCVs without a vehicle-to-load function

* Another subsidy is available for vehicles from automobile manufacturers that have a certain level of sales of ZEVs and others.



Fuel cell vehicle
© Toyota Motor Corporation

Hydrogen use in the Transportation Sector

Promotion of Fuel Cell Buses

Aim	To have 300 'zero emission buses' in operation by 2030
Current Situation	Number of Fuel cell buses in Tokyo 109 (As of November 2023)
Subsidy	<ul style="list-style-type: none"> ● Support for introduction costs [when combined with national subsidies] <p>【Basic subsidy】 Upper limit of 50,000,000JPY* *This figure is reached when you subtract the total government subsidy and the cost correspondent to a typical diesel bus</p> <p>【Additional subsidy】 Upper limit of 20,000,000JPY* * 1) dependent on a written agreement to introduce at least 5 units for 5 years, 2) must also go toward the maintenance of hydrogen stations</p> <ul style="list-style-type: none"> ● Support for fuel costs <p>Subsidies for hydrogen stations in Tokyo to buses with a Tokyo license plate to account for the difference in sale price compared to diesel fuel.</p>



Fuel Cell Bus
 ©TMG Bureau of Transportation

Hydrogen use in the Transportation Sector

Promote the Early Implementation of Fuel Cell Trucks

Current Status

- Participating in and collaborating with large-scale social implementation projects involving automobile manufacturers, shippers, logistics companies, etc.
- Number of Light-scale fuel cell trucks introduced in Tokyo area : **39** (as of the end of November 2023)

Project Overview

- Introducing Large Fuel Cell trucks, etc. from trunk logistics to last mile delivery
 - Small FC trucks: Approximately 190 units (to be introduced gradually from 2023)
 - Large FC trucks: Approximately 50 units (to be introduced gradually from 2025)
- Building an energy management system integrated with operation management

Subsidy Projects

● Early Implementation Project for ZEV Trucks

- Provide subsidies to businesses that introduce fuel cell trucks
- Subsidies are provided to businesses and other entities that introduce fuel cell trucks, as an incentive, in order to promote wider use of FCVs (upper limit 13,000,000JPY)



Large Fuel Cell Truck
©Toyota Motor Corporation



Light-duty Fuel Cell Truck
©CJPT, Ltd.

Promotion of hydrogen use in the transport field

Trial operation and implementation support for fuel cell garbage trucks

Trial operation

- The project has been carried out in cooperation with Waseda University since FY 2019 using a project proposal system that welcomes suggestions from university researchers.
- Trial operation was conducted in Minato Ward in FY 2021 and Tama City from FY 2022 to 2023.

Implementation support

- Since FY 2023, FC garbage trucks have been lent free of charge for a certain period of time to municipalities that want to use them on a trial basis and support has been provided to those aiming at the intensive introduction of them.



Fuel cell garbage truck

Implementation support for fuel cell forklifts

Progress so far

- In FY 2022, a survey of introduction status was carried out, verifying the use of actual equipment at logistics centers.
- Since FY 2023, a project has been in place to match businesses that are considering introducing fuel cell forklifts with businesses that provide the forklifts and hydrogen chargers, and part of the price of the forklifts has been subsidized for the businesses that choose to purchase them.



Fuel cell forklift
© Toyota Industries Corporation

Promoting the Use of Green Hydrogen

Collaboration with Yamanashi Prefecture

Project outline

- Conclusion of a Basic Agreement on Promoting the Use of Green Hydrogen with Yamanashi Prefecture
- Collaboration in **promoting the use of Green Hydrogen from Yamanashi Prefecture in Tokyo**, and **encouraging the development of technologies covering the production of Green Hydrogen through its use**



Basic Agreement Signing event on October 28, 2022 with Yamanashi Governor Nagasaki and Tokyo Governor Koike

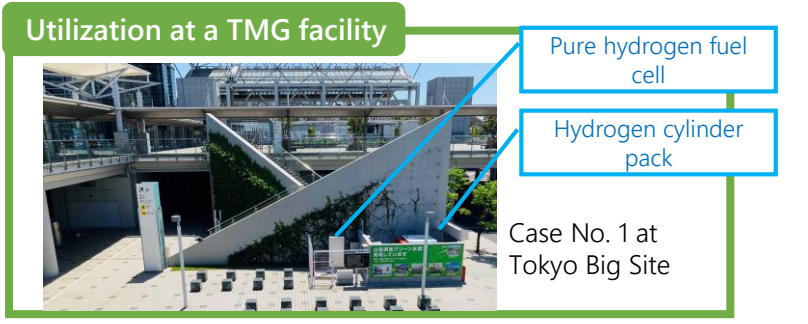
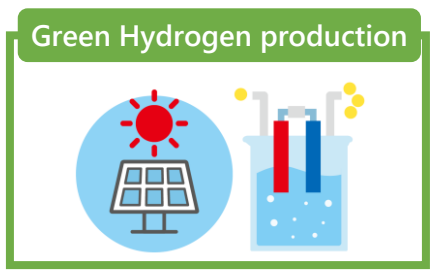


New Energy and Industrial Technology Development Organization (NEDO)
Developing P2G system technology for building a CO₂-free hydrogen powered society from 2016 to 2022
* Yonekurayama Electric Power Storage Technology Research Site in Yamanashi Prefecture © Yamanashi Prefectural Enterprise Bureau

Building the foundation for the use of Green Hydrogen - Utilization at a TMG facility for creating introduction examples

Project outline

- A pure hydrogen fuel cell has been installed at a TMG facility, allowing TMG to demonstrate the advantages of using Green Hydrogen produced in Yamanashi Prefecture.
- PR for visitors has also been arranged.



Promoting the Use of Green Hydrogen

Holding of the Tokyo Green Hydrogen Roundtable

Outline

- Examples were shared in the discussions between companies and organizations making advanced efforts for expanding the use of Green Hydrogen etc. in August and November 2022 and February and May 2023.

1st Round on August 19, 2022

- Theme: Establishment of an international hydrogen supply chain and the expansion of Green Hydrogen etc.
- Participants: Iwatani Corporation, ENEOS, Kawasaki Heavy Industries, Shimizu Corporation, Sumitomo Corporation, Toshiba Energy Systems, Marubeni Corporation, Miura Industries

2nd Round on November 30, 2022

- Theme: Establishment of a hydrogen supply system including pipelines and the broader use of hydrogen
- Participants: Iwatani Corporation, ENEOS, Tokyo Gas, Toyota Motor Corporation, Ota Ward (observer)

3rd Round on February 14, 2023

- Theme: Hydrogen supply network (Green Hydrogen production and hydrogen transportation method)
- Participants: Asahi Kasei, ENEOS, Obayashi Corporation, Tokyo Gas, Toray, NEDO

4th Round on February 17, 2023

- Theme: Hydrogen supply network in the airport coastal area
- Participants: Kawasaki City, Ota Ward

5th Round on May 24, 2023

- Theme: Revision of the Basic Hydrogen Strategy of the national government and the formulation of the Hydrogen Industry Strategy and Hydrogen Safety Strategy
- Participants: Asahi Kasei, ENEOS, Kawasaki Heavy Industries, Chiyoda Corporation, Panasonic Holdings, Hitachi Zosen, Mitsui & Co., Ltd, Hydrogen Value Chain Promotion Council, High Pressure Gas Safety Institute

6th Round on February 17, 2023

- Theme: Exchange of opinions on hydrogen supply systems including pipelines, etc.
- Participants: JFE Steel, Tokyo Gas, Tokyo Gas Network, Nishimura & Asahi Law Office, High Pressure Gas Safety Association, Tokyo Energy Issues Advisory Board Committee member



Promoting the Use of Green Hydrogen

Green Hydrogen production in Tokyo

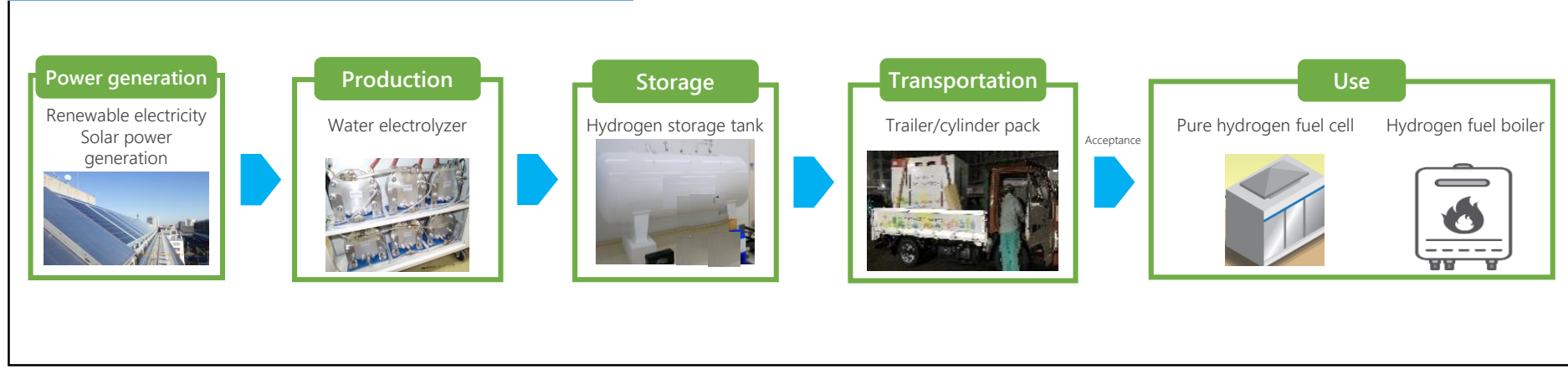
Project content (1)

- Present TMG's model for producing and using Green Hydrogen by developing such efforts as designing Green Hydrogen production facilities to be installed on TMG-owned land
- Promote the broader use of Green Hydrogen by encouraging its implementation in Tokyo

Project content (2)

- Produce Green Hydrogen in Tokyo and develop production and supply centers to supply it in Tokyo
- Install solar panels and hydrogen production equipment on the Central Breakwater to produce hydrogen through renewable energy
- Implement the project in cooperation with the Tokyo Bay eSG Project in FY 2023 and FY 2024

Process from hydrogen production to use



Promoting the Use of Green Hydrogen

Use of hydrogen produced in Fukushima Prefecture during the Tokyo 2020 Games

Hydrogen used at the Relaxation House and residential buildings in the Olympic Village

- Hydrogen produced with renewable energy in Fukushima Prefecture was used at the Relaxation House and in some of the residential buildings in the Olympic Village.



©Tokyo 2020 / Uta MUKUO

Relaxation House in the Olympic Village

Hydrogen used for the Olympic cauldron and relay torches

- Hydrogen was used for the first time in the history of the Games for the Olympic cauldron and some of the relay torches.
- In some of these cases the hydrogen used was produced with renewable energy in Fukushima Prefecture.



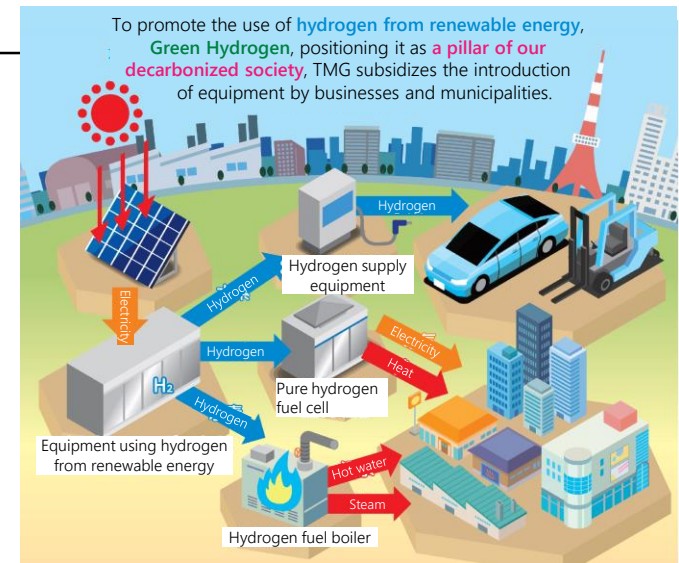
Olympic cauldron

Promoting the Use of Green Hydrogen

Support for businesses introducing equipment producing or using hydrogen (1)

Project outline

- **Project to promote the introduction of equipment in anticipation of the full-scale use of hydrogen from renewable energy**
 - Subsidized equipment
 - Equipment using hydrogen from renewable energy, pure hydrogen fuel cells, and hydrogen fuel boilers
 - Subsidy rate and maximum subsidy
 - Equipment using hydrogen from renewable energy: **1/2 (up to 370 million yen)**
 - Pure hydrogen fuel cells: **2/3 (up to 87 million yen)**
 - Hydrogen fuel boilers: **2/3 (up to 45 million yen)**



Support for businesses introducing equipment producing or using hydrogen (2)

Goal 30 MW of commercial and industrial fuel cells by 2030

Project outline

- **Project to promote the formation of smart energy areas using hydrogen in the commercial and industrial sectors**
 - Subsidized equipment: Commercial and industrial fuel cells
 - Subsidy rate and maximum subsidy: **2/3 (up to 333 million yen)**

Promoting the Use of Green Hydrogen

Support for businesses introducing equipment producing or using hydrogen (3)

Project outline

● Project to support the implementation of equipment producing or using Green Hydrogen (from FY 2023)

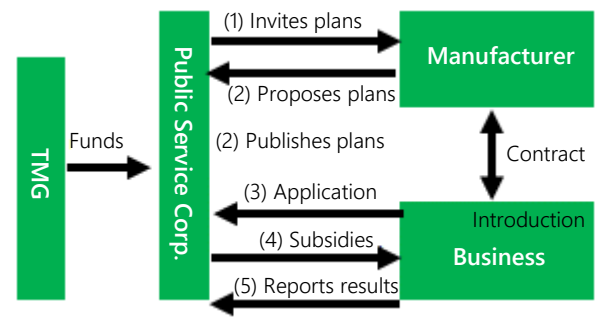
Hydrogen equipment manufacturers will propose model plans that package equipment covering production through use of Green Hydrogen in a form suitable for installation in Tokyo. Businesses will explore installation locations and costs by referring to the model plans. TMG will provide support for the introduction of these model plans.

■ Project content

Subsidized equipment	Subsidy rate	Scale	Maximum subsidy
One package ^{*1}	10/10	2	253 million yen
Other than one package		3	177 million yen
Renewable electricity equipment ^{*2}		-	54 million yen

*1 Equipment that integrates hydrogen production through use in a container

*2 Subsidy for scale according to hydrogen production capacity



■ Project sequence

- (1) Start of public invitation of model plans from manufacturers
- (2) The Public Service Corporation will publish proposed model plans. (from August, 2023)
- (3) Based on the published model plans, businesses will apply for subsidies to the corporation, contract with manufacturers, and start construction work for introducing equipment (installation and reporting to be completed by the end of December 2026).
- (4) The corporation will subsidize the introduction costs after businesses complete the introduction.
- (5) Businesses will hold a tour of equipment, disseminate information on it, and report the results to the corporation.

Promoting the Use of Green Hydrogen

Hydrogen Energy Conference for Action: HENCA Tokyo 2023

To further advance the construction of an international hydrogen supply chain and technological development, a new international conference “HENCA Tokyo 2023” will be held by TMG.

*HENCA is an abbreviation for Hydrogen Energy Conference for Action

The conference is archived at : <https://www.tokyo-h2-forum.metro.tokyo.lg.jp/en/>

Speakers

Moderator



Governor Koike's speech



Panel Discussion

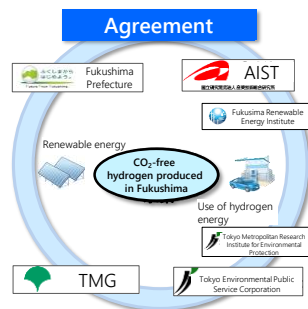
After the conference, a joint message was issued towards the social implementation of hydrogen in 2030.

Fostering Momentum

A variety of collaborations to raise awareness of hydrogen

Agreements with Fukushima Prefecture, AIST, and Environmental Public Service Corporation

- Fukushima Prefecture, the National Institute of Advanced Industrial Science and Technology, Tokyo Environmental Public Service Corporation, and TMG signed a four-party agreement for the expansion of Green Hydrogen in 2016.



Basic agreement with NEDO

- An agreement was concluded with NEDO in 2020 to obtain technical knowledge for TMG's policies, and collaborate on information dissemination and awareness raising.



Hydrogen information center "Tokyo Hydrogen Museum"

- Easy-to-understand information on hydrogen is provided for all, from children to the elderly, at the Tokyo Hydrogen Museum, a comprehensive learning facility established in 2016 where visitors can enjoy learning about hydrogen through a hands-on experience.



© Tokyo Environmental Public Service Corporation

Tokyo Hydrogen Promotion Team

- To foster a movement toward the expansion of hydrogen energy in both public and private sectors, the Tokyo Hydrogen Promotion Team was formed in 2017 in cooperation with more than 100 private companies and local governments in Tokyo.



Fostering Momentum

Formulation of the Tokyo Hydrogen Vision

Outline of the Tokyo Hydrogen Vision

- Show the **Tokyo of 2050 with hydrogen energy widespread.**
- Present the **direction of hydrogen initiatives toward the milestone of 2030.**
- Encourage the **understanding of Tokyo residents and participation of businesses** by communicating the efforts of companies to make hydrogen more familiar.



Hydrogen mascot "Suison"
© Tokyo Environmental Public Service Corporation

Chapter 1 Climate Crisis and Hydrogen Energy

Significance of hydrogen for the climate crisis and the realization of a decarbonized society

Chapter 2 Visions for 2050

Green Hydrogen fully utilized in all fields, including transport, power generation, and industrial fields, supporting the massive introduction and supply of renewable energy as well as contributing to decarbonization and a stable energy supply

Chapter 3 Direction of Actions toward a 2030 Carbon Half

Expanding the use of Green Hydrogen, ensuring the broader use of hydrogen in the transport and other fields



Fostering Momentum

Creating a website featuring hydrogen energy: Tokyo Hydrogen Navigator

Outline of Tokyo Hydrogen Navigator

- **A website that aggregates information on hydrogen energy to be opened in June 2023**
- Aiming to provide an opportunity for Tokyo residents to become more familiar with hydrogen and for businesses to consider participating in the hydrogen business



Main content

The latest information on hydrogen energy

Efforts and support measures of TMG, including subsidy information

Activities of the Tokyo Hydrogen Promotion Team

Expansion of hydrogen energy in Tokyo

Introduction of kids' page, videos, and learning facilities

<https://www.tokyo-h2-navi.metro.tokyo.lg.jp/>

*Japanese only



Fostering Momentum

Governor Koike's statement at COP28

- Attended COP28 "Local Climate Action Summit" and gave a lecture on Tokyo's initiatives
- Disseminating efforts towards launching a hydrogen exchange in collaboration with H2Global
- Date: Friday, December 1, 2023 Location: Dubai (United Arab Emirates (UAE))

The Tokyo Metropolitan Government will work with H2Global, an internationally known institution with one of the most developed support instruments for global hydrogen today, to promote efforts to establish a hydrogen exchange in Tokyo. In addition, we will promote efforts to form alliances with overseas cities and other entities to ensure the supply of hydrogen. Furthermore, in order to increase the demand for hydrogen, the Tokyo Metropolitan Government will take the lead in using it and encourage the private sector to do the same.

都は、世界有数の水素普及機関として知られるH2Globalと連携して、東京に水素取引所を立ち上げる取組を進めていきます。
また、水素の供給を確保するため海外の都市等とアライアンスを組む協定を結ぶ取組を進めていきます。さらに、都が水素の需要を伸ばすため、その利用を率先して進め、民間にも働きかけを行っていきます。



The governor spoke at LCAS, hosted by Bloomberg Philanthropies at COP28