

# 16th Kawasaki International Eco-Business Forum

Outlook for Local Production and Local Consumption Model  
for Production Technologies in Hydrogen &  
Ammonia Derived from Used Plastic

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Oguchi  
Planning Group  
Kawasaki Plant  
Showa Denko K.K.  
13 November 2019

# INTRODUCING SHOWA DENKO GROUP



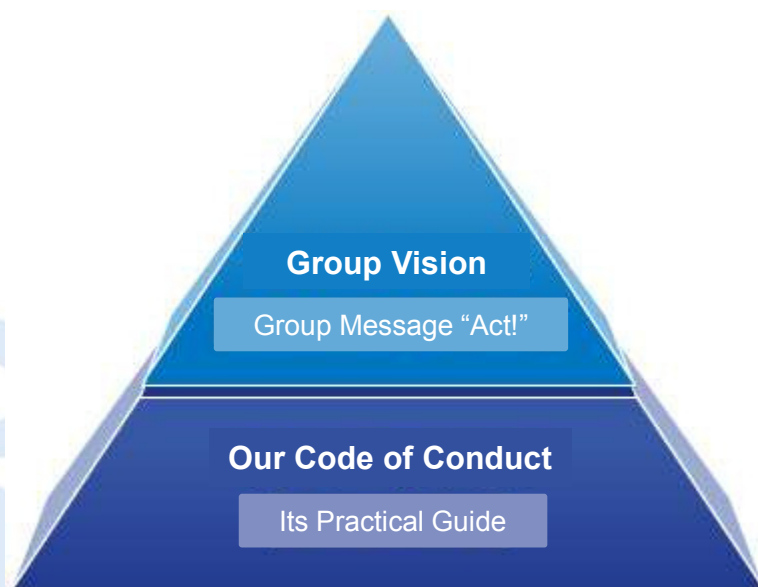
# Company Outline



Showa Denko K.K.

Founded: 1 June 1939  
Head office: 1-13-9 Shiba Daimon, Minato-ku, Tokyo  
President & CEO: Kohei Morikawa  
Capital: 140,564 million yen\*  
Employees: Consolidated 10,634\*

\*As of 31 December 2018

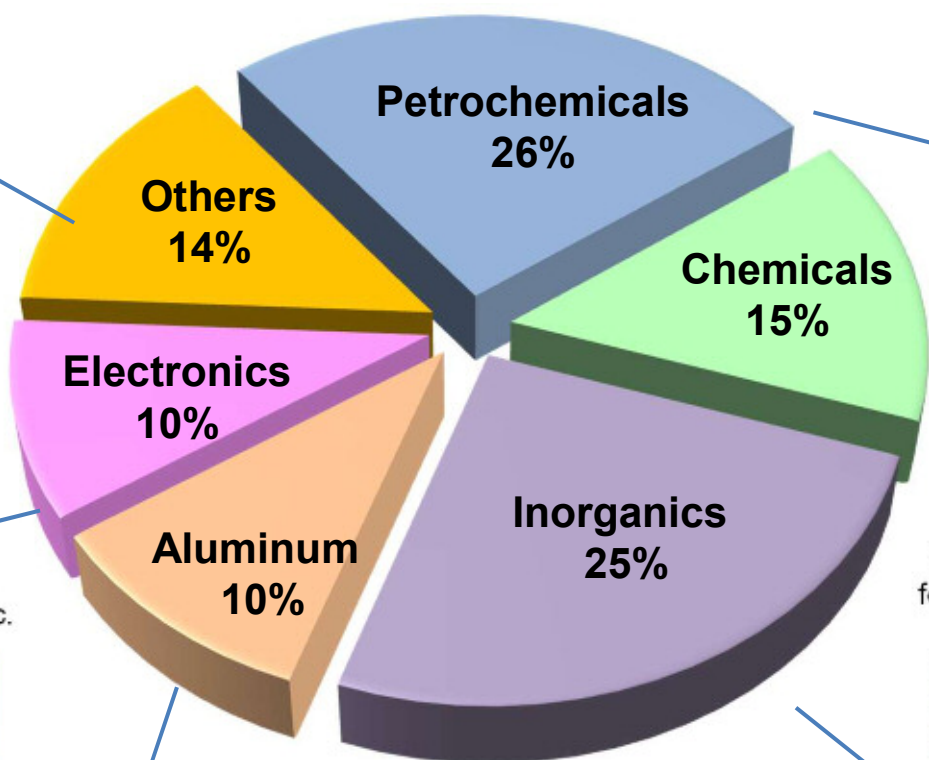


Under its vision, Showa Denko Group strives to realize “a company contributing to the sound growth of society” by helping to create a society where affluence and sustainability are harmonized.

# Introducing Our Main Business Segments



Sales: 992.1 billion yen (FY2018)



Sic epitaxial wafers, etc.



Lithium-ion battery materials, etc.



Hard disks, etc.



High-purity foils for electrolytic capacitors, cast bars and cast materials, etc.



Plastic raw materials, synthetic rubber raw materials, etc.



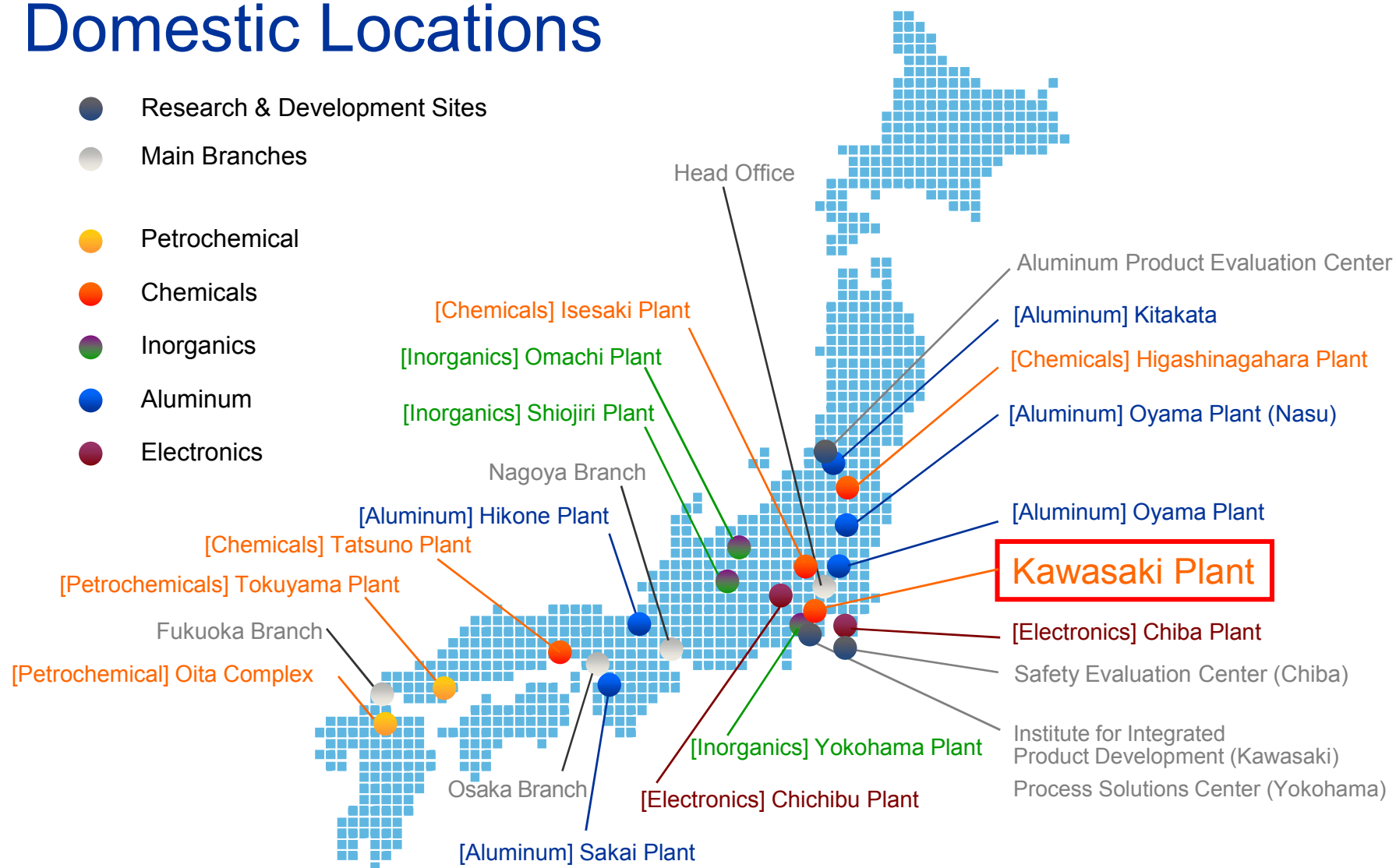
Cosmetics raw materials, special gases for semiconductors, fibrous raw materials, gases for industry, etc.



Graphite electrodes (for electric steelmaking furnaces), grinding materials, etc.

Ammonia production is carried out at Kawasaki Plant

## Domestic Locations





**Mt. FUJI**

**SHOWA DENKO K.K.  
Kawasaki Plant**

**YOKOHAMA**

**TOKYO**

**KAWASAKI**

**TAMAGAWA  
RIVER**

**HANEDA  
AIRPORT**





Tokyo

Tamagawa River

Chidori

Kawasaki

Gasification facility

Crushing facility

Ogimachi

Okawa

To Yokohama

Total area:  
559,000m<sup>2</sup>



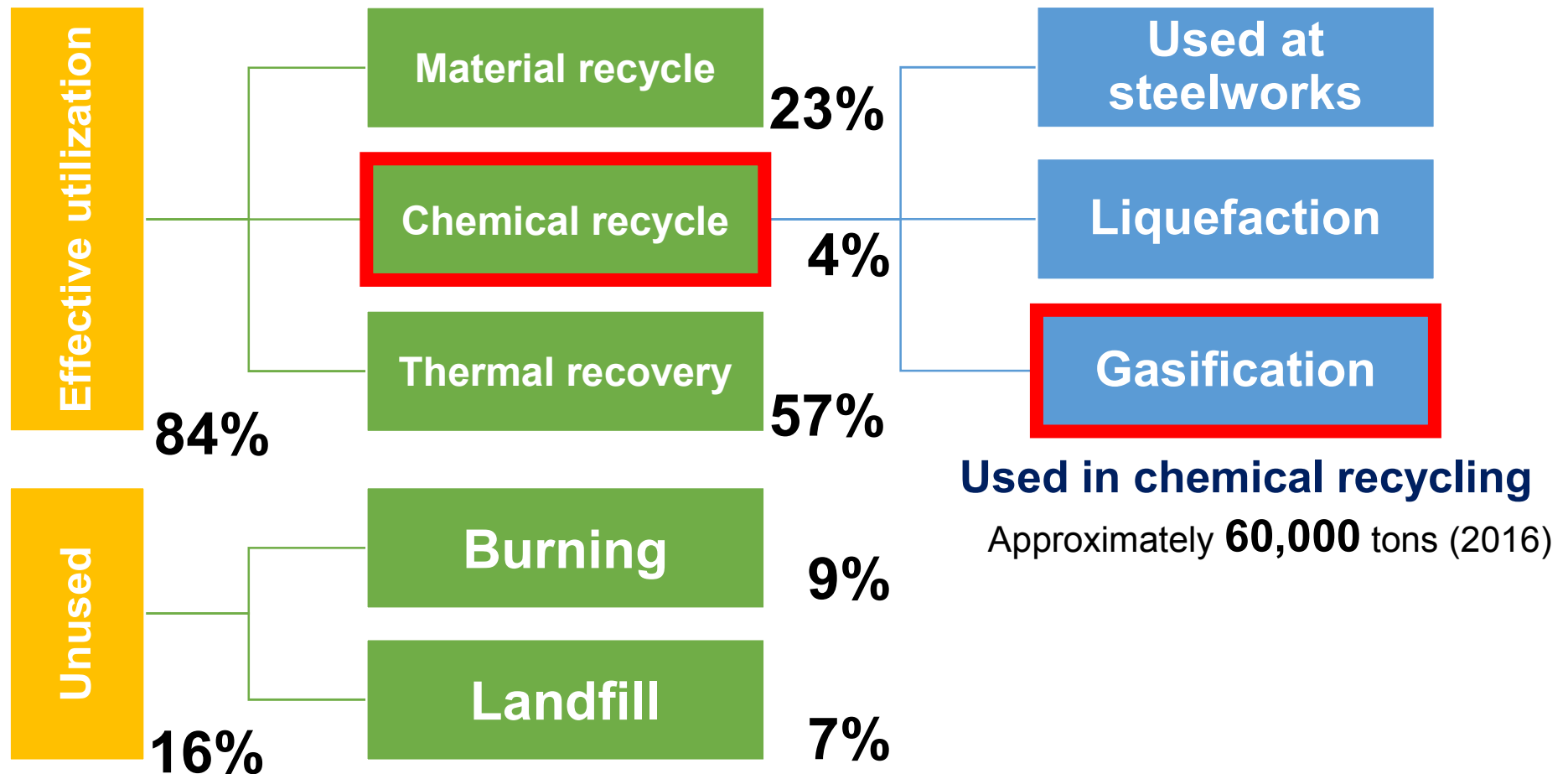
# **OUR INITIATIVES INVOLVING HYDROGEN & AMMONIA PRODUCTION FROM WASTE PLASTICS**





# Current Situation with Plastic Recycling in Japan

Total volume of waste plastic: 8.99 million tons (2016)



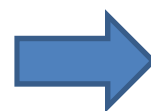
# Plastic Chemical Recycling Project



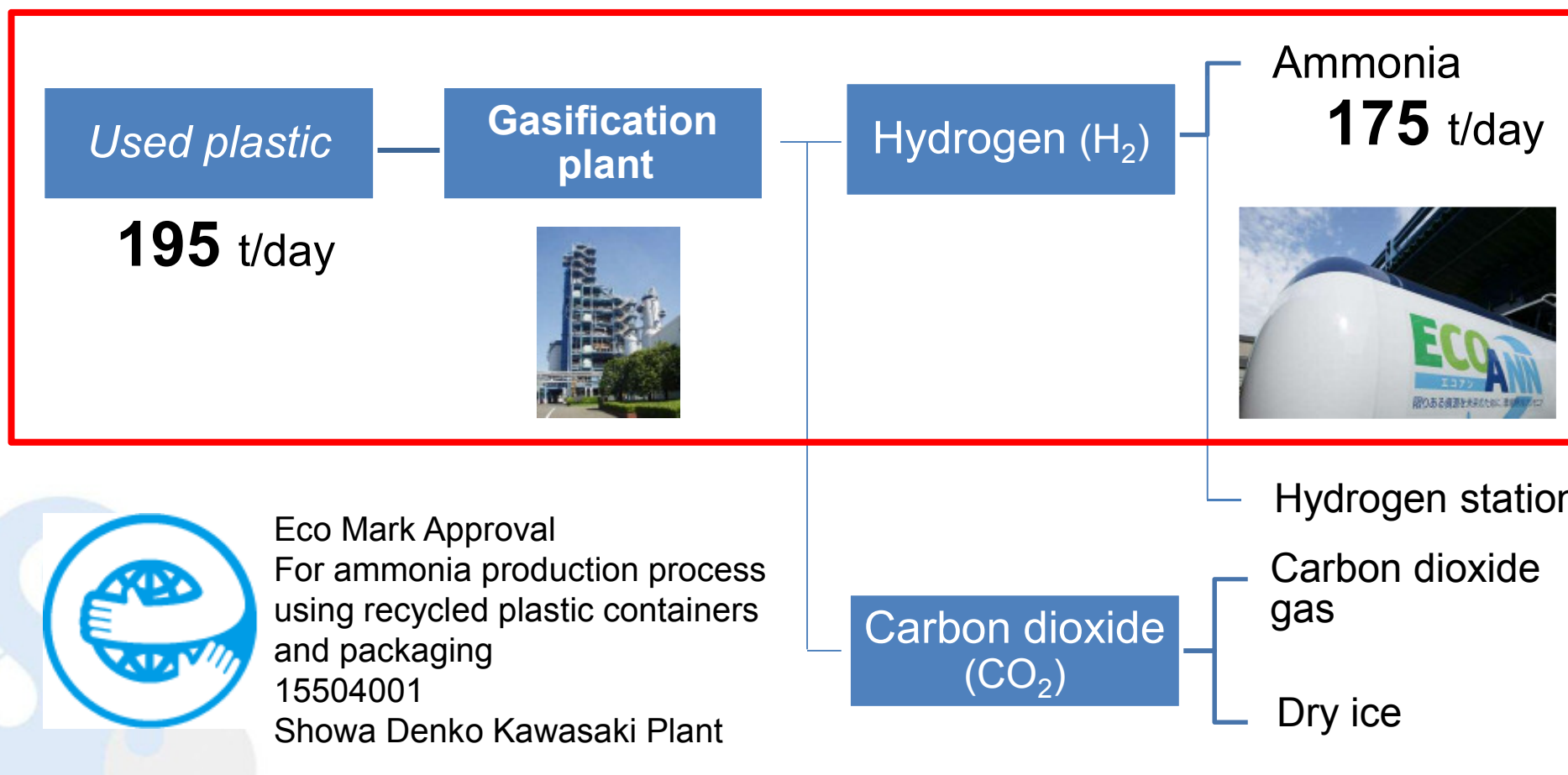
Showa Denko K.K.

## (1) Making hydrogen and ammonia from used plastic

Domestic  
Volume used plastic waste:  
8.99 million tons (2016)



Chemical recycling:  
Approx. 60,000 tons (2016)



# Plastic Chemic Recycle Work



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## (2) Carbon dioxide reused in carbon dioxide gas and dry ice



Showa Denko Group

### Carbon dioxide



Carbonated drinks



Fresh food packaging



Plant forcing

### Dry ice

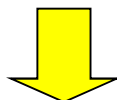




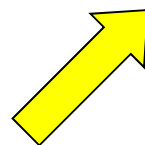
# Outline of Crush Molding Facilities



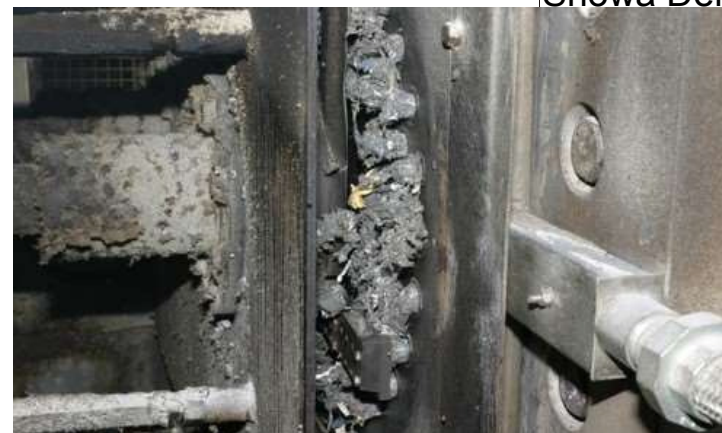
**Compressed bale (received)**



**Crushing (crusher)**



(Magnetic separator)



**Volume reduction molding  
(molding machine)**



**Volume reduced product  
(refuse paper & plastic fuel, or RPF)**

# Outline of Gasification Facility



## -- Gasification facility --



Low-temperature  
gasification furnace

Temperature: 600°C  
Pressure: 1 MPaG

High-temperature  
gasification furnace

Temperature: 1,400°C  
or higher  
Pressure: 1 MPaG





# Night-time View of Ammonia Plant

- Our air conditioner gasification facility is one of the noted night-time tourist spots in Kawasaki!



Akihiro Furuya@marvelick(Team Factory Style)



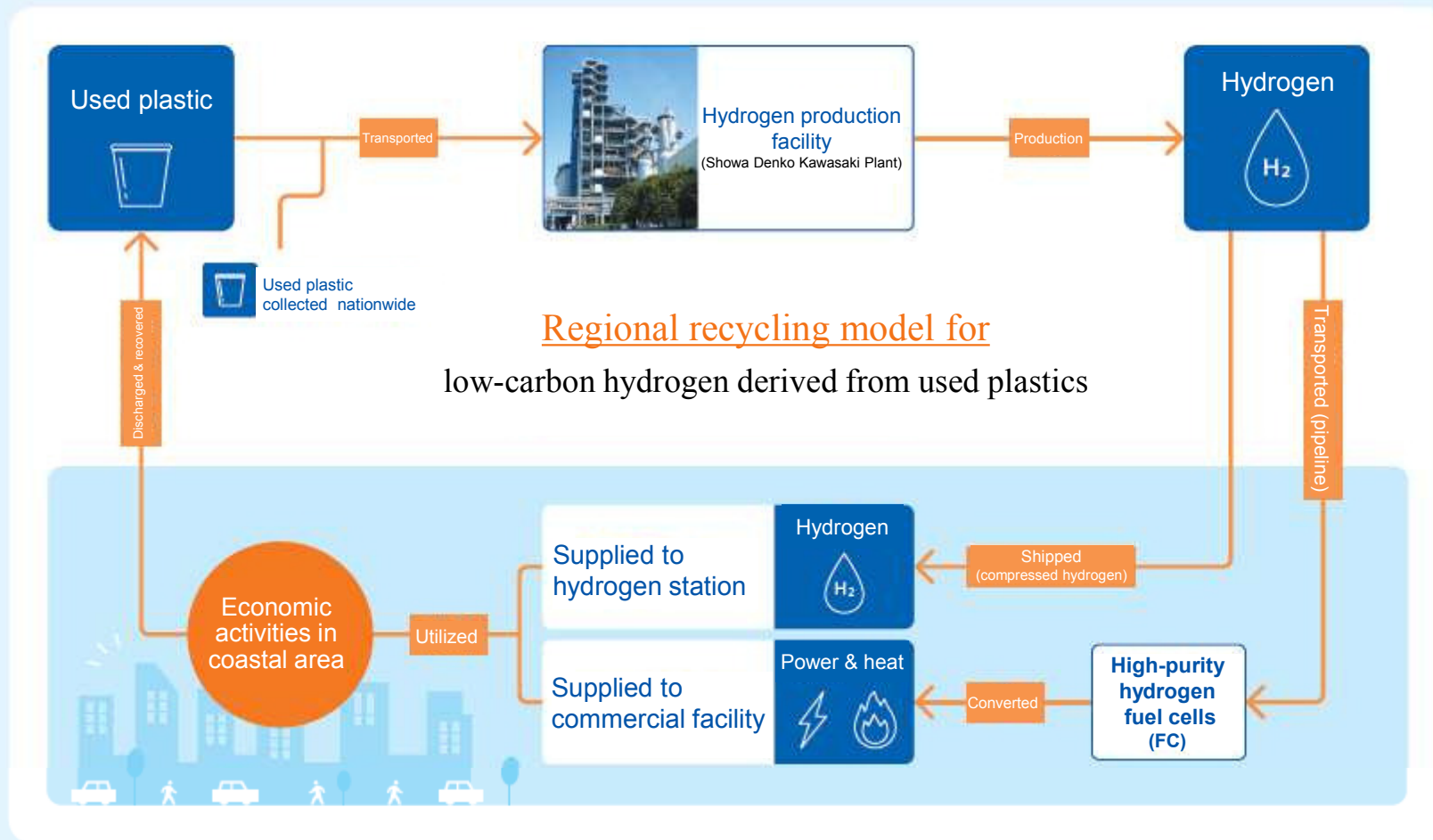
# Ministry of the Environment (MOE): Initiatives for Collaborating with Local Communities and Demonstrating Low-carbon Hydrogen Technologies

**Making use of low-carbon hydrogen derived from used plastics**

**Regional recycling of hydrogen**

**Demonstration of model for local production and local consumption**

For 5 years from 2015, MOE is implementing a low-carbon hydrogen supply chain project to promote mid-to-long-term efforts to reduce global warming via projects to reduce the amount of carbon in hydrogen as well as making earnest efforts to use that hydrogen.



# Using FC (Hotel) & FCV (Hydrogen Station)



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Hydrogen  
Usage

Demonstration

1

## FCV

Supplying low-carbon hydrogen to hydrogen station in Shinsuna Koto-ku, Tokyo (Tomoe Shokai facility)



Features

- Supplying compressed hydrogen by hydrogen gas tanker (trailer truck)
- Using inexpensive, compact pre-cooler
- 5 or 6 FCVs can be filled per unit time

Hydrogen  
Usage

Demonstration

2

## High-purity FC

Supplying power & heat (hot water) to Kawasaki King Skyfront Tokyu Rei Hotel



Features

- Supplying hydrogen by pipeline
- 30% of hotel's energy provided by hydrogen
- Hotel's used plastic (combs & toothbrushes, etc.) recycled as hydrogen

# FCV Demonstration Image



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We started supplying hydrogen derived from used plastics to a hydrogen station from July



## Hydrogen Station

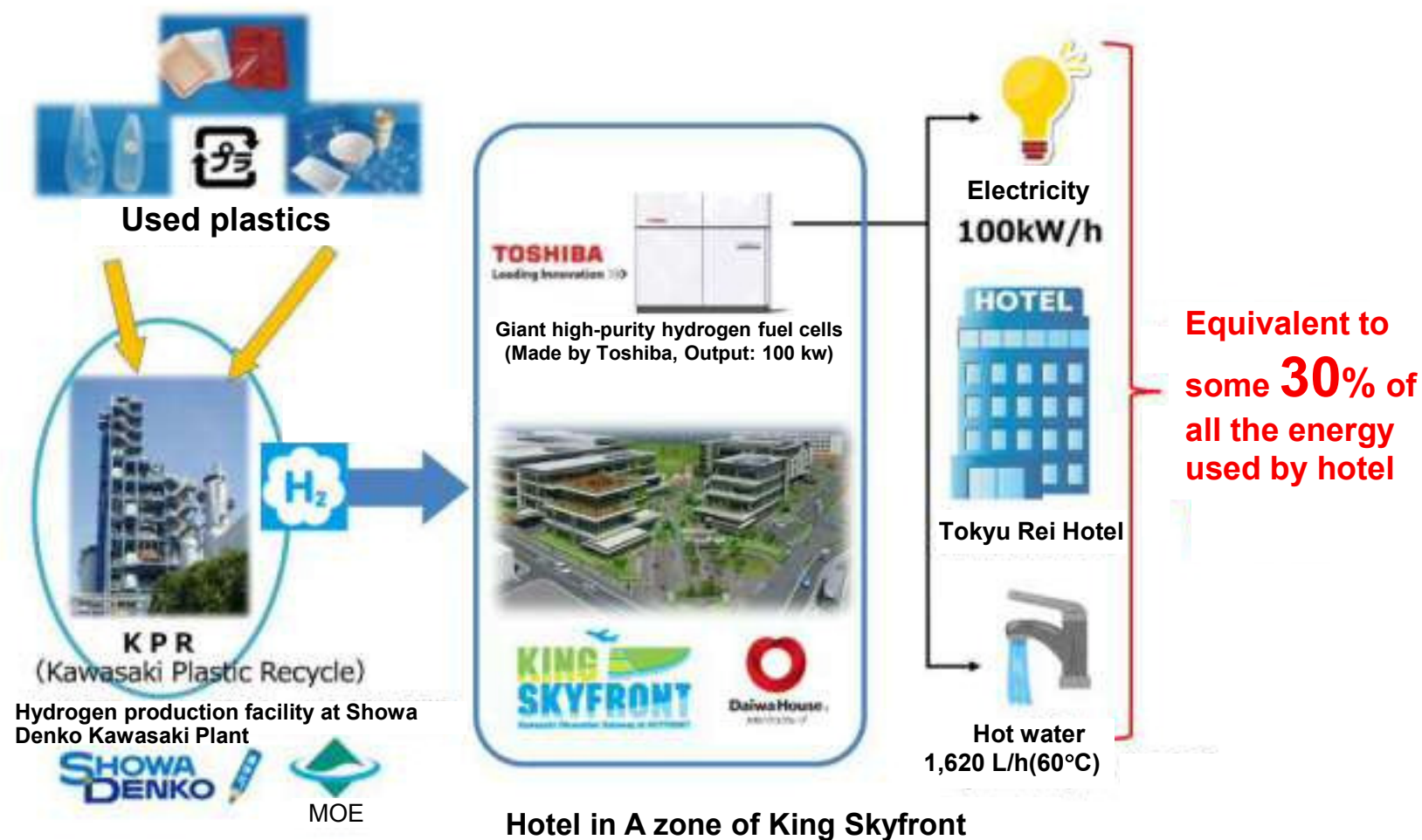
SHINSUNA





# FC Demonstration Image

We signed a comprehensive agreement paving the way for realization of a hydrogen society with Kawasaki City  
Commenced use of hydrogen derived from plastic in hotel that started business in 2018



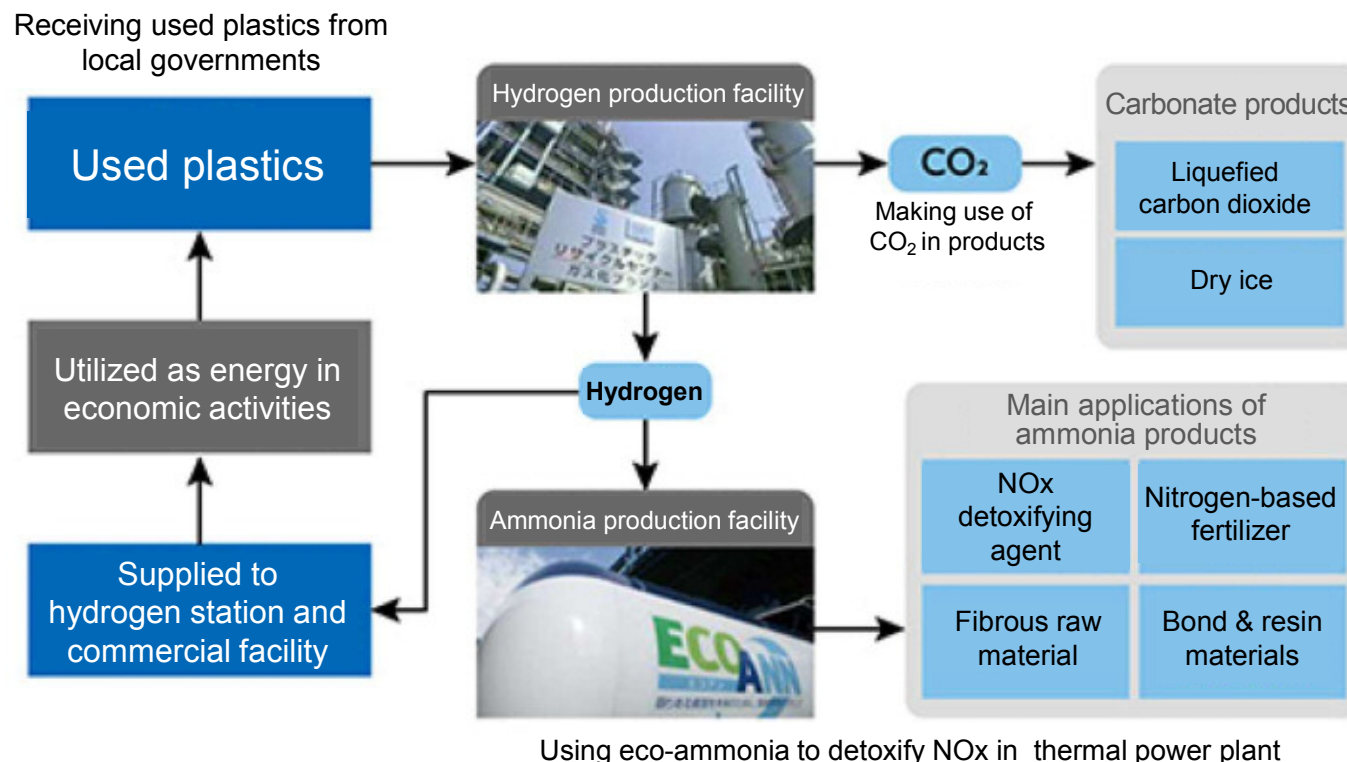
Source: Data from Kawasaki City press conference

# Initiatives for Showa Denko Kawasaki Plant's SDGs



Showa Denko K.K.

## Recycling used plastics into chemical materials



Achieving zero emissions from used plastics in materials

Contributing  
SDGs

