



KAWASAKI CITY

# Kawasaki Hydrogen Strategy

## For the future of Hydrogen



Coastal Area International Strategy Office City of Kawasaki

<Contact address>

Coastal Area International Strategy Office ,City of Kawasaki

TEL : + 8 1 - 4 4 - 2 0 0 - 2 0 9 5

Email : 59jigyo@city.kawasaki.jp



# Main organizations in KING SKYFRONT

## Drug discovery Drug discovery support



PeptiDream

**FUJIFILM**  
Value from Innovation



SINCE 1952



LEADING-EDGE NANOTECHNOLOGY



Gene Therapy  
Research Institution

## Medical device

Johnson & Johnson

JOHNSON & JOHNSON K.K.  
MEDICAL COMPANY

Medtronic

Further, Together



CREATE MEDIC



## Regenerative medicine



Sumitomo Dainippon  
Pharma

**LIC**  
Kanagawa

**RICOH**



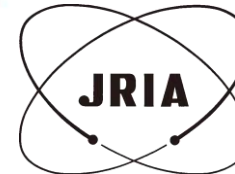
## Research institute & University



NIHS

**ICONM**

Innovation Center of NanoMedicine



JRIA

Japan  
Radioisotope  
Association



慶應義塾

Keio University



東京工業大学

Tokyo Institute of Technology

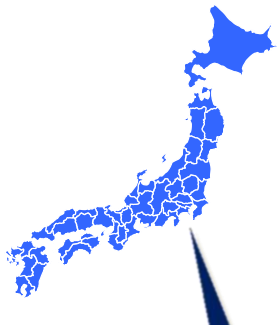
# ① Potential of Kawasaki City



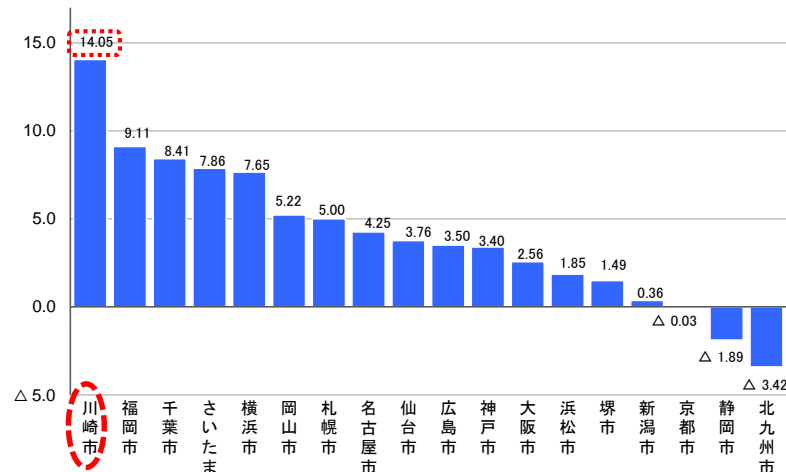
# Profile of Kawasaki City

## ◆ Summary

- Total area : 144.35km<sup>2</sup>
- Population : 1,517,710 (as of Feb.1, 2019)
- Households : 728,258 (as of Feb.1, 2019)

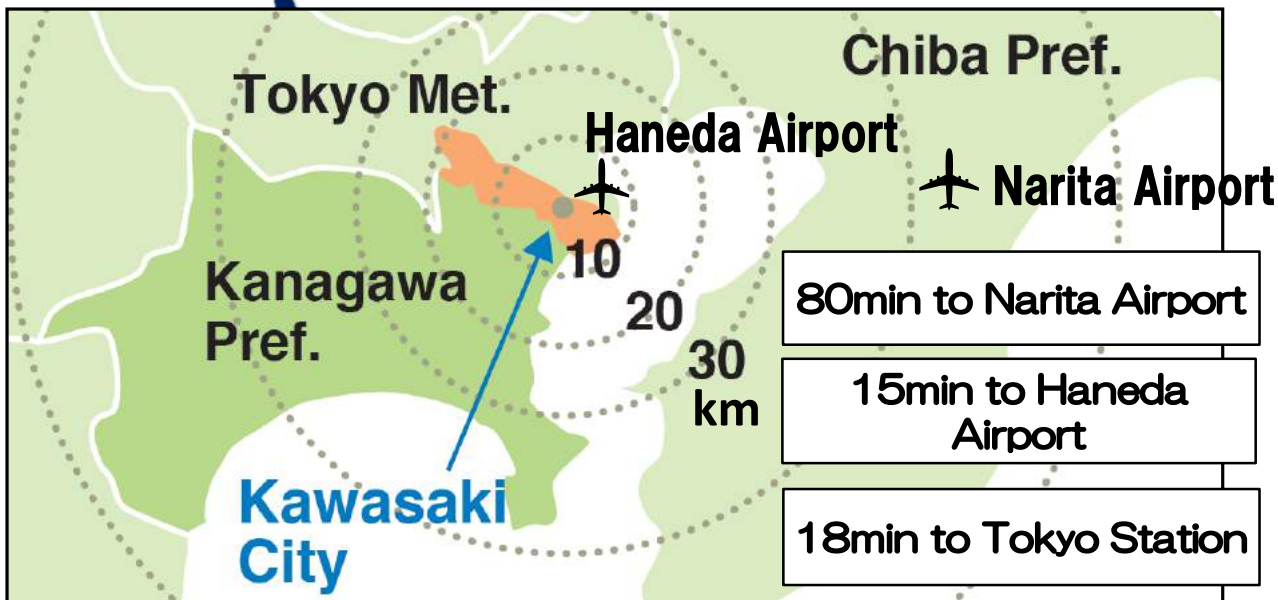


## ◆ Population Growth Rate



Source : Calculated by Kawasaki City based on the national census conducted in 2000 and 2010.

※ Quoted from the metropolitan comparison statistical chronology (2010)





# Only 10 Minutes Walk from terminal

Image of the Connection Road



Kawasaki-side

Tokyo-side

**View from Haneda**

# Efforts to pollution problems

Citizens, companies, government efforts to pollution problems, environmental problems were gradually improved



(1950~1960's)



(Now)

# The Kawasaki Coastal Area as a Power Supply Hub

The power generation capacity of the Kawasaki Coastal Area is approximately 7.7 million kW. This corresponds to the power consumption equivalent of all households located in the greater metropolitan area ( Number of households: approximately 19.22 million).

## Kawasaki Biomass Power Station

[Operated by] Kawasaki Biomass  
[Type] Wood Biomass



Haneda Airport



## Kawasaki Thermal Power Plant

[Operated by] TEPCO Fuel & Power  
[Type] Thermal Power



## Ogishima Wind Power Plant

[Operated by] JX Energy  
[Type] Wind Power



## Ukishima Solar Power Plant

[Operated by] Tokyo Electric Power, Kawasaki City  
[Type] Solar Power



## Ukishima Waste Treatment Plant

[Operated by] Kawasaki City  
[Type] Thermal Power (waste)



### Category

- Thermal Power Plant
- Solar Power Plant
- Wood Biomass Power Plant
- Wind Power Plant



# Hydrogen and fuel cell related companies are accumulated

Hydrogen and fuel cell related companies are accumulated in and around city

## TOSHIBA

Fuel cell related business  
Utilization of hydrogen

## Fuji Electric

Fuel cell related business

## Tokyo Gas

Fuel cell related business for households

## SHOWA DENKO

Production and supply of hydrogen

## Asahi Kasei Chemicals

Hydrogen production technology using water electrolysis

## Mitsubishi Kakoki

Development of hydrogen production equipment

## Tomoe Shokai

Supply of hydrogen  
Evaluation analysis



## Chiyoda Corporation

Hydrogen storage/transport technology

## JFE Container

Development of hydrogen storage container

## JXTG Energy

Hydrogen refueling station related business  
Production and supply of hydrogen, fuel cell

## AIR LIQUIDE Japan

Hydrogen refueling station related business  
Production and supply of hydrogen

## Taiyo Nissan

Hydrogen refueling station related business. Production and supply of hydrogen

## Iwatani Corporation

Hydrogen refueling station related business  
Production and supply of hydrogen

## Hitachi Automotive Systems

Hydrogen refueling station related business

## TOA Oil

Utilization of Hydrogen (generation)

## JFE Steel

Utilization of hydrogen, byproduct hydrogen



# Hydrogen demand in Kawasaki Coastal Area

Strong hydrogen demand in coastal industrial area

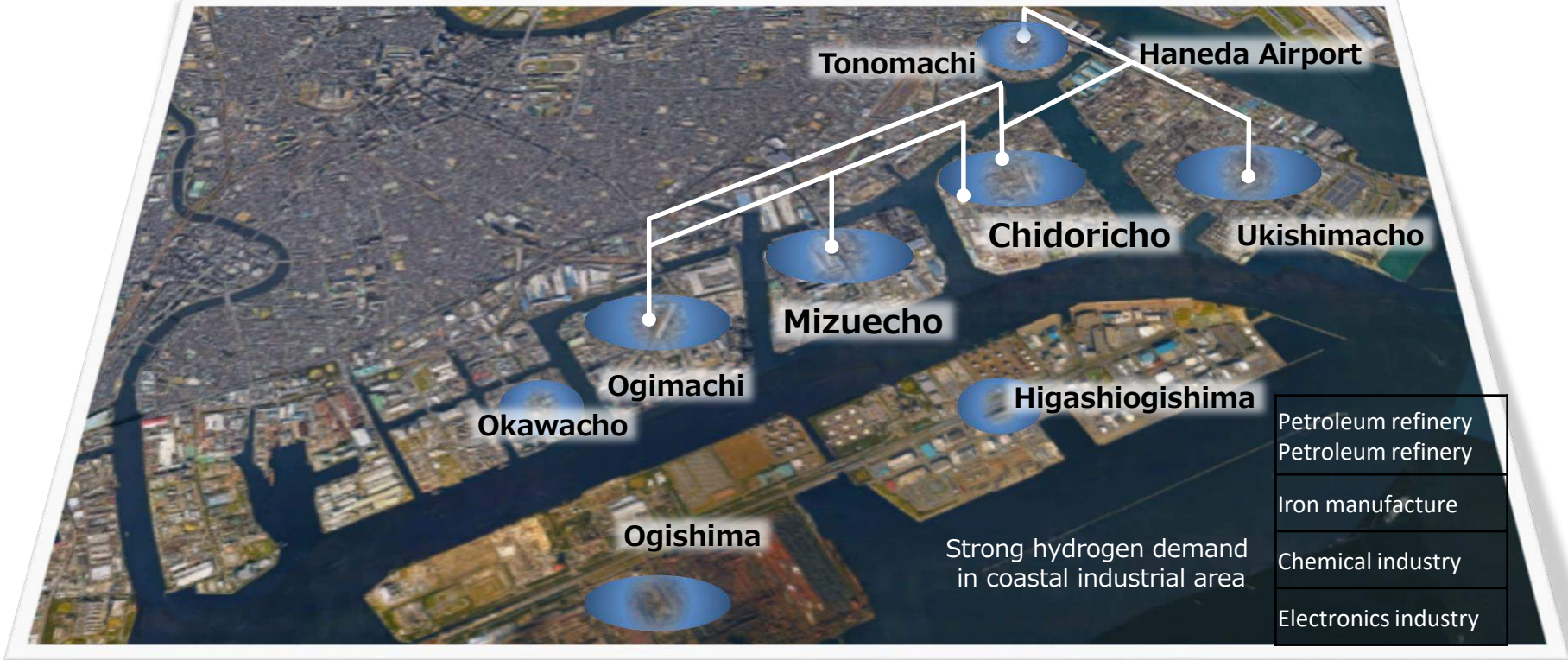
Petroleum refinery	Utilized for desulfuration to remove sulfur content in crude oil Additives for producing petrochemicals
Iron manufacture	Utilized for bright annealing of surfaces of steel products like stainless steel
Chemical industry	Raw materials used in production of ammonium Raw materials used in production of polymer
Electronics industry	Raw materials used in production of semiconductor/electronic device

# Hydrogen demand in Kawasaki Coastal Area

Image of hydrogen utilization at Kawasaki Coastal Area

**Hydrogen usage in the Kawasaki coastal area :  
About 150 thousand Nm<sup>3</sup>/h**

=  **FCV**  
About 3 thousand cars

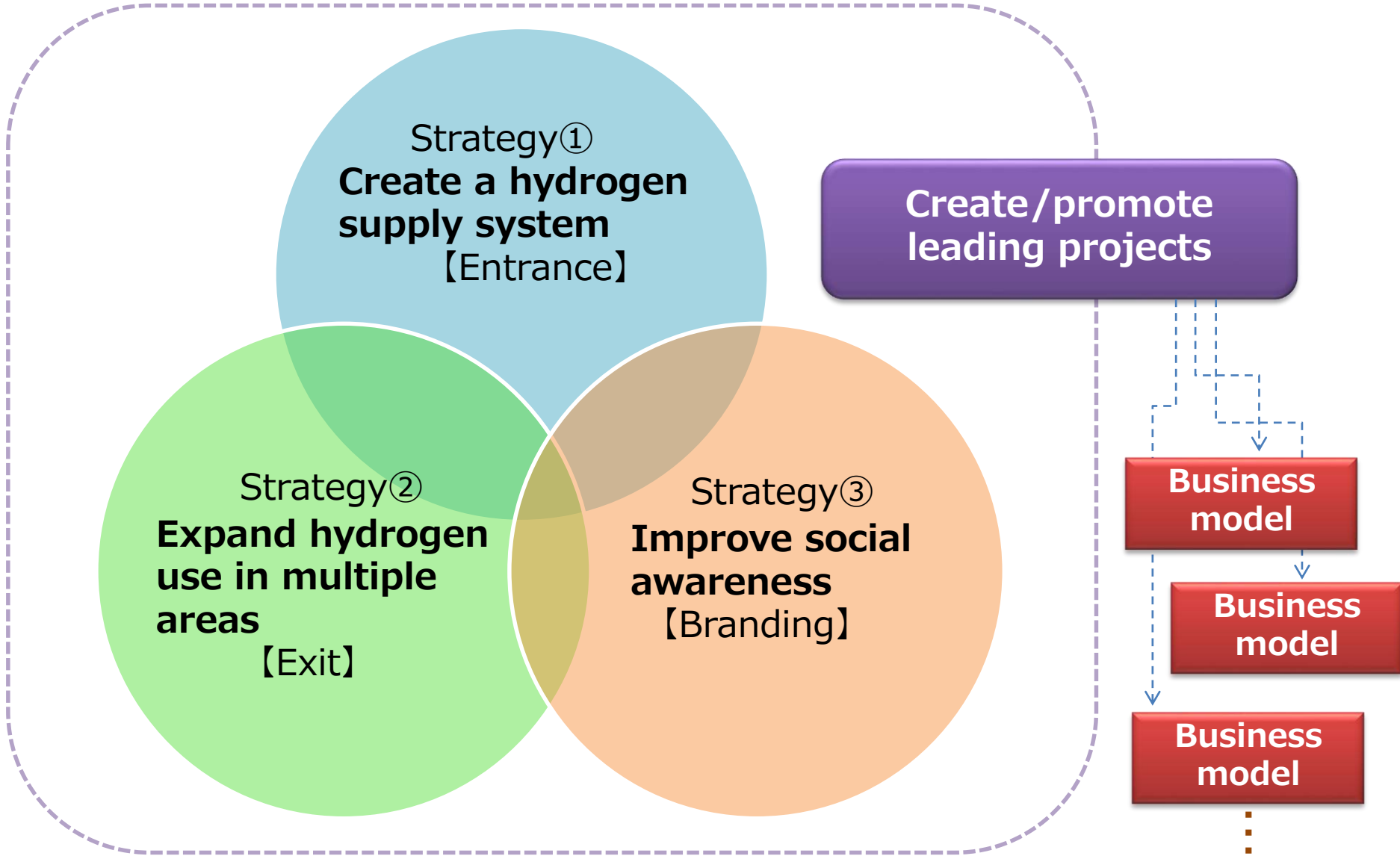


## ② Kawasaki Hydrogen Strategy



# Kawasaki Hydrogen Strategy Aimed at Creating a Hydrogen Society

【Three strategies】



Strategy①  
**Create a hydrogen supply system**  
【Entrance】

Strategy②  
**Expand hydrogen use in multiple areas**  
【Exit】

Strategy③  
**Improve social awareness**  
【Branding】

**Create/promote leading projects**

**Business model**

**Business model**

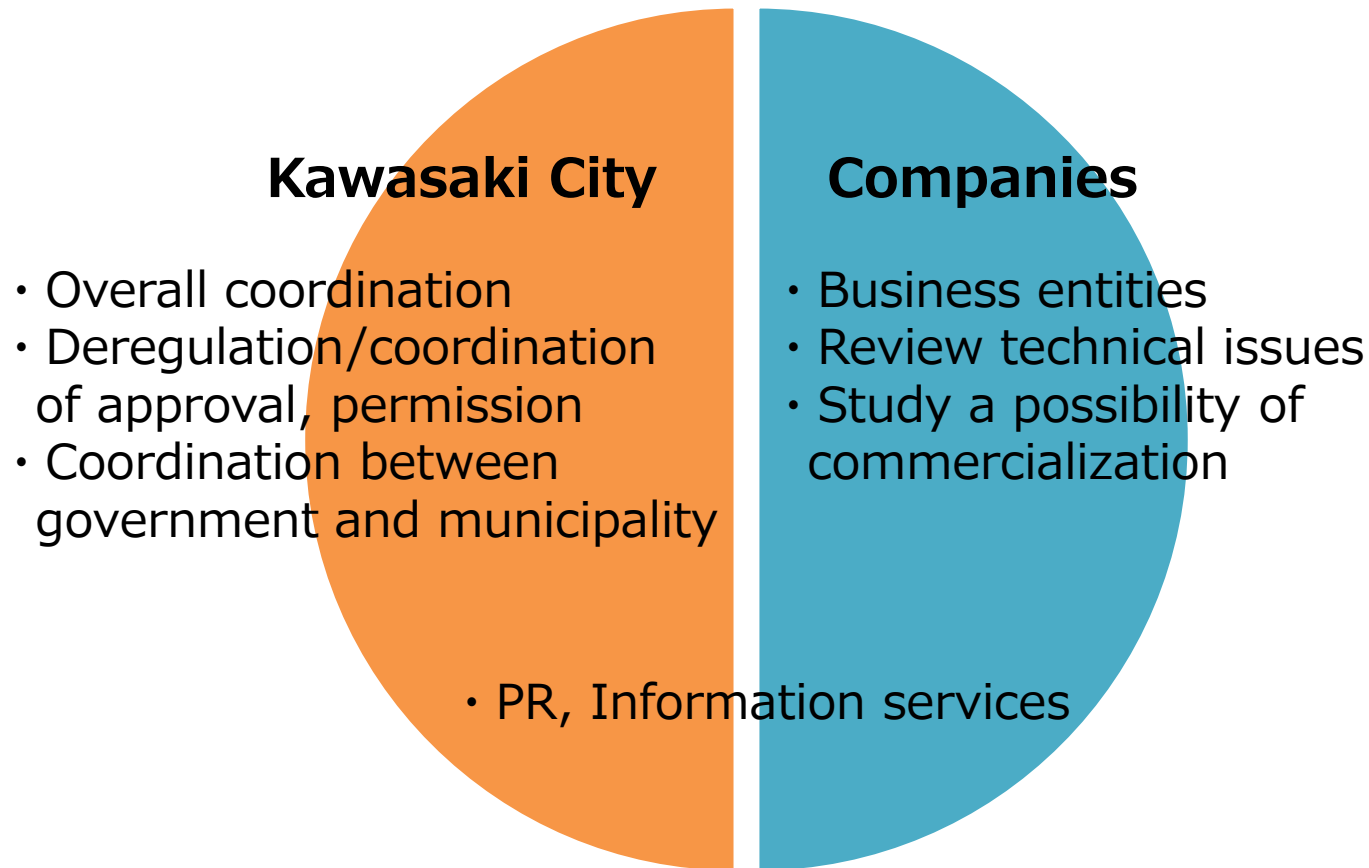
**Business model**

⋮



# Kawasaki Hydrogen Strategy Aimed at Creating a Hydrogen Society

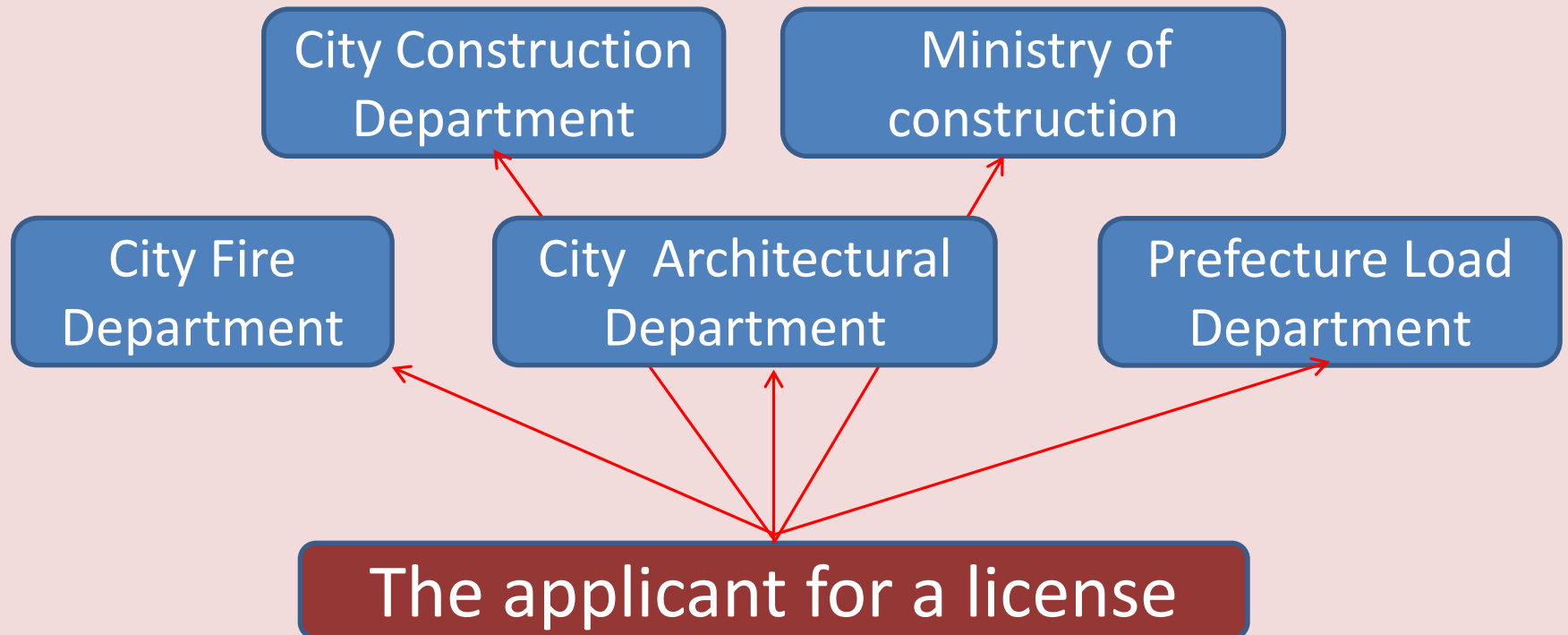
## 【Division of Roles】



## One Stop Service For Hydrogen Business at Kawasaki

procedures  extremely complex

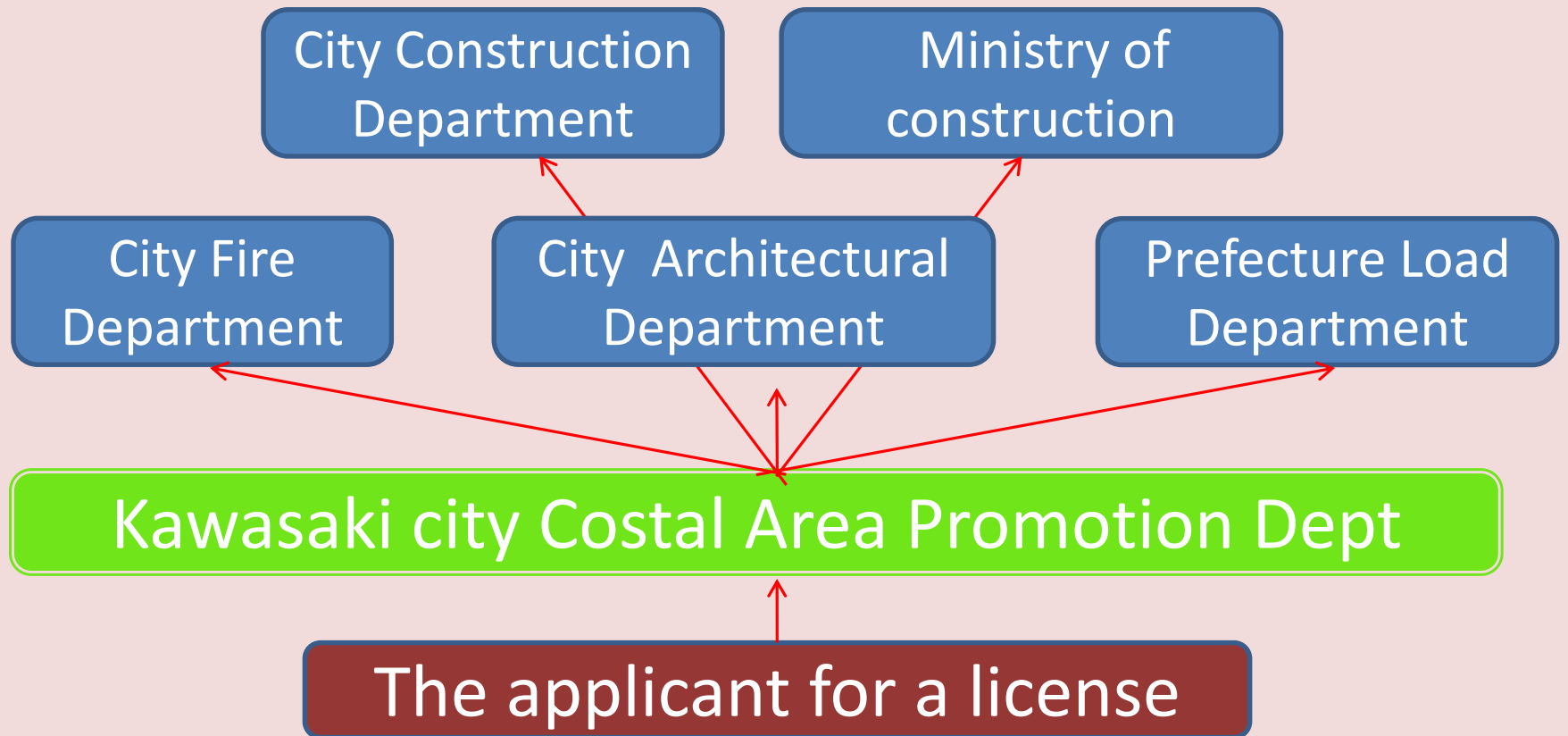
General authorization process of City government



## Kawasaki Systems

procedures  Very easy!

One stop authorization process at Kawasaki City



## ③ Leading Projects





# Leading Projects

## ① Hydrogen supply chain creation model



AHEAD

## ② Hydrogen BCP model



TOSHIBA

## ③ CO2-free hydrogen utilization model at train stations



JR  
JR東日本

## ④ Regional recycling-based hydrogen local production-local consumption model



SHOWA  
DENKO

## ⑤ Low carbon hydrogen utilization model in industrial sectors



環境省  
Ministry of the Environment

TOYOTA Iwatani TOSHIBA

TOYOTA

TTS  
ES TOYOTA TURBINE AND SYSTEMS

## ⑥ Packaged hydrogen station model



三菱化工機株式会社

※①: NEDO 「Hydrogen Society Building Technology Development Project / Development of large-scale hydrogen energy utilization technology」  
([http://www.nedo.go.jp/activities/ZZJP\\_100096.html](http://www.nedo.go.jp/activities/ZZJP_100096.html))

※④、⑤: Ministry of Environment 「Regional collaboration - Low-carbon hydrogen technology demonstration project」 (<http://www.env.go.jp/press/100858.html>)

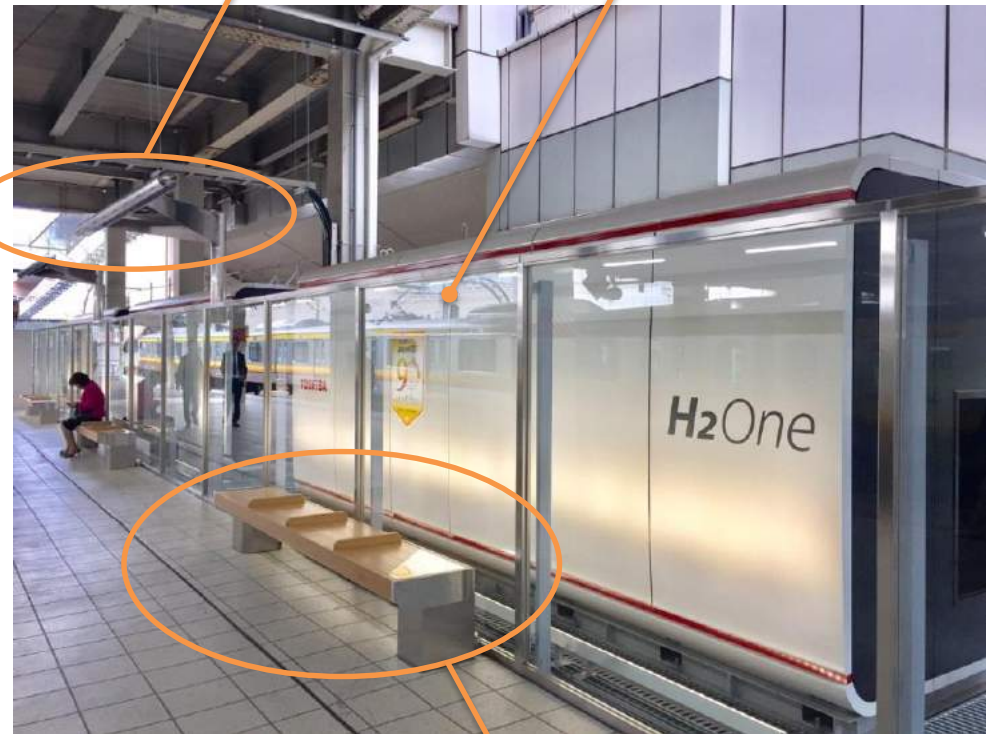
# CO2-Free Hydrogen Utilization Model at Stations

Musashi –Mizinokuchi station

JR Nambu Line



Before



After

「H2One」

Dry Mist

Warm bench

160,000 people a day use it

# Kawasaki Hydrogen Network Project Overall Concept

## Kawasaki Hydrogen Network Project Overall Concept

