Development and Operation of Sustainable Transportation Infrastructure in Japan

18th December, 2023

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Ministry of Land, Infrastructure, Transport and Tourism

(MLIT)

The field of MLIT

For secure and prosperous society

1. 50th anniversary of Japan-Vietnam diplomatic relations and development of transportation between the two countries

2. Methods for developing/operating sustainable core transportation infrastructure in Japan

    - Railway
    - Port
    - Airport

3. Development/operation of transportation infrastructure for decarbonization

Trade volume between Japan and Vietnam (1988~2022)

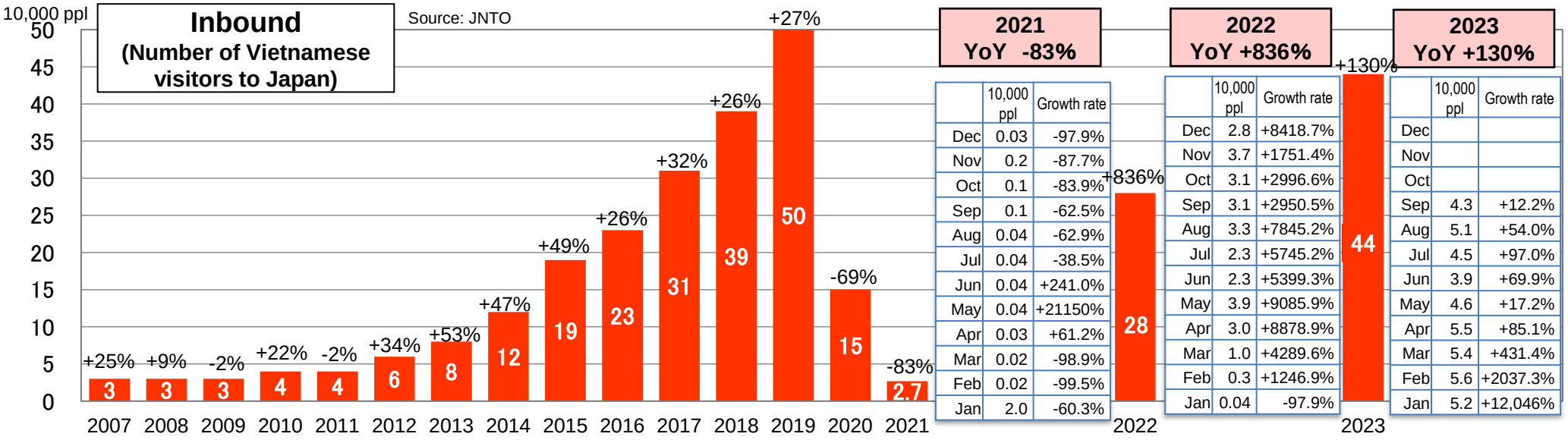
- ○ Trade between Japan and Vietnam has been expanding steadily, and has approximately tripled compared to a decade ago.
- ○ Japan-Vietnam trade is generally balanced, and Japan is Vietnam's fourth largest trading partner.

Japan→Vietnam

Vietnam→Japan

(Source) Ministry of Finance “Trade Statistics”

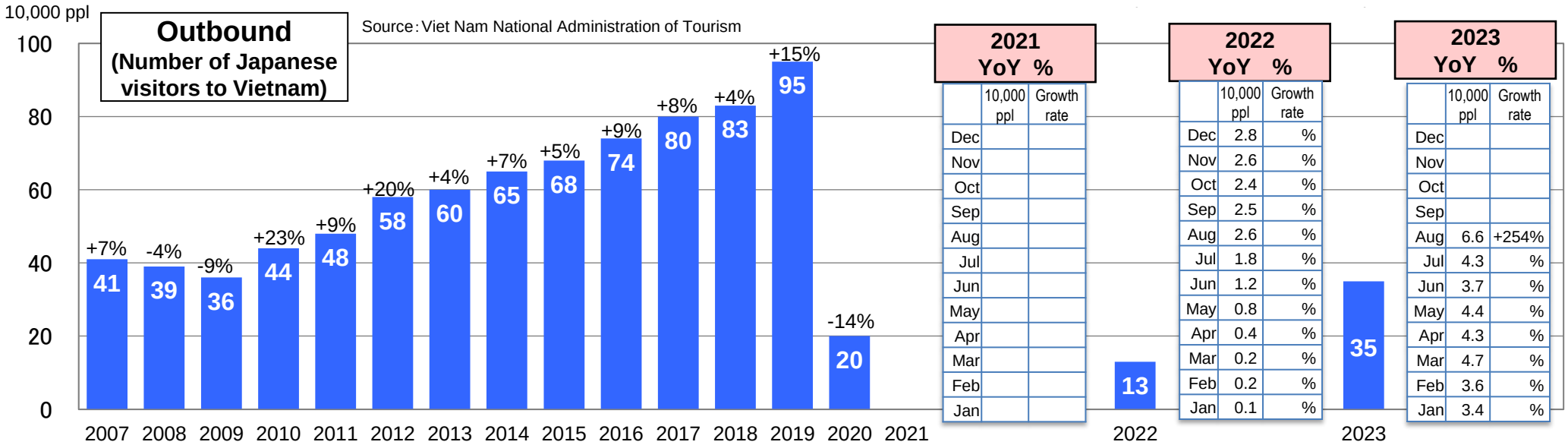
The number of Japanese/Vietnamese visitors to their respective countries (2007-2023)



	10,000 ppl	Growth rate
Dec	0.03	-97.9%
Nov	0.2	-87.7%
Oct	0.1	-83.9%
Sep	0.1	-62.5%
Aug	0.04	-62.9%
Jul	0.04	-38.5%
Jun	0.04	+241.0%
May	0.04	+21150%
Apr	0.03	+61.2%
Mar	0.02	-98.9%
Feb	0.02	-99.5%
Jan	2.0	-60.3%

	10,000 ppl	Growth rate
Dec	2.8	+8418.7%
Nov	3.7	+1751.4%
Oct	3.1	+2996.6%
Sep	3.1	+2950.5%
Aug	3.3	+7845.2%
Jul	2.3	+5745.2%
Jun	2.3	+5399.3%
May	3.9	+9085.9%
Apr	3.0	+8878.9%
Mar	1.0	+4289.6%
Feb	0.3	+1246.9%
Jan	0.04	-97.9%

	10,000 ppl	Growth rate
Dec		
Nov		
Oct		
Sep	4.3	+12.2%
Aug	5.1	+54.0%
Jul	4.5	+97.0%
Jun	3.9	+69.9%
May	4.6	+17.2%
Apr	5.5	+85.1%
Mar	5.4	+431.4%
Feb	5.6	+2037.3%
Jan	5.2	+12,046%



	10,000 ppl	Growth rate
Dec		
Nov		
Oct		
Sep		
Aug		
Jul		
Jun		
May		
Apr		
Mar		
Feb		
Jan		

	10,000 ppl	Growth rate
Dec	2.8	%
Nov	2.6	%
Oct	2.4	%
Sep	2.5	%
Aug	2.6	%
Jul	1.8	%
Jun	1.2	%
May	0.8	%
Apr	0.4	%
Mar	0.2	%
Feb	0.2	%
Jan	0.1	%

	10,000 ppl	Growth rate
Dec		
Nov		
Oct		
Sep		
Aug	6.6	+254%
Jul	4.3	%
Jun	3.7	%
May	4.4	%
Apr	4.3	%
Mar	4.7	%
Feb	3.6	%
Jan	3.4	%

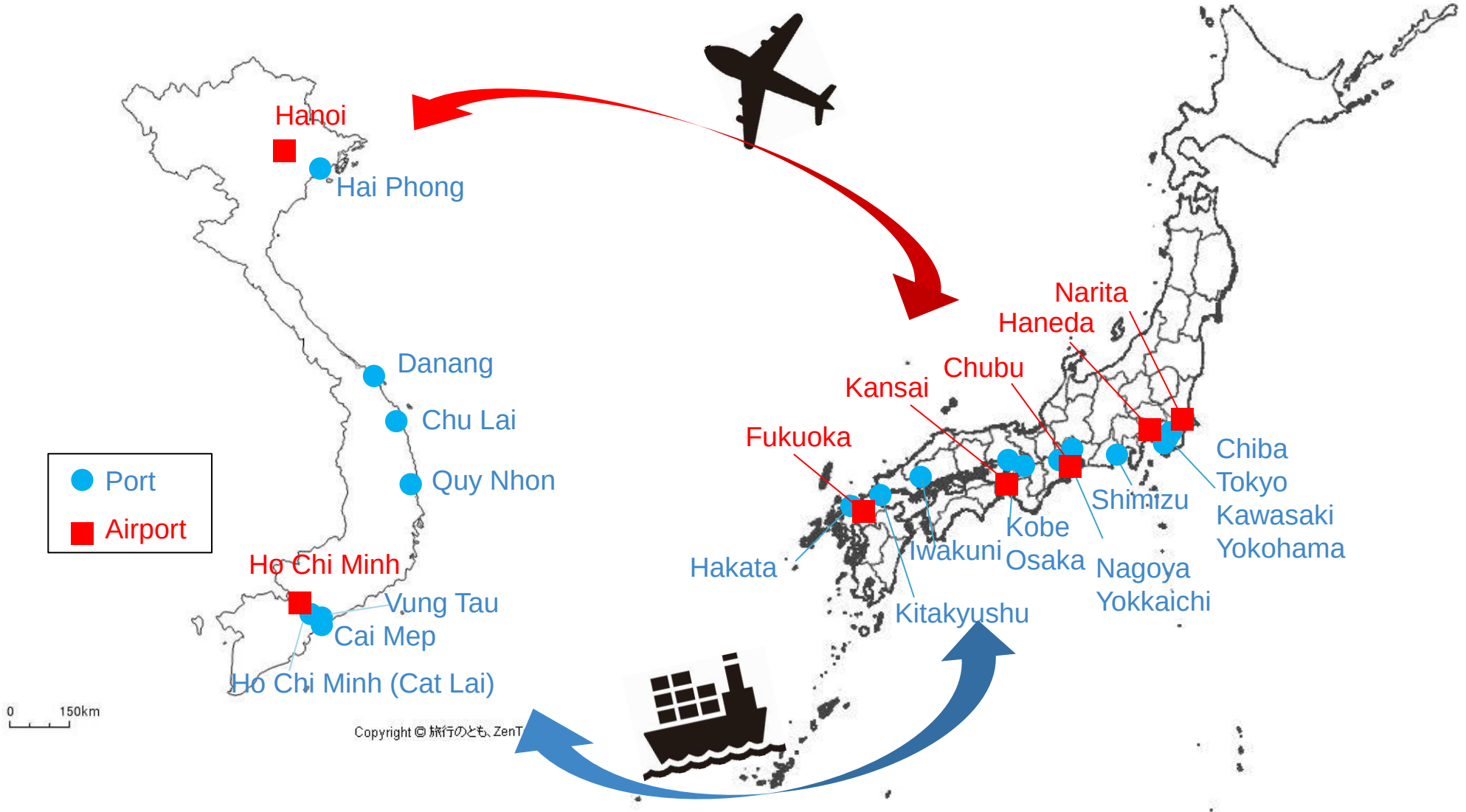
Total for both countries	44	42	39	48	52	64	68	77	87	97	111	122	145	35	

41 54

*As the numbers are rounded off, their sum may not match the total. *The % notation in this table is the growth rate compared to the previous year (same month).
*The number of Vietnamese visitors to Japan are determined values up to 2022, provisional values for January to July 2023, and estimated values for August-September 2023.
*There is no published data on the number of Japanese visitors to Vietnam from April 2020 to December 2021.

Sea and Air routes connecting Japan and Vietnam

◯ Five airports and 12 ports across Japan are directly connected by sea and air to Hanoi, Ho Chi Minh, and other parts of Vietnam.



Japan's Cooperation in the development of Vietnam's core transportation infrastructure

- ○ Japan cooperated in the development of Vietnam's core ports/airports.
- ○ Also cooperated in the development of Ho Chi Minh's first urban railway.

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Trends in the core transportation infrastructure development in Japan

Postwar

- Systematic **development of transportation infrastructure** in response to increasing transportation demand.
- Development of central infrastructure throughout the country that will contribute to balanced development of the country.

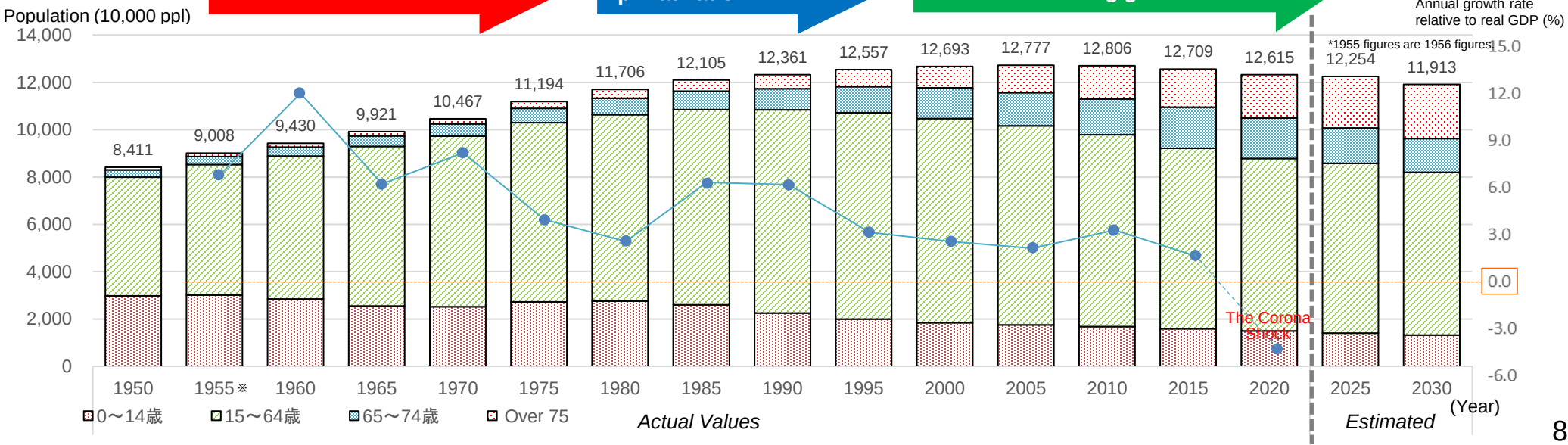
1980s-

- While past demand growth could not be expected due to the declining birthrate, aging population, and stable growth, **improving the quality of services** became an issue.
- The provision of **efficient and diverse transportation services** by the **privatization** of government-owned corporations such as Japan National Railways was encouraged.
- Amid **excess concentration in the Tokyo metropolitan** area and internationalization, decentralization and development of regional airports and ports were promoted.

2000s-

- Completion of the transportation network. More emphasis on **"management"** of infrastructure.
- Amid population decline and intensifying international competition, various forms of **public-private partnership (PPP)** are being explored due to the need for focused investment and involvement by public entities in key airports, ports, and strategic infrastructure, etc.

High economic growth period → **Stable growth, privatization** → **Globalization, population decline, slowing growth**



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Development of Japan's railway network

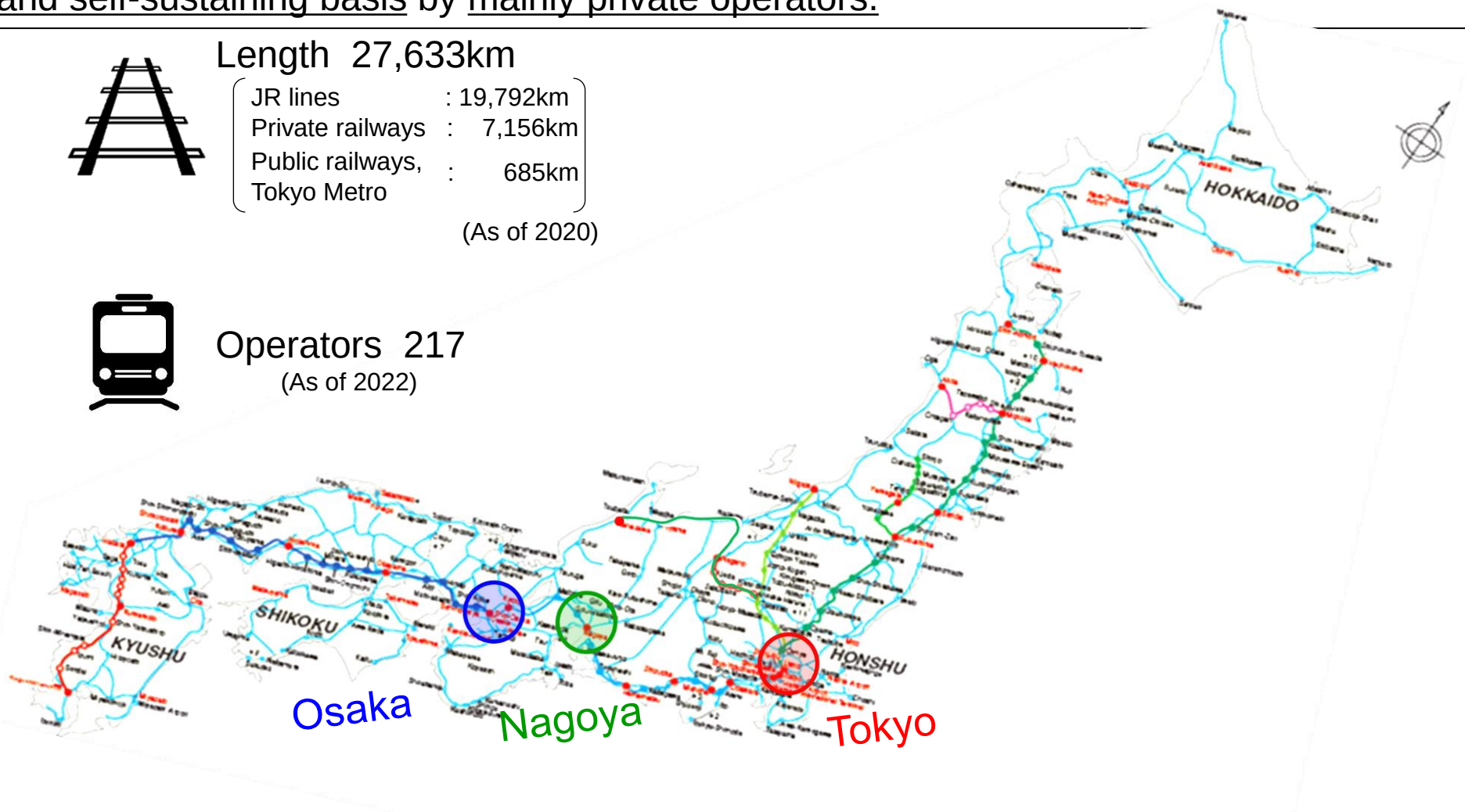
- In the 150 years since railways first opened, approximately 28,000 kilometers of railway network have been developed across the country. It has contributed to the physical and psychological integrity of the country and has driven industrial development.
- Facility development and transportation services are provided with on a user-expenses and self-sustaining basis by mainly private operators.

Length 27,633km

JR lines	: 19,792km
Private railways	: 7,156km
Public railways, Tokyo Metro	: 685km

(As of 2020)

Operators 217
(As of 2022)



The methods of development and operation of trunk railways and Privatization of Japan National Railways

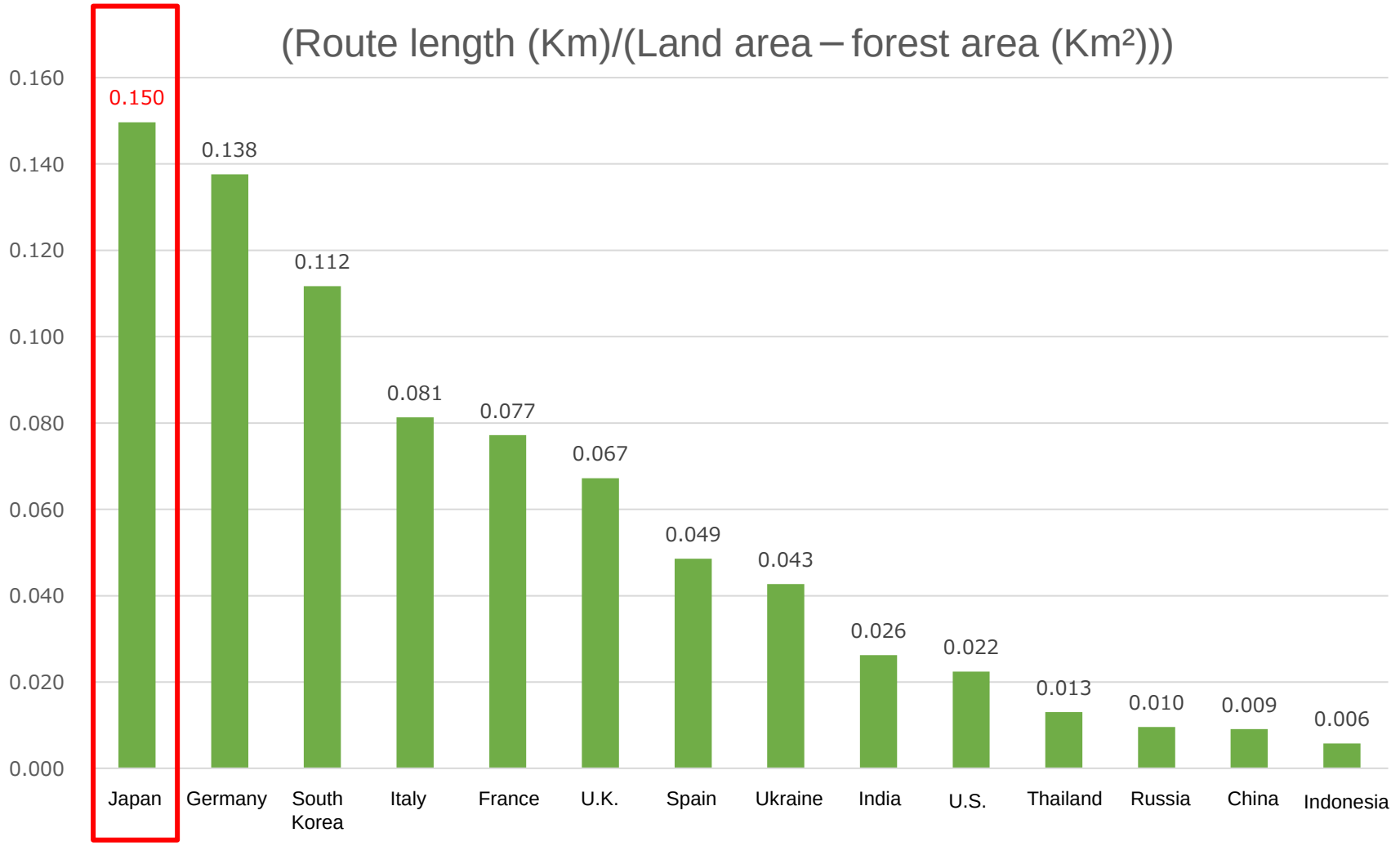
I: Government-established and government operated method	1872	Railway opens between Shinbashi and Yokohama
II: Introduction of the privately-established and privately-owned method	1883	Japan Railway (private) opens between Ueno and Kumagaya
	1900	Private Railway Act
III: Railway nationalization	1906	Railway Nationalization Act
IV: Conversion into a public enterprise	1948	Japanese National Railways Law
V: Privatization	1986	Japan National Railway Reform Law + Railway Business Act

- Improved services
  - ◇ Laying new conventional lines, speeding up existing lines, etc.
  - ◇ Progress in barrier-free design (eliminating steps, etc.)
- Diversified management
  - ◇ Real estate business
  - ◇ Tourism
  - ◇ In-station business






Characteristics of Japanese railways (route density)



(*1) Source (Route length): "The World Bank Group" https://data.worldbank.org/indicator/IS.RRS.TOTL.KM?end=2019&start=1995&view=chart (Excerpt from 2017 data)
(*2) Source (Land area): "World Statistics 2022" (Statistic Bureau, Ministry of Internal Affairs and Communications) https://www.stat.go.jp/data/sekai/pdf/2022al.pdf (Excerpt from 2020 data)
(*3) Source (Forest area): "World Statistics 2022" (Statistic Bureau, Ministry of Internal Affairs and Communications) https://www.stat.go.jp/data/sekai/pdf/2022al.pdf (Excerpt from 2020 data) Forest area of China includes Hong Kong, Macau, and Taiwan. No data for the U.K.
(*4) Figures are rounded off to the fourth decimal place

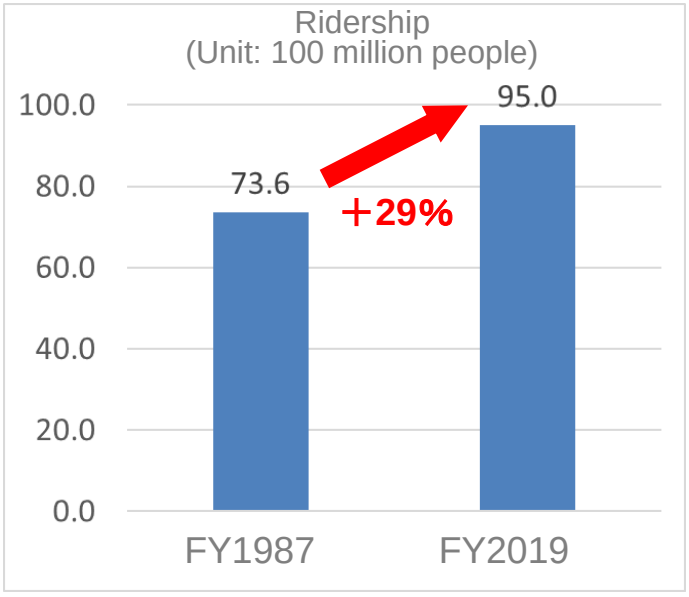
Characteristics of Japanese railways (transportation share)

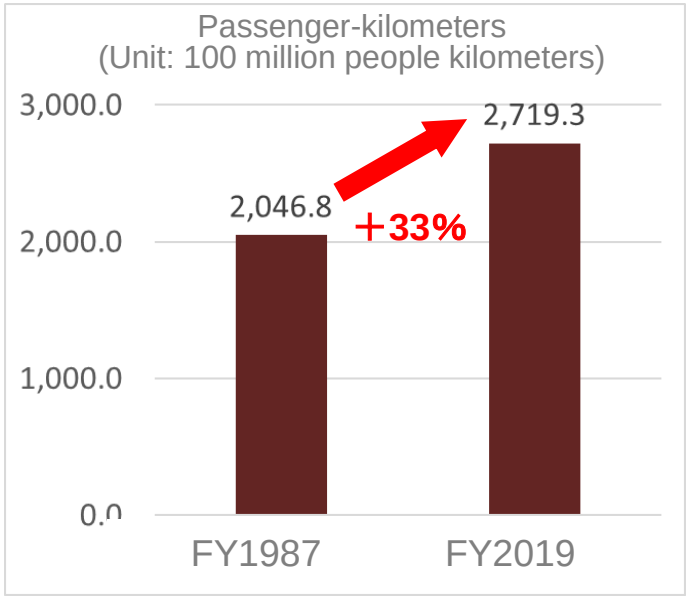
Transportation share by mode of transportation in each country [passenger-kilometers] (FY2019)

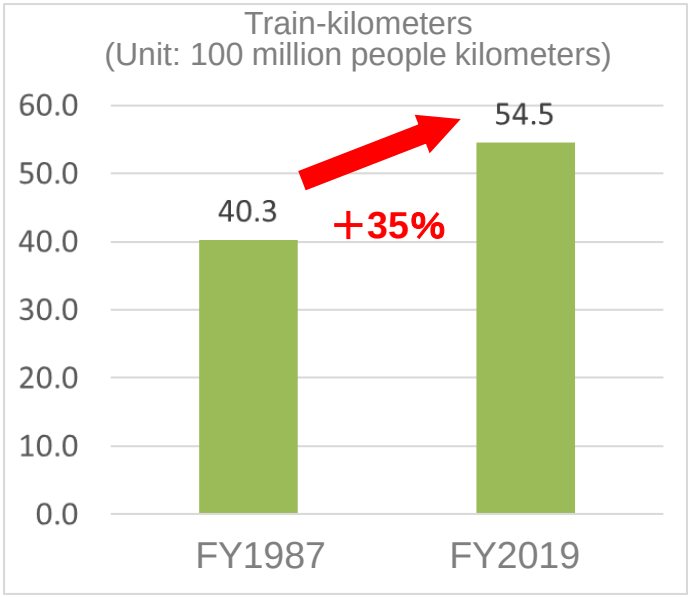
	Railway	Automobile (Bus, cars)	Airplane
Japan	30%	63%(*)	7%
U.K.	9%	90%	1%
Germany	9%	85%	6%
France	11%	87%	2%
U.S.	1%	84%	15%

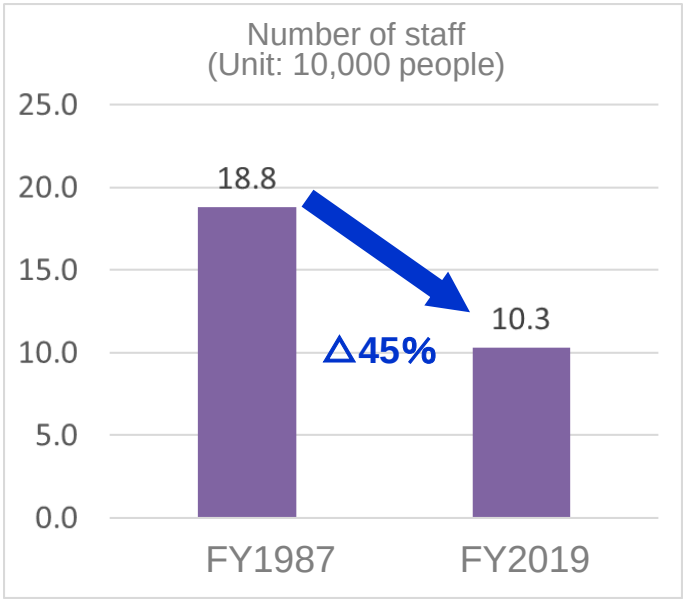
(*) The passenger-kilometers for automobiles in Japan was estimated using a model formula.
Created using Japan Railways in Figures and the Annual Report of Road Transport Statistics

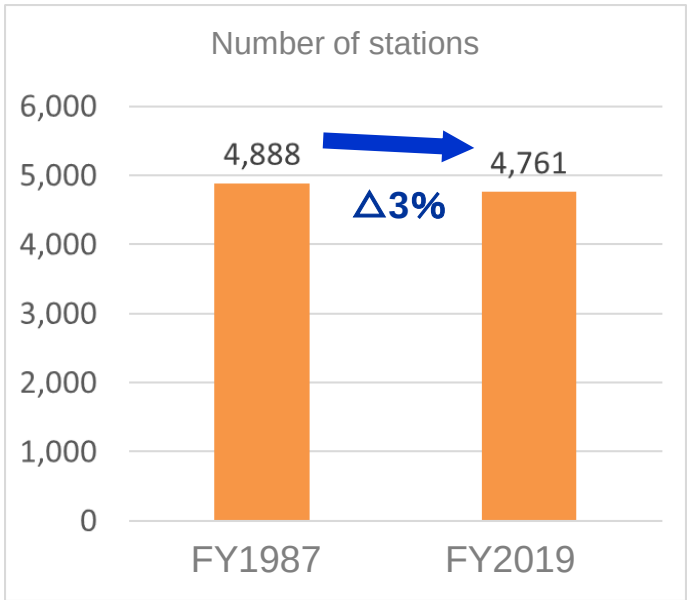
Comparison of various indicators (when the JR Passenger Railway Companies were established vs now)

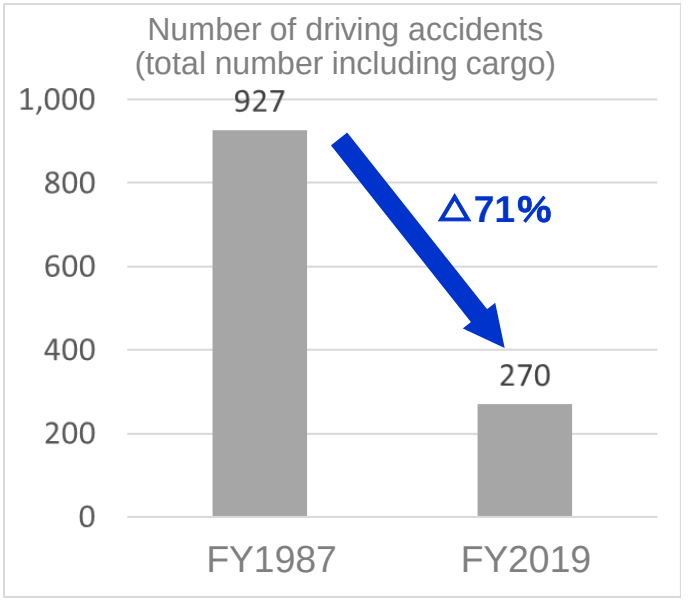






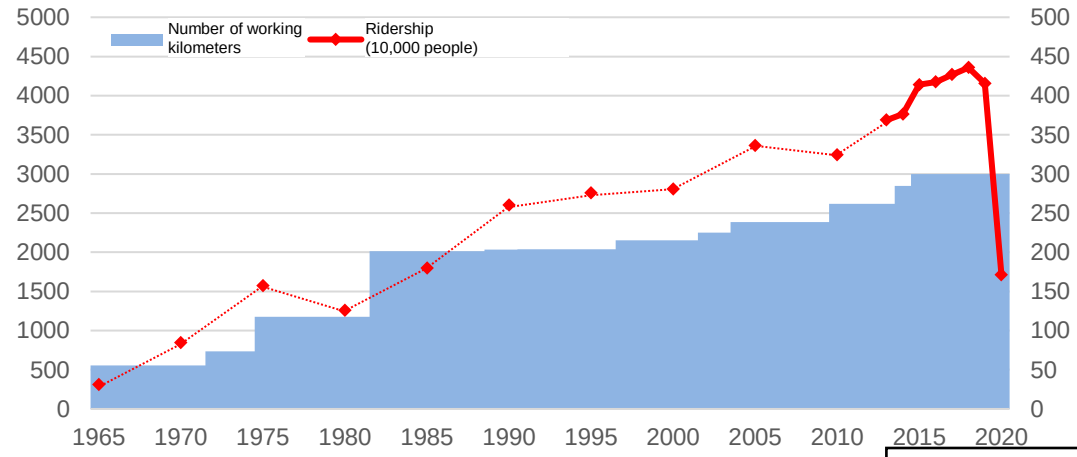






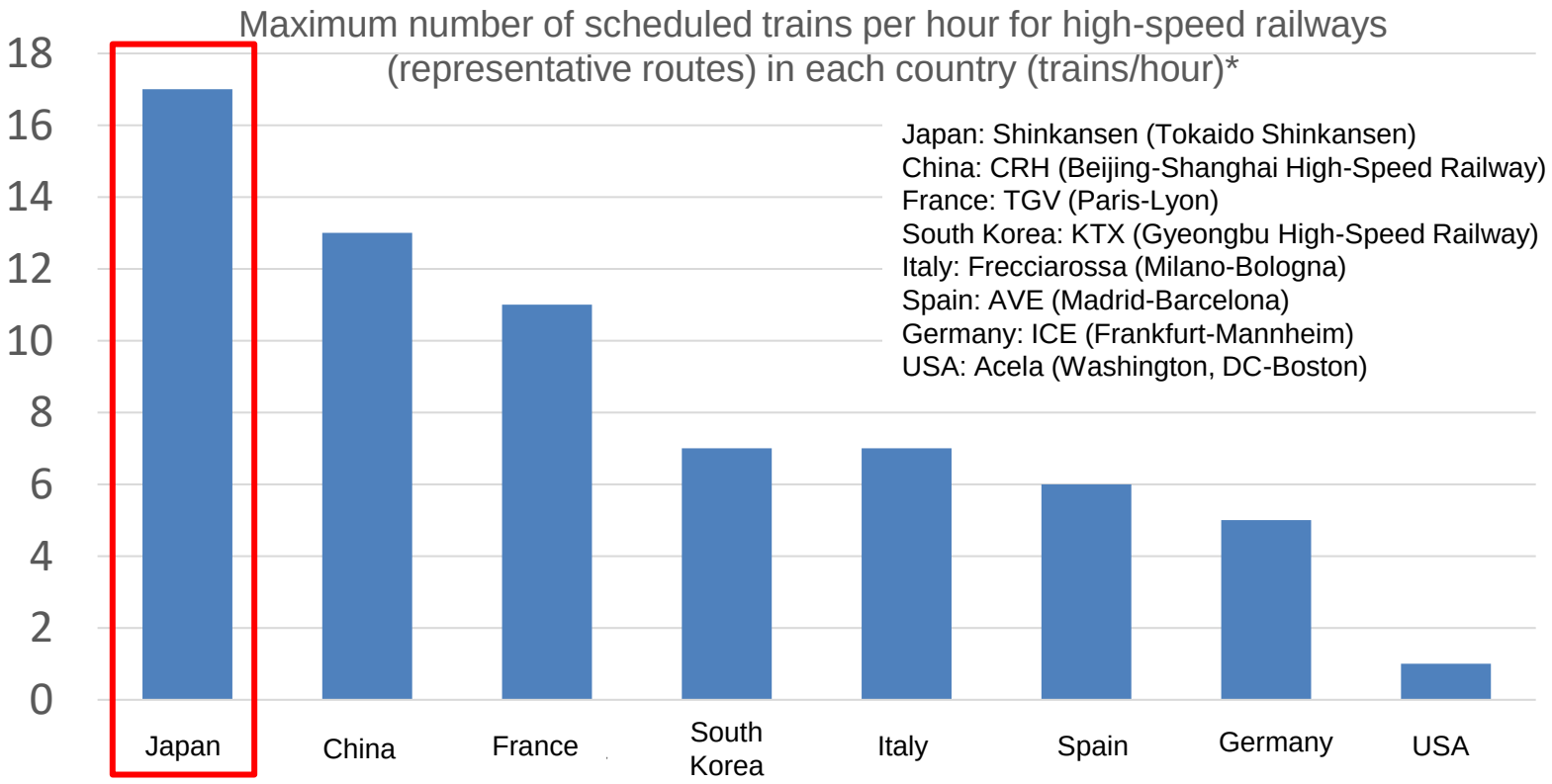
Development of Japan's Shinkansen railway network

- The Tokaido-Sanyo Shinkansen was developed in response to the increase in transportation demand in the postwar period.
- Afterwards, planning and development was carried out from the perspective of developing a high-speed transportation system for the comprehensive and balanced development of the country.



Characteristics of Japan's Shinkansen system

○ The Shinkansen supports the development of areas along the track by operating at high-density diagram, combining direct routes between core cities and routes that relay to regional cities that lie in between.



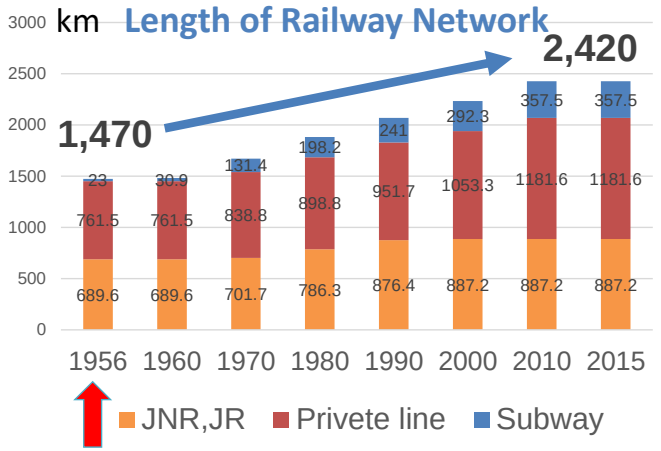
(*) For the regular service pattern which yields the maximum number of scheduled trains per day for the representative routes (Example: Weekdays, Saturday, Sunday, etc.), the number of departures from the base station (Japan: Tokyo, China: Beijing South, France: Paris Gare de Lyon, South Korea: Seoul, Italy: Milano Centrale, Spain: Madrid Puerta de Atocha, Germany: Frankfurt (Main), USA: Washington, DC - Union Station) is used.
High-speed trains of other companies and brands on the same route (Example: AVE also includes iryo, avio, Ouigo, and Alvia) are also included.

(Source) Created by the Ministry of Land, Infrastructure, Transport and Tourism using:
Japan: JR West timetable (October 2023 edition) https://pamph.jr-odekake.net/Sanyo2310/
China: Study Group of China Railway Timetable in Japan China Railway timetable (2023 Spring-Summer edition)
South Korea: Korail
France, Italy, Spain, Germany: EUROPEAN RAILL TIMETABLE (Autumn 2023 edition)
USA: Amtrak timetable (2023) https://www.amtrak.com/train-schedules-timetables

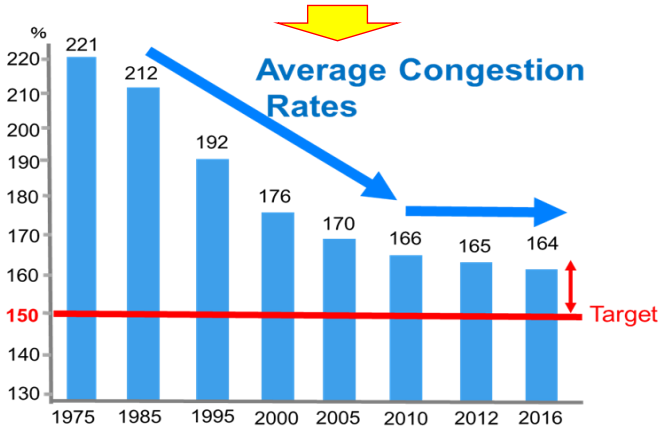
Development of the urban railway network

○ A dense urban railway network was developed with a focus on easing congestion, improving speed, improve airport access, and creating a healthy urban structure, by developing subways, improving the transport capacity of urban railways, and promoting mutual through service. In urban areas, railway development combined with urban development was promoted.

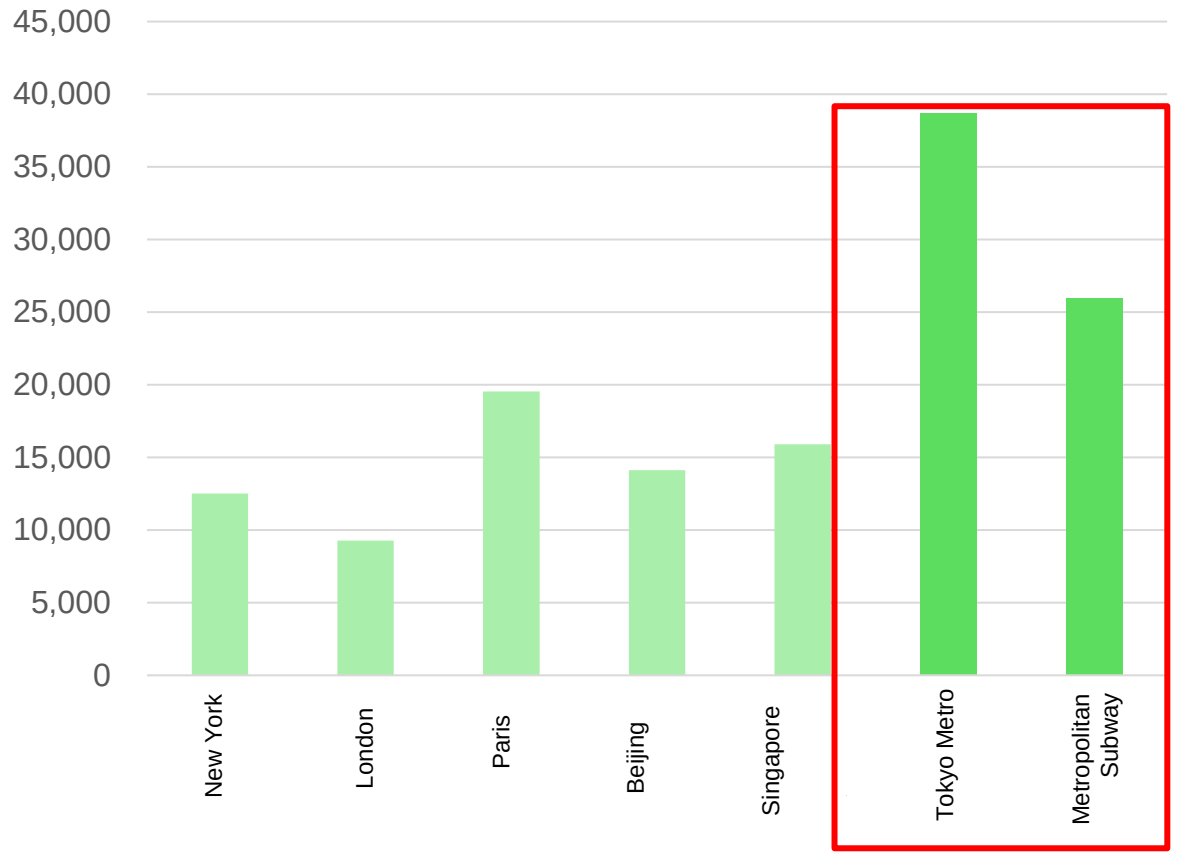
Changes in railway extension and congestion rate in the Tokyo area



The 1st Urban Rail Master plan



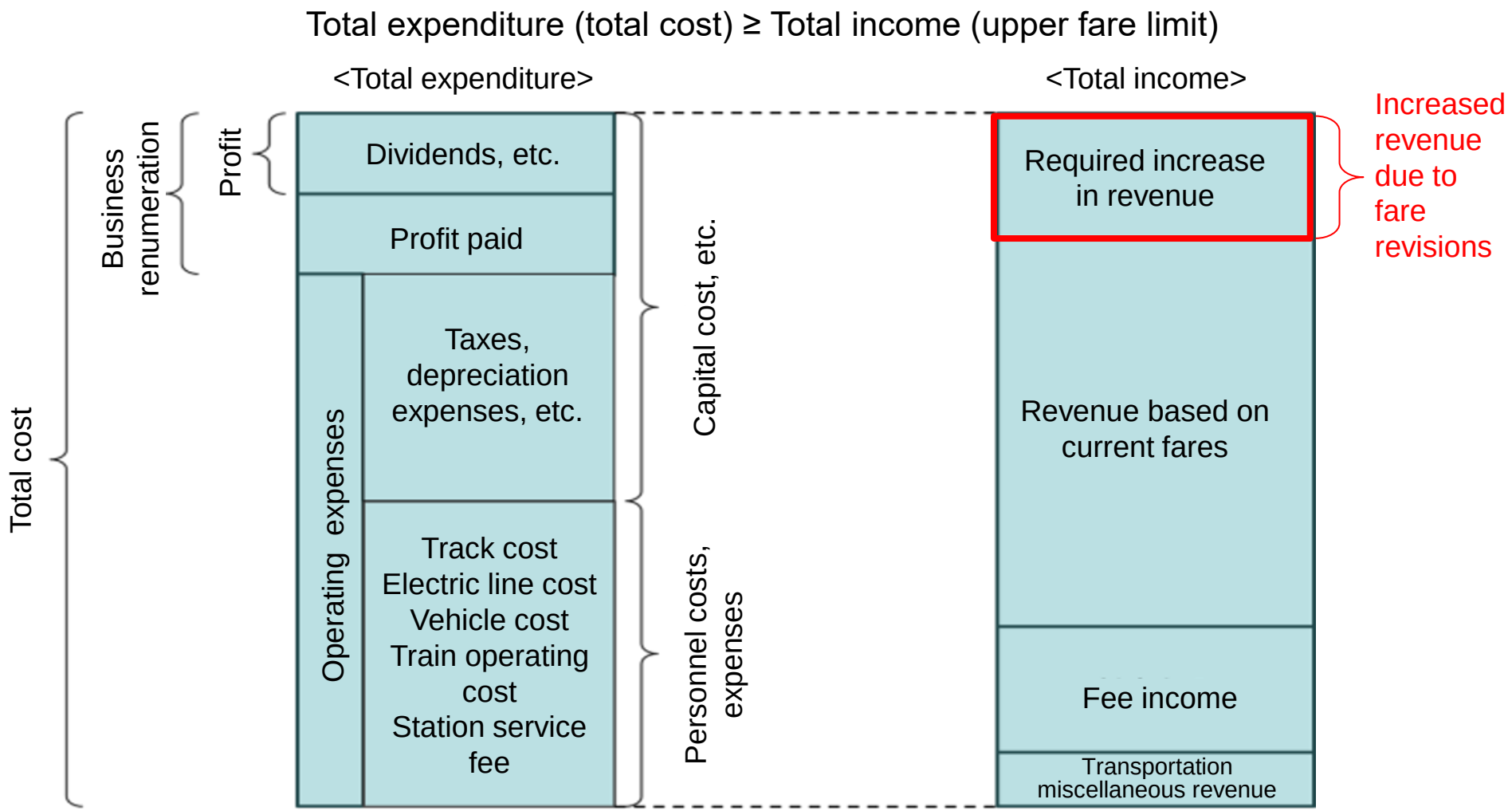
Transport density of urban railways in each country
(Ridership/number of working kilometers)



Created based on “Full version: Metros of the World” (Japan Subway Association)

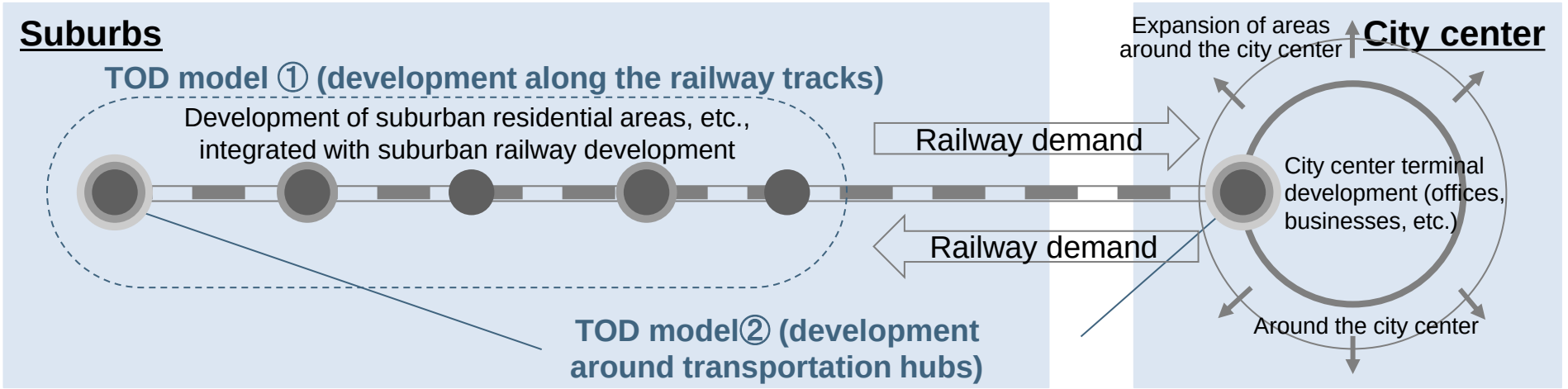
Concept of railway fares: *Fully distributed cost method*

○ The MLIT reviews and approves the upper limit of the fare set by the railway operator to ensure that it does not exceed the sum of the appropriate cost under efficient management and appropriate profit.

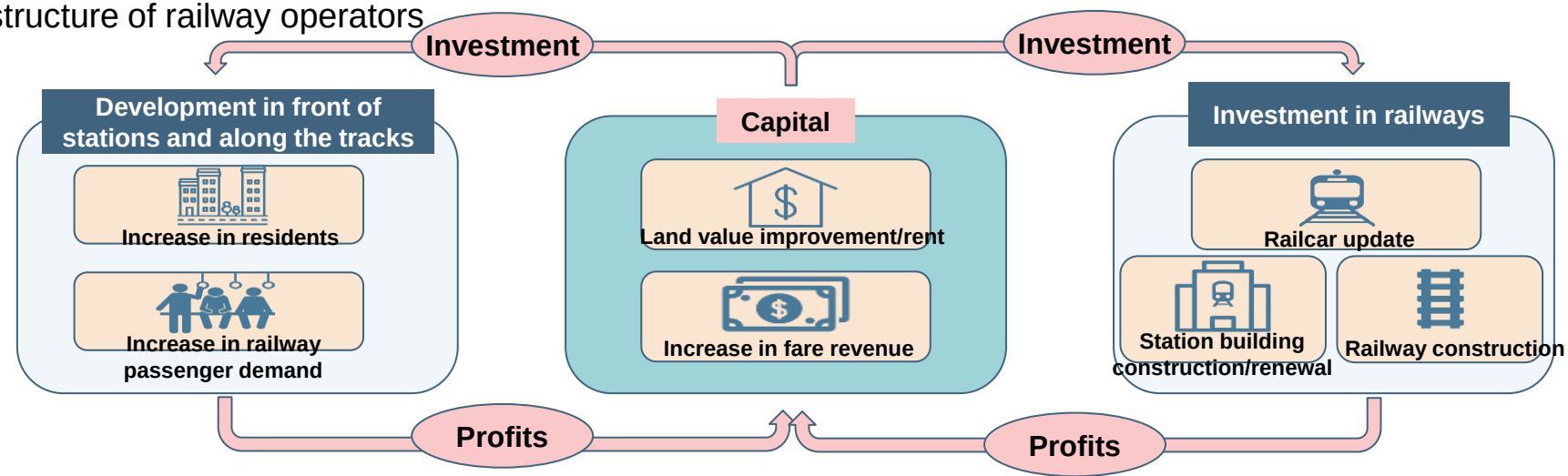


Railway development along with urban development: *Japanese-style TOD*

○ In metropolitan areas, a profit structure that internalizes the external economic effects of railway development is realized by expanding the passenger transport business into a multifaceted business including real estate development, mainly centered on major private railway companies, resulting in railway development combined with urban development.



Profit structure of railway operators



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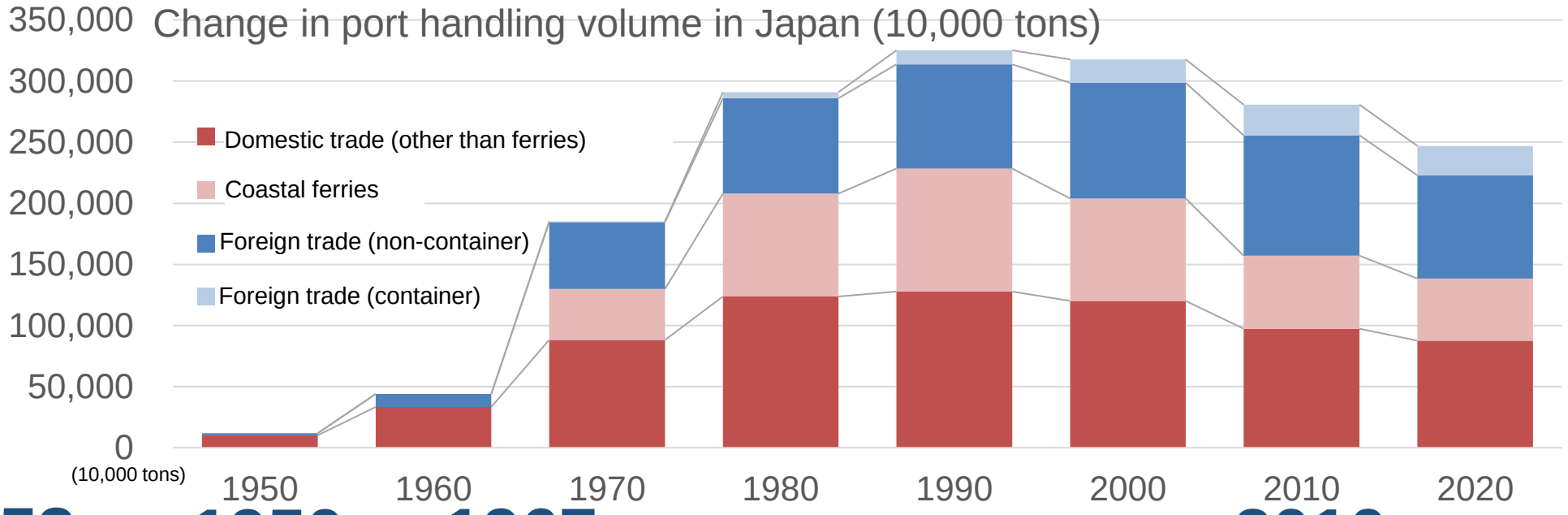
History of port development in Japan

○ Ports were developed throughout the country after the war as industrial bases. Furthermore, development was promoted as domestic and international distribution bases in accordance with economic growth. Compatibility with larger ships and formation of hubs are promoted amid globalization.



1853

1950 Systematic port development and expansion of **heavy and chemical industries** to regions

1967 **Containerization Ferries**

Environmental conservation and creation of **waterfront area**

2010 Enhancing international competitiveness through **"selection and concentration"**


Perry Expedition to the Tokugawa shogunate


Industrial port development (Kashima Port)


Arrival of container ships

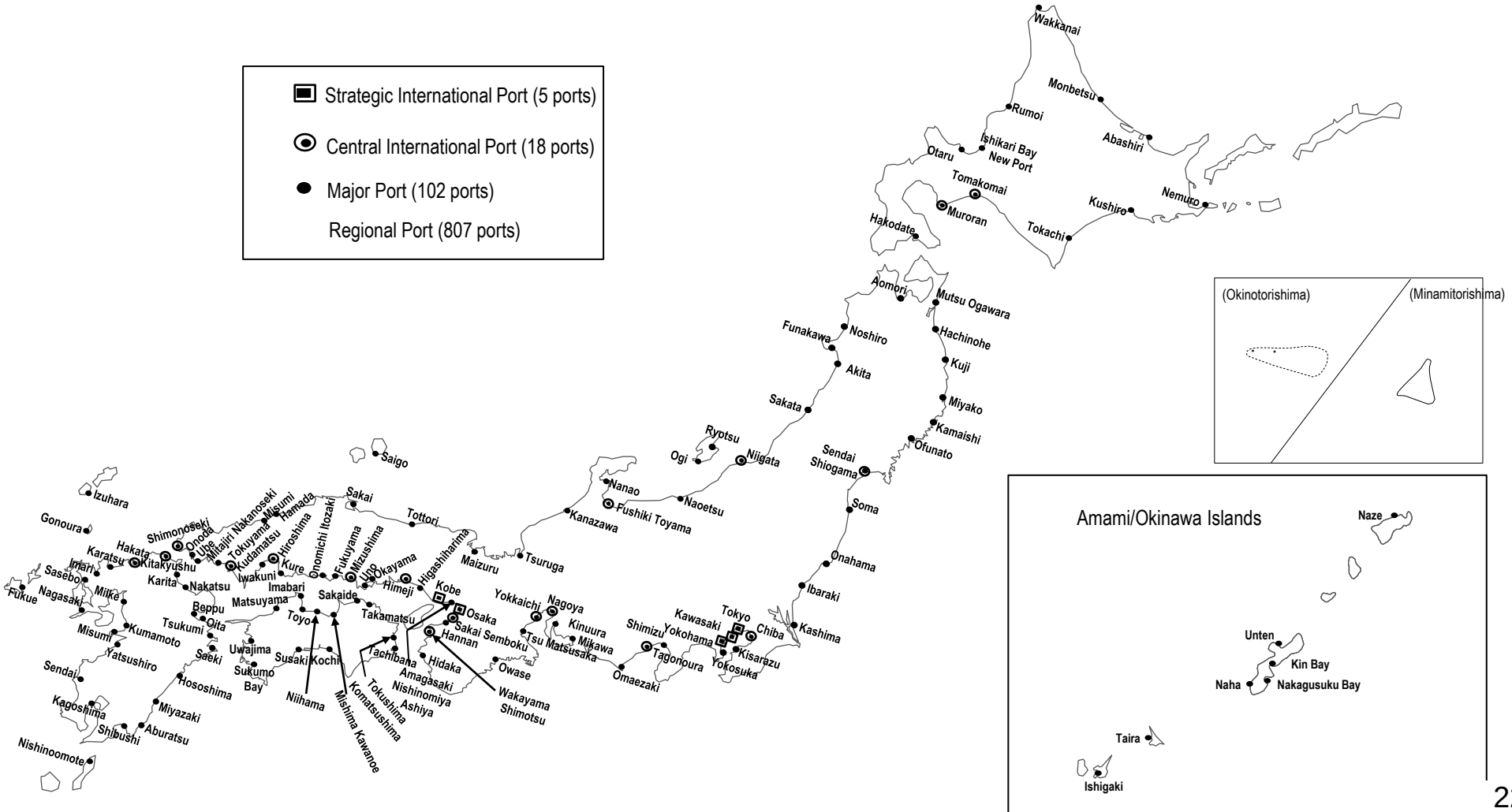

Waterfront development (Osaka Bay)


Increase in size of container ships


Arrival of cruise ships in port "white ships of the Heisei era"

Types and locations of ports in Japan

- ○ Mainly developed and managed by the port management body (local government, etc.). According to the importance of the facility, the national government provide subsidies and directly develop.
- ○ The national government promoted planned development through the Five-year Plan for Port Development (approved by the Cabinet). From the 1980s, development policies which guide each development were formulated based on the long-term port visions (Council for Transport Policy report).



Port development method (basic)

○ Sea routes, breakwaters and berths, etc. are developed by port management bodies and the national government as public work projects.
○ Cargo handling equipment and wharf sites, etc. are developed/operated by the port management bodies by issuing bond. This is repaid with usage fee income.

[ ] indicates the business entity.

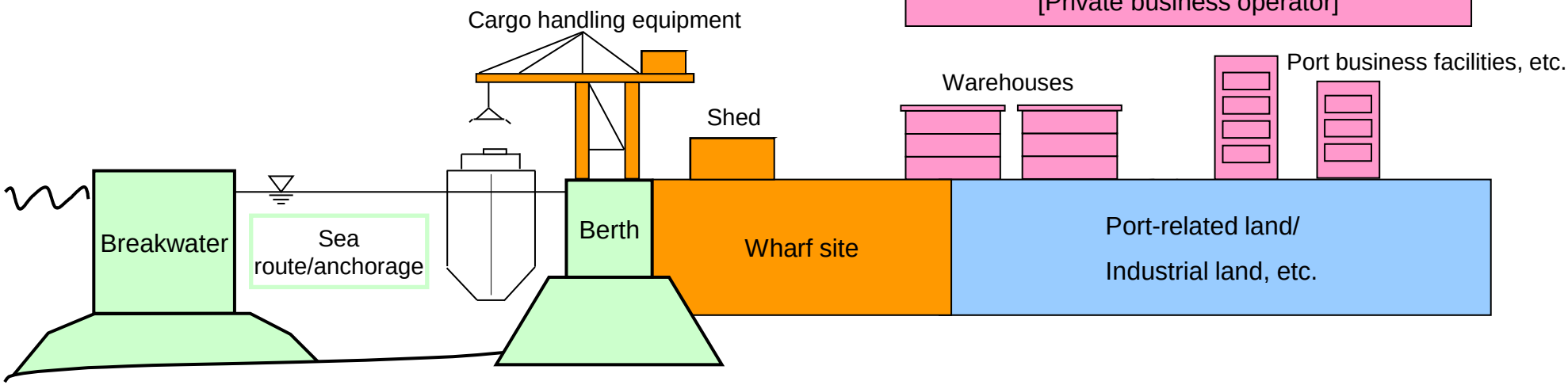
Port-related bond issuance business

①Port development project
[Port managers or country]
(Breakwater, berth, sea route/anchorage, etc.)

②Port function facilities development project
[Port managers]

③Waterfront land development project
[Port managers, etc.]

④Port-related businesses by the private sector
[Private business operator]

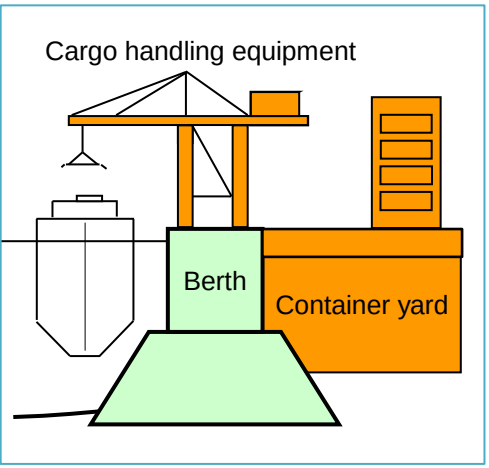


①Breakwaters, berths, sea routes/anchorages, etc., for use by the general public are maintained by **the government or port managers as public work projects** (port development projects).
②Cargo handling equipment, wharf sites, sheds, etc., are maintained by **the port managers** using usage fee income and through **debt issuance businesses** (port function facilities development project).
③Port-related land/industrial land, etc., are maintained by **the port managers,** etc., through land sale fees and **debt issuance businesses** (waterfront land development projects).
④In addition to these, the port managers, local governments, port operating companies, and private business operators maintain the necessary port facilities themselves.

Port development methods in accordance with the times (Container terminal example)

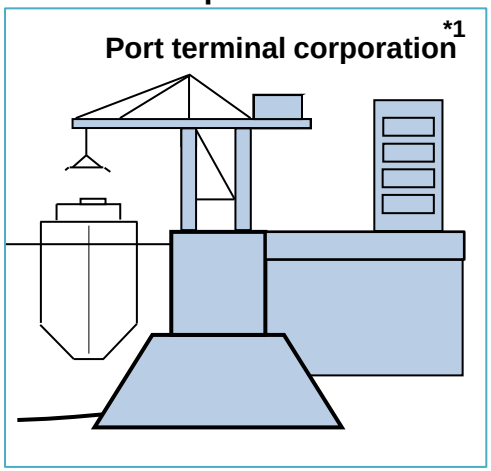
- ○ The public corporation system (a port terminal corporation) which recover cost by usage fees was introduced to rapidly develop container terminals and improve usage efficiency through exclusive use.
- ○ Due to an increase in business scale (increased ship size) and intensifying international competition, usage fees were reduced through public involvement.
- ○ A port operating company (private company) manages multiple wharves in an integrated manner in order to further improve efficiency.

Public method



・License

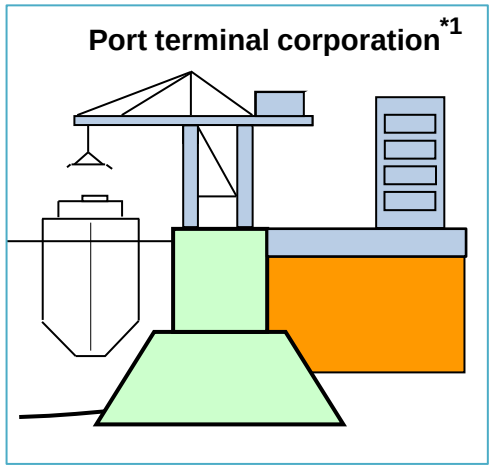
Public corporation method



・A public corporation maintains the wharf in an integrated manner using interest-free/low interest loans from the government, etc., and its own funds, and provides exclusive loans to shipping companies, etc.

⇨ **Rapid development**
Improved usage efficiency

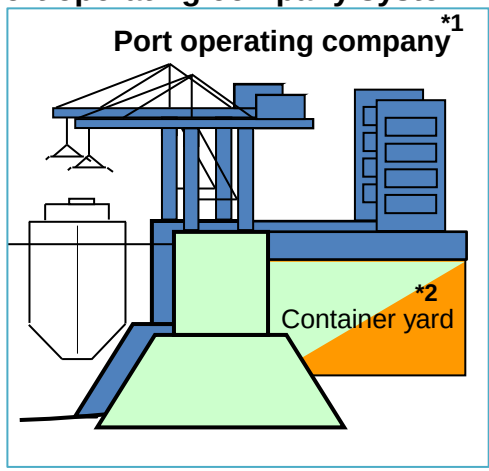
New method



・A public corporation operates the berths and container yards (wharves) maintained by the public and cargo handling equipment, etc., that it maintains itself, in an integrated manner. *3

⇨ **Improved usage efficiency**
Reduced usage fees

Port operating company system



・One port operating company leases a group of wharves developed by the public on a long-term basis, and operates them in an integrated manner with its own wharf facilities, etc. *3

⇨ **Public-private management**
Further reduction of usage fees
Improved efficiency of placement/investment

*1 Developed with using the wharf development fund loan program (loan ratio is [national interest-free loan: interest-free loan from port manager: special sublease bond: operators, etc.] = 1:1:4:4~4:4:1:1)
*2 Limited to container terminals with quake-resistant berths with a water depth of 16m or more.
*3 Wharf public corporations and port operating companies lease each wharf to shipping companies, etc.

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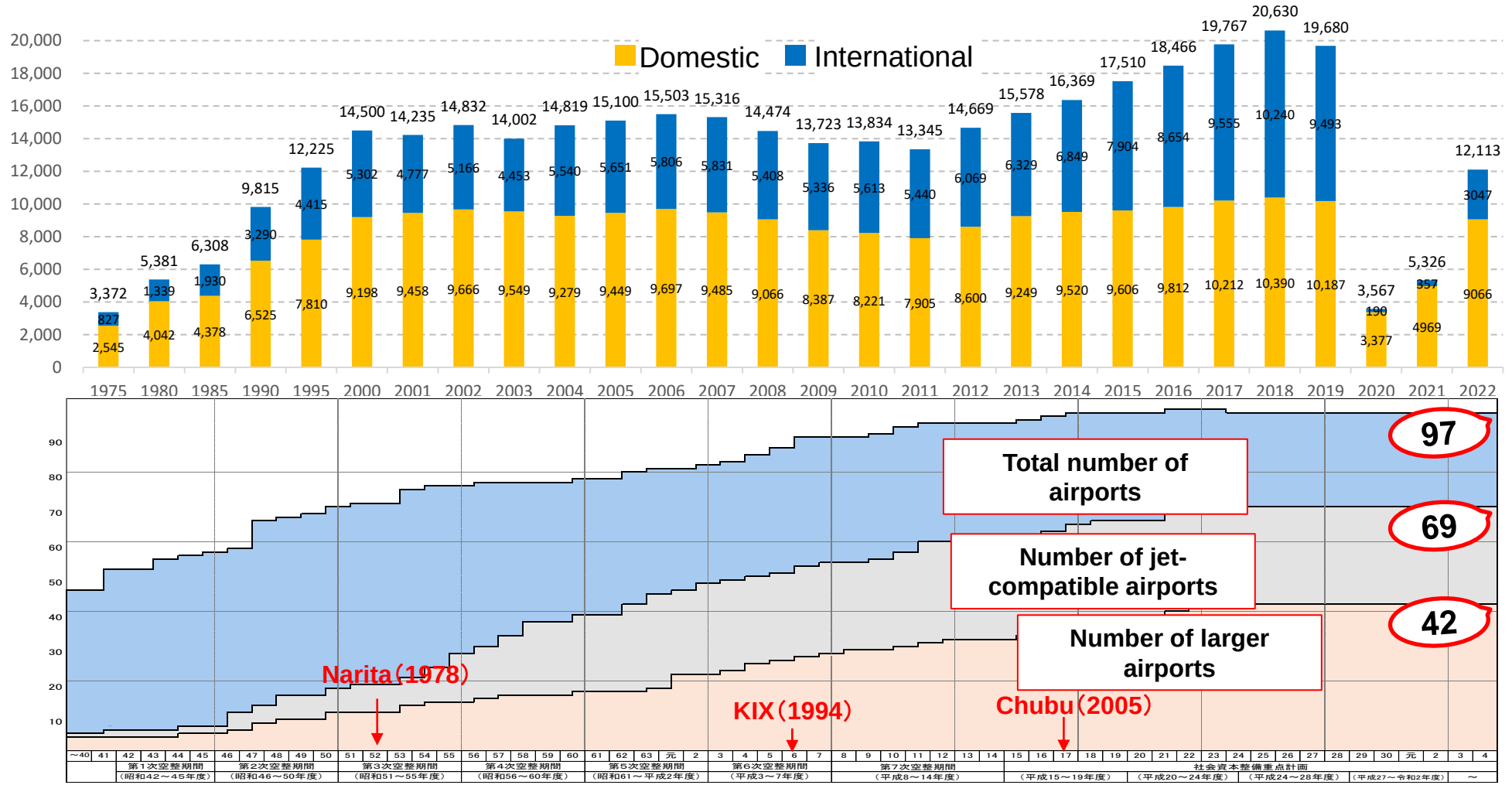
History of airport development in Japan

○ The airport network was developed in response to domestic and international demand for high-speed transportation in light of rapid economic growth.

○ As airplanes became larger and equipped with jet engines to meet increased demand, development of airports to accommodate these airplanes were promoted.



Note) 1. “Total number of airports”: Total number of airports (excluding heliports) and shared airports
2. “Number of jet-compatible airports”: Total number of airports (excluding heliports) and shared airports with a runway length of at least 2,000m or where jet planes are in service
3. “Number of larger airports”: Total number of airports (excluding heliports) and shared airports with runways of 2,500m or more, with facilities that can accommodate large aircraft, etc.

Types and locations of airports in Japan

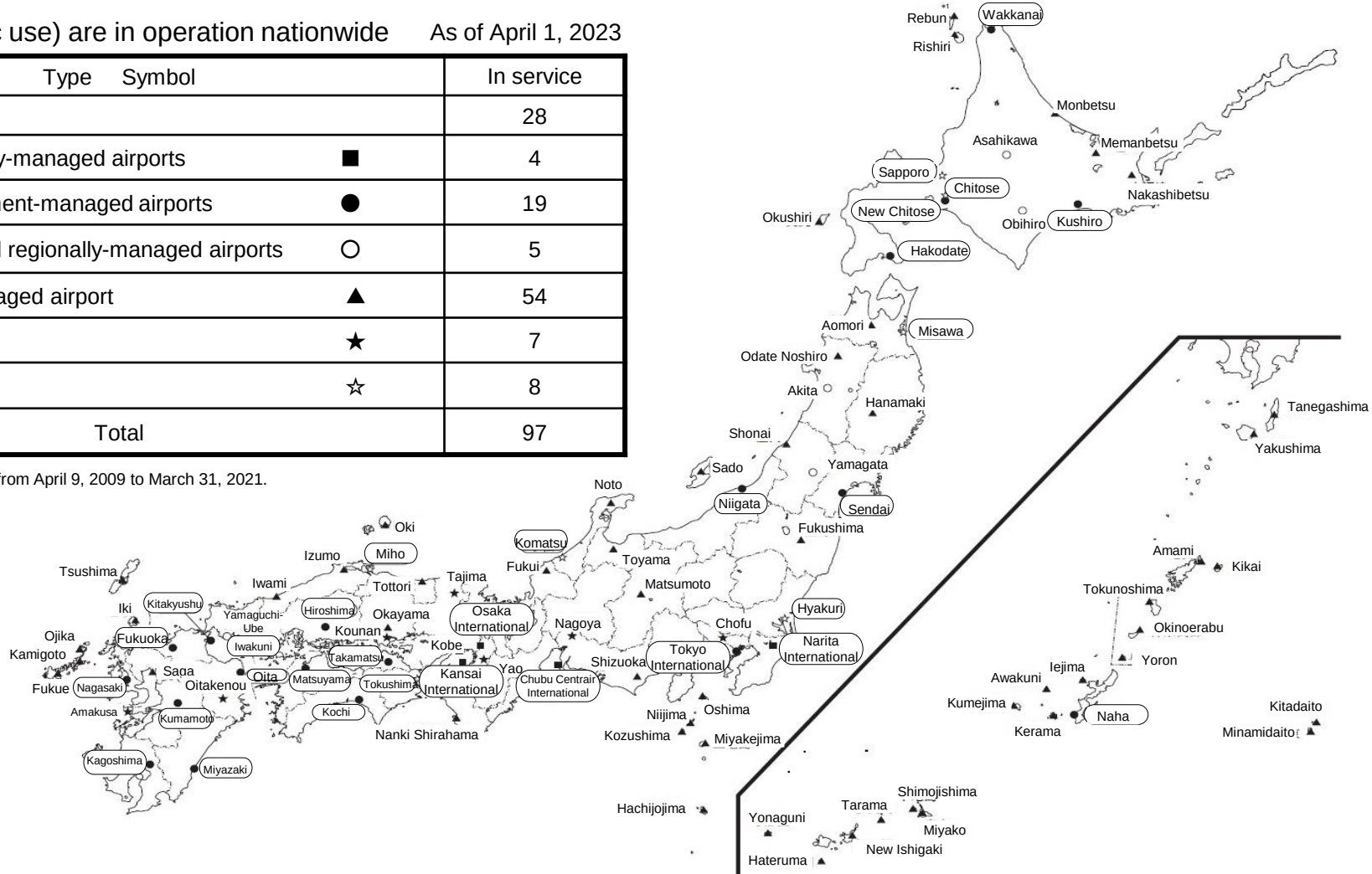
○ In order to respond to the increase in aviation demand, nationwide development of airports was promoted through the Five-year Plans for Airport Development (approved by the Cabinet) and the "national revenue pool system", and development from a location aspect is mainly complete (number of airports: 97).

○ Establishment of hub airports are done by the national government or airport companies. Regionally-managed airports are established and managed by regional governments.

97 airports (public use) are in operation nationwide As of April 1, 2023

Type	Symbol	In service
A Hub airports		28
① Company-managed airports	■	4
② Government-managed airports	●	19
③ Specified regionally-managed airports	○	5
B Regionally-managed airport	▲	54
C Other airports	★	7
D Shared airport	☆	8
Total		97

*1 Rebun Airport is closed from April 9, 2009 to March 31, 2021.



Airport facilities and the development/operation entities

- ○ Runways, etc., and air navigation facilities are developed by the national and local governments using the Airport Development Account by pooling landing fees and usage fees, etc., from around the country.
- ○ The airport terminal buildings, etc. are maintained/operated by private businesses using usage fees, etc.

Air navigation facilities (Airport installation/manager facilities)

Basic airport facilities, etc. (Airport installation/manager facilities)

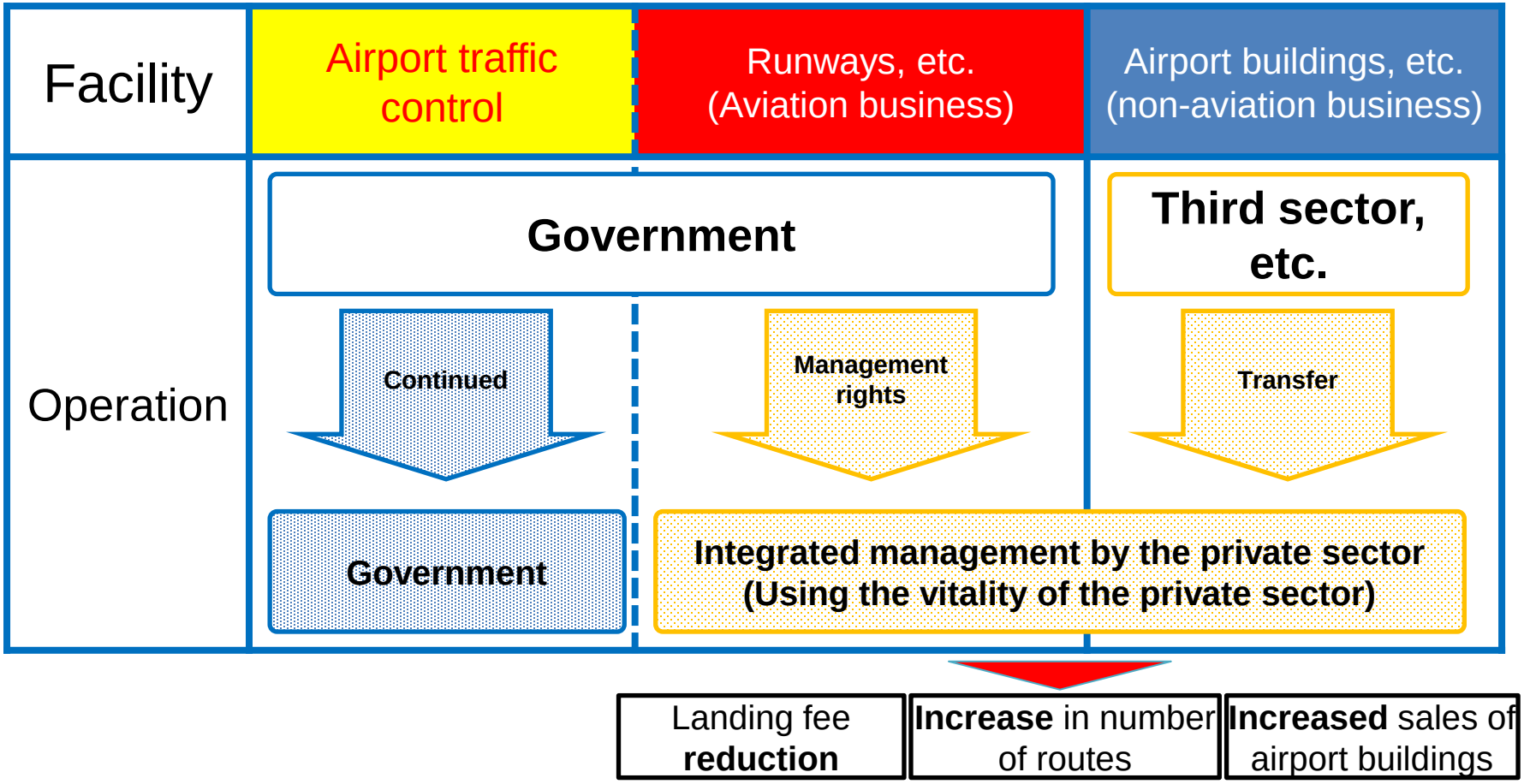
Airport buildings, etc. (Private business facilities)

Landing fees, etc.→ Maintenance and development (nation-wide pool system) (aviation business)

Revenue→ Maintenance and development (non-aviation business)

Overview of airport management concessions

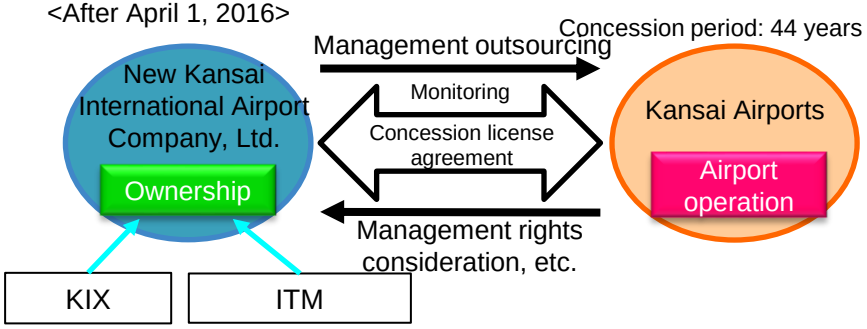
○ The increase in aviation demand has led to demand for improving user benefits, including maintaining and strengthening the aviation network, and strengthening international competitiveness, resulting in a shift in airport policy from “development” to “management”.



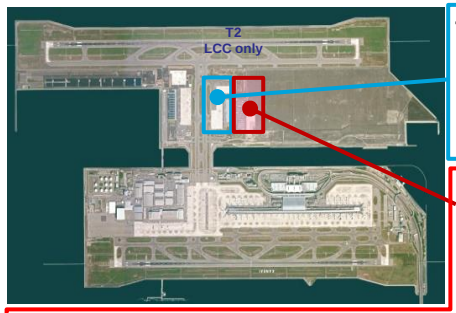
Introduction of the concession system:
Kansai International Airport (KIX) and Osaka International Airport (ITM)

○Operation began in April 2016 by Kansai Airports, which has the operation rights to KIX and ITM. This will ensure early and reliable repayment of Kansai Airport debt, revitalize and strengthen Kansai Airport as an international hub airport and expand air transport demand for the entire Kansai area.

<After April 1, 2016>



○Development of KIX LCC Terminal (T2) [Company business]



Terminal 2 Building (Domestic flights)
Service started on October 28, 2012
・Total floor area: Approx. 30,000㎡ (Single-storied [2-story in some areas])
・Domestic flights only
・9 spots

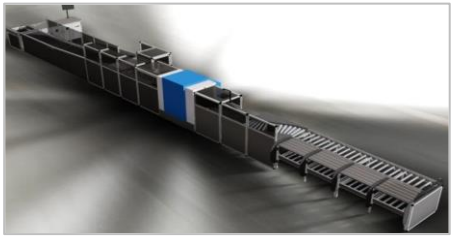
Terminal 2 Building (International flights)
Service started on January 28, 2017
・Total floor area: Approx. 36,000㎡ (Single-storied [2-story in some areas])
・International flights only
・6 spots (can accommodate up to 11 small aircraft)

Introduction of Japan's first "walk-through" duty-free shop and "smart security" system

Walk-through shopping area

"Smart security" system

Smart lane



Body scanner

○Renewal of Itami Airport Terminal Building [Company business]

First major renovation of the terminal building in 50 years

・Pre-opening of the central/rooftop area in April 2016
・Grand opening in August 2020
・Full-scale operation of smart lanes and introduction of walk-through shopping areas, etc.

○Development of facilities for business jets [Company business]

Response to demand for business jets, which is expected to increase further in the future.

・Opened on June 15, 2018
・Inside Terminal Building 2 (domestic flights)
・Facility overview: Security checkpoint, CIQ facility, car pickup and drop-off location/parking lot, reception counter, waiting lounge, conference room
・Operating hours: 24 hours

○Renovation of KIX Terminal 1 [Company business]

Construction period (scheduled):
End of May 2021~ around fall 2026

◆**Current issues** ・Congestion in the international departure area
・North-south distribution of international flight procedural facilities, etc.

◆**Renovation details** ・International departure area dimensions +60% (10,000㎡ ⇒ 16,000㎡)
・International flight security checkpoint processing capacity 4,500⇒6,000 people/hour
・Measures against overcrowding to prevent Covid-19, etc.

➢ **Expansion of international flight acceptance capacity to approximately 40 million people**

(Source：Kansai Airports press release, etc.)

1. 50th anniversary of Japan-Vietnam diplomatic relations and development of transportation between the two countries
2. Methods for developing/operating sustainable core transportation infrastructure in Japan
    - Railway
    - Port
    - Airport
3. Development/operation of transportation infrastructure for decarbonization

Decarbonization of railways

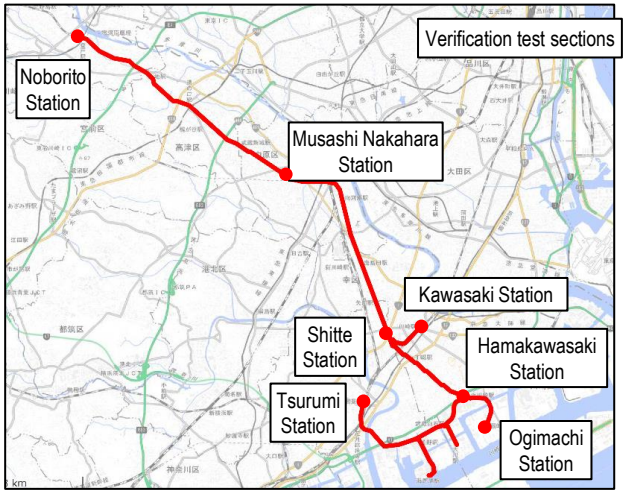
- ○ JR East is developing a hydrogen-powered fuel cell railway vehicle “HYBARI” in collaboration with manufacturers.
- ○ Verification tests are currently being conducted on the Tsurumi Line and Nambu Line, etc., starting in March 2022, with the goal of social implementation by 2030.
- ○ In addition, JR Central is moving forward with investigative research and experiment preparations regarding fuel cell vehicles, and JR West has also announced that it will conduct development towards introduction. JR Hokkaido is also considering future introduction.

Example of JR East’s initiatives

Fuel cell railway vehicle “HYBARI” (actual photo of the test drive train)

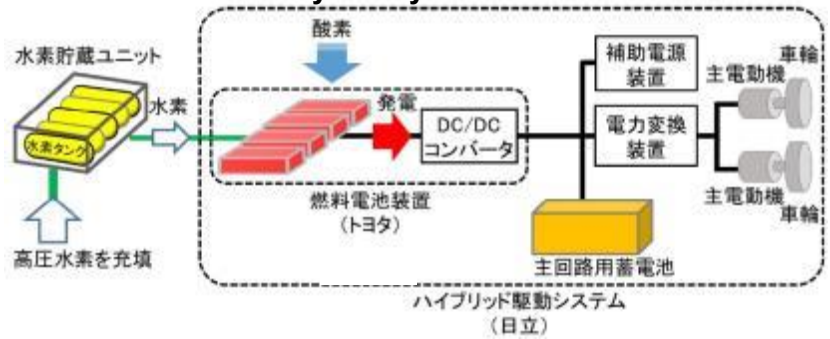
Source: Material provided by JR East

Verification tests are currently being conducted on the Tsurumi Line/Nambu Line



*Created by the Ministry of Land, Infrastructure, Transport and Tourism based on materials published by JR East

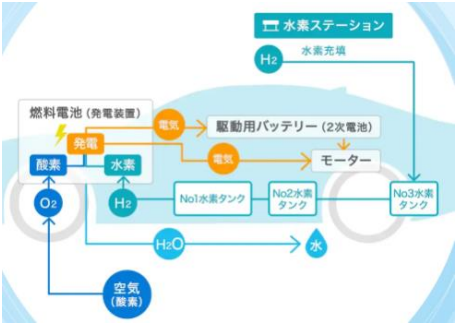
< “HYBARI” fuel cell hybrid system>



*The fuel cell device uses the fuel cell technology of the fuel cell car “MIRAI”

Source: JR East HP

<Reference: Mechanism of the fuel cell car “MIRAI” >

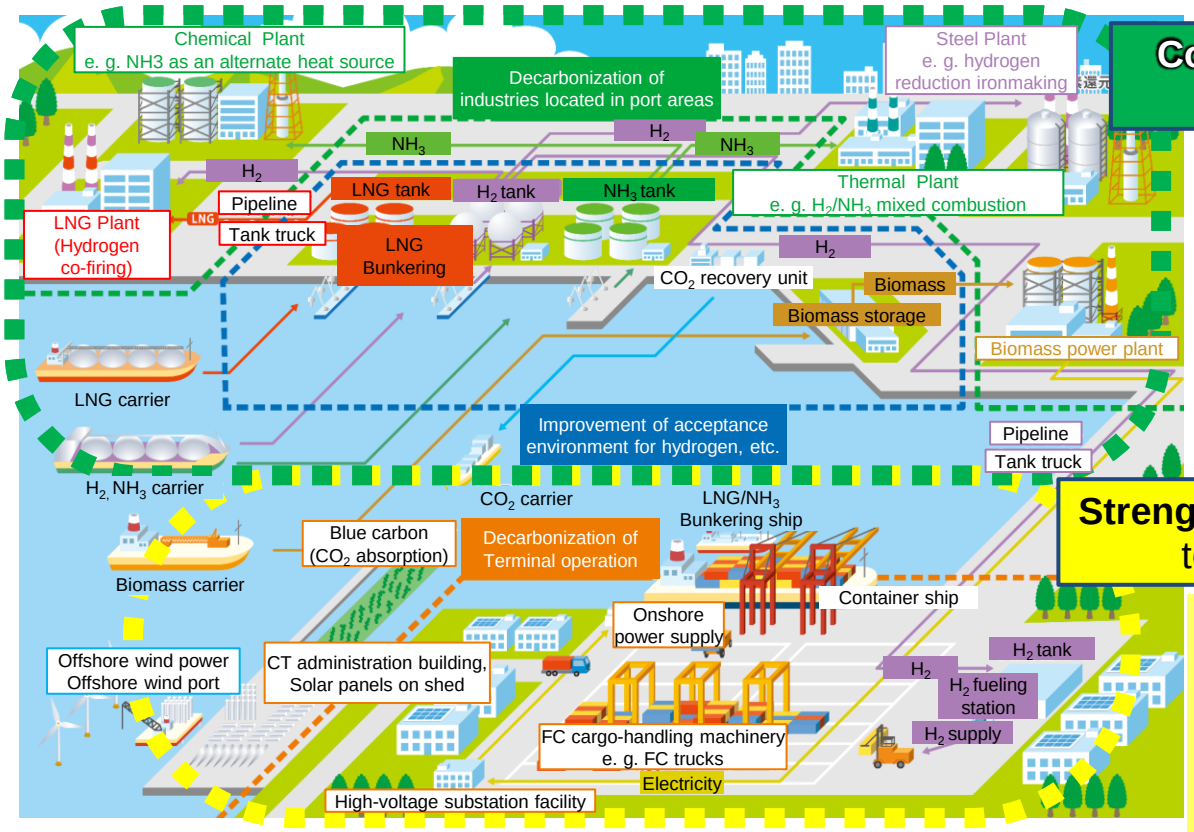


Source: Toyota Motor Corporation HP

Decarbonization of ports

- ○ Ports function as a supply chain hubs, places where industries gather, and a place for transportation/manufacturing activities, etc.
- ○ Contribute to enhancing the competitiveness of Japan's industries and ports and realizing a decarbonized society by promoting decarbonization initiatives at ports.
- ○ Promote decarbonization of activities in ports and coastal industries.

"Carbon neutral port (CNP)" formation image



Contribution to the decarbonization of ports/coastal areas

Contribute to decarbonization of ports/coastal areas by promoting environmental development necessary for supplying hydrogen and ammonia, etc., required for industrial energy conversion.

Strengthen the competitiveness of ports by responding to the decarbonization needs of shippers, etc.

Formation of competitive ports that are chosen by shippers and shipping companies by promoting efforts to decarbonize the port facilities, etc., in response to the demand for decarbonization of the entire global supply chain.

Decarbonization of airports

○ Overall objectives and a timetable for airport decarbonization was formulated in February 2022.

<Objectives> By FY2030, we aim to approach carbon neutrality at all airports by reducing emissions at each airport by at least 46% (compared to FY2013) and maximizing the potential of introducing renewable energy, etc.

○ Support such as introducing equipment for airport decarbonization and model demonstrations, etc., has also been provided since FY2022.

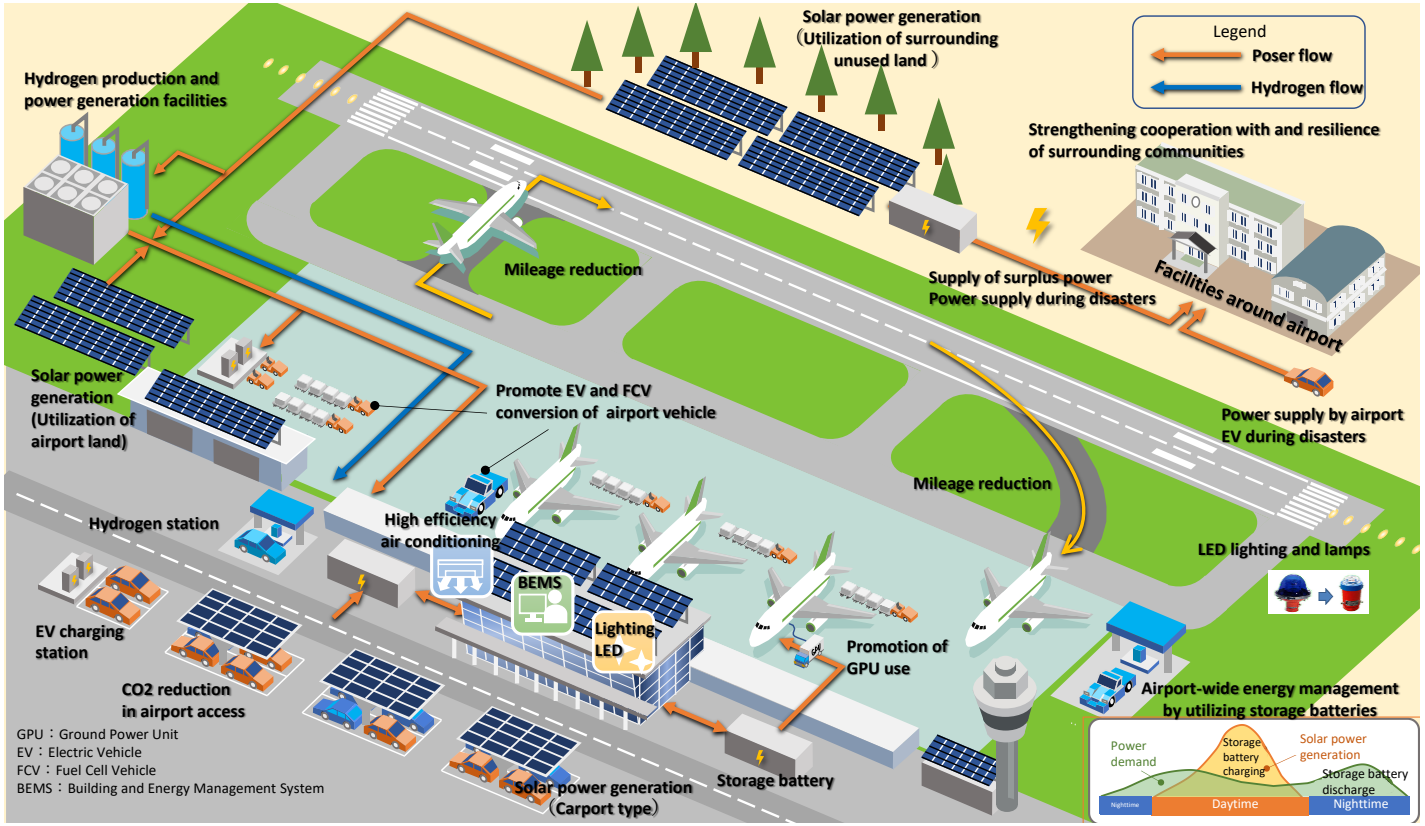


Image of promoting airport decarbonization

Main initiatives in the schedule for airport decarbonization

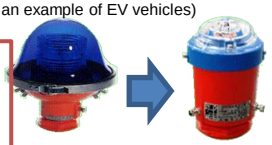
①Reducing CO2 emissions from airport facilities and airport vehicles

Promoting the conversion of airport vehicles to EV/FCV(The photos are an example of EV vehicles)

②Reducing CO2 emissions from ground-based aircraft

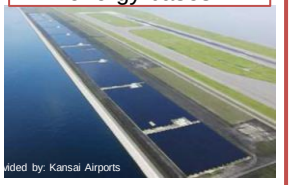
Promoting GPU use

Reducing travel distance



Switching to LED lights

③Creating renewable energy bases



Promoting the introduction of solar power generation

Xin cảm ơn

Thank you very much