14 January 2020

JTTRI International Seminar on Railway and Area Development in Thailand

一般財団法人運輸総合研究所

タイにおける鉄道整備と沿線開発に関する国際セミナー

Railway and Area Development

Masai MUTO, Dr.

Japan Transport and Tourism Research Institute

Senior Research Fellow

運輸総合研究所　主任研究員

武藤　雅威

Profile

Masai MUTO

1989	M.Eng., Department of Civil Engineering, Tokyo University of Science
1989	R&D of Superconducting Maglev Train System, Railway Technical Research Institute
2001	D.Eng., Department of Civil Engineering, Tokyo University of Science
2005	Laboratory Head of Transport Planning, Railway Technical Research Institute
2013	General Manager, Strategic Research Division Railway Technical Research Institute
2010-2019	Part-Time Lecturer, Keio University
2013-2018	Visiting Professor, Tokyo University of Science
2019	JTTRI, Senior Research Fellow

Contents

Introduction

(1) Objectives

- In order to solve problems such as serious traffic congestion caused by rapid population growth ASEAN cities, integration of railway and area development will be proposed based on the local conditions in each cities.

This presentation is one of the research outcomes from:

"Research Group on Railway and Area Development" sponsored by JTTRI

- Dr. Shigeru Morichi, Professor Emeritus, GRIPS, as a director of this research group
- Collaboration with 18 experts from academic, public and private sectors

(2) Directions

- Utilizing Japanese expertize and JTTRI long-accumulated know-how
- Case study in Hanoi, Bangkok, Jakarta, and Manila.

Chapter 1: Challenges in Urban Railway Development

Four case studies

- Hanoi Metro Line 2 (Phase3)

https://vietnamfinance.vn/tap-doan-sumitommo-muon-thuc-nhanh-du-an-do-thi-thong-minh-nhat-tan-noi-bai-20180303205654052.htm

- Bangkok MRT Orange Line

https://www.mrta-orangelineeast.com/en/train

- Jakarta MRT North-South Line (Phase2)

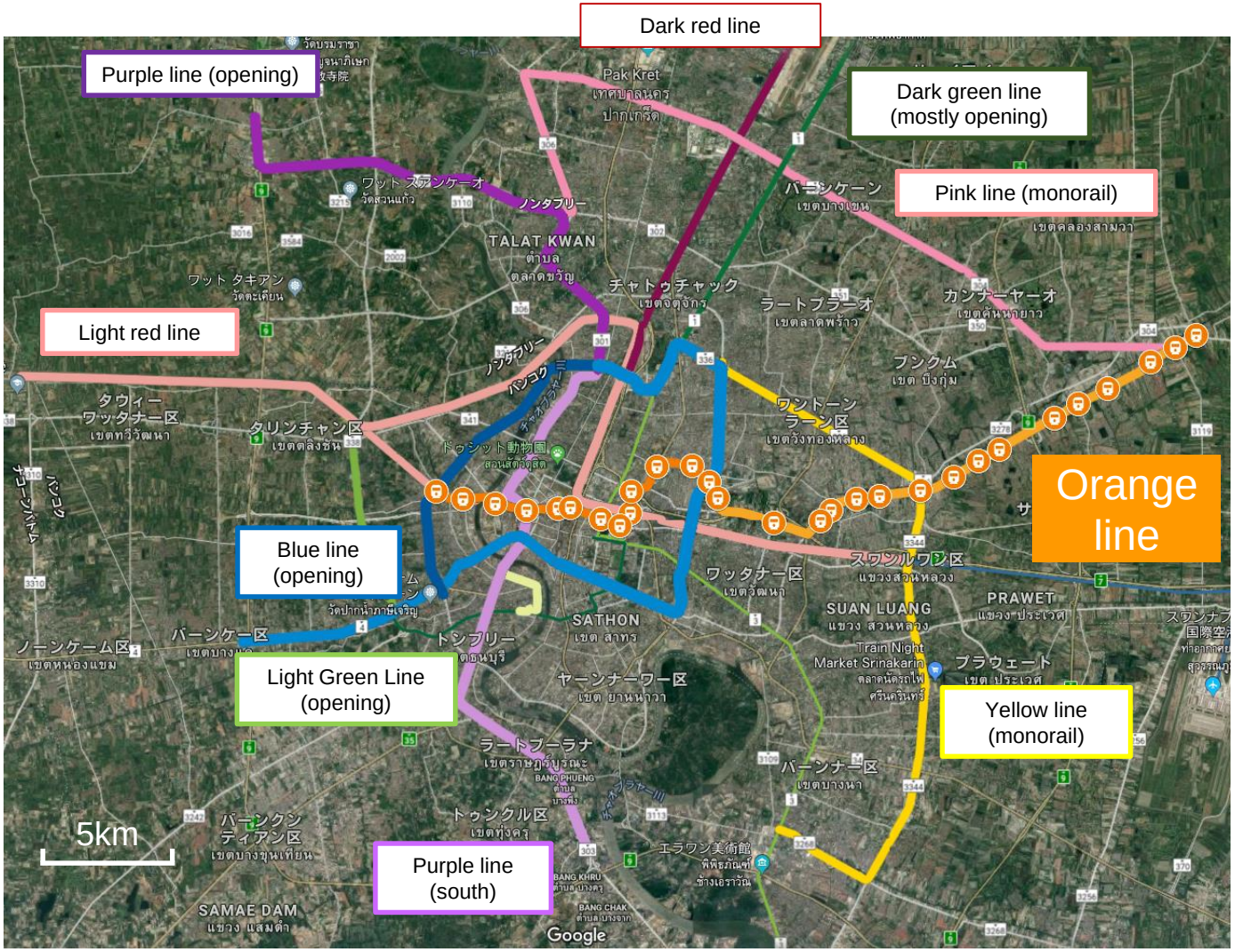
https://news.detik.com/berita/d-4491696/pagi-ini-mrt-jakarta-mulai-berbayar

- Metro Manila Subway Line 9 (Mega Manila Subway)

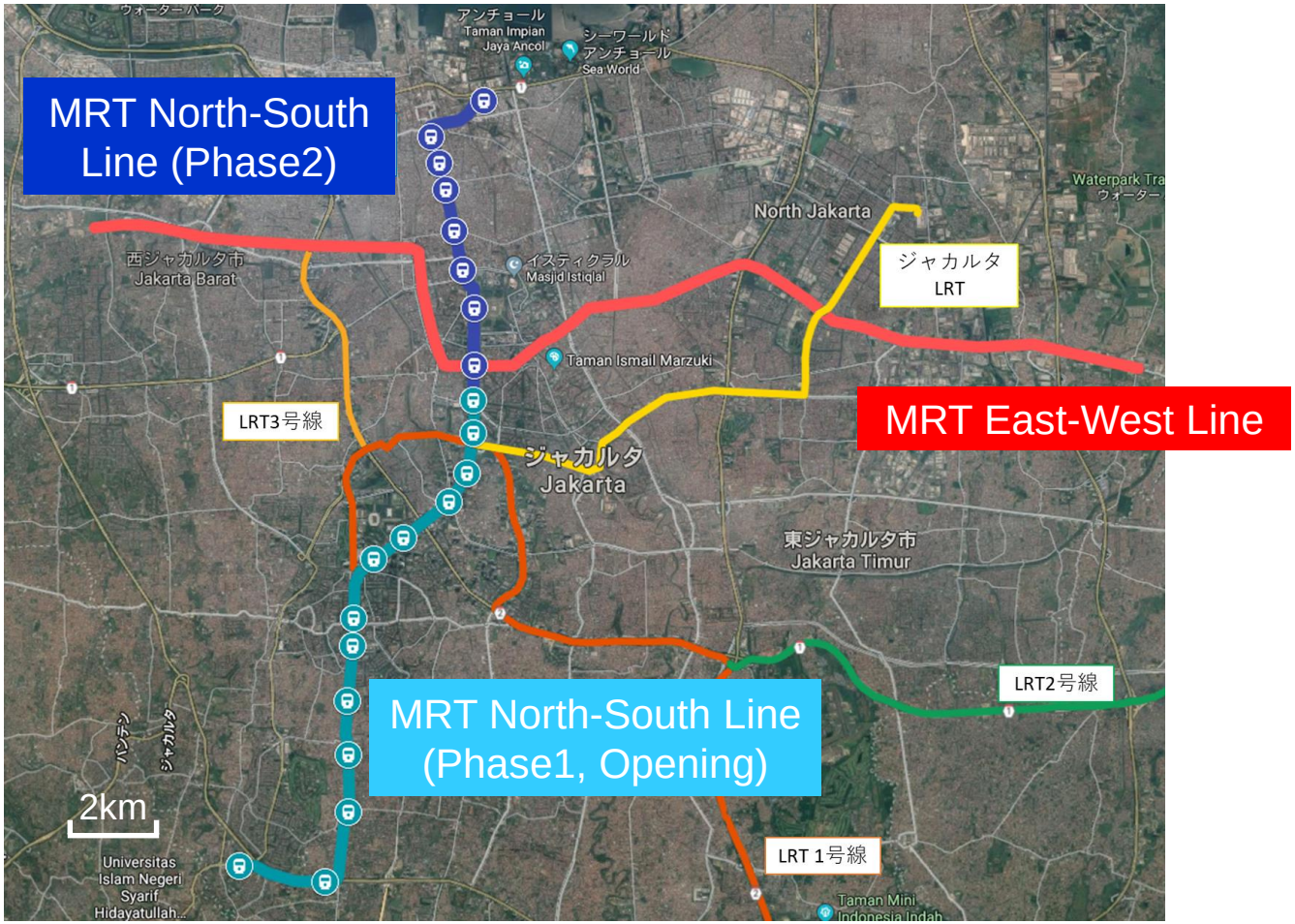
You Tube : FILIPINO PROUD CHANNEL

Hanoi Metro Line 2 (Phase3)

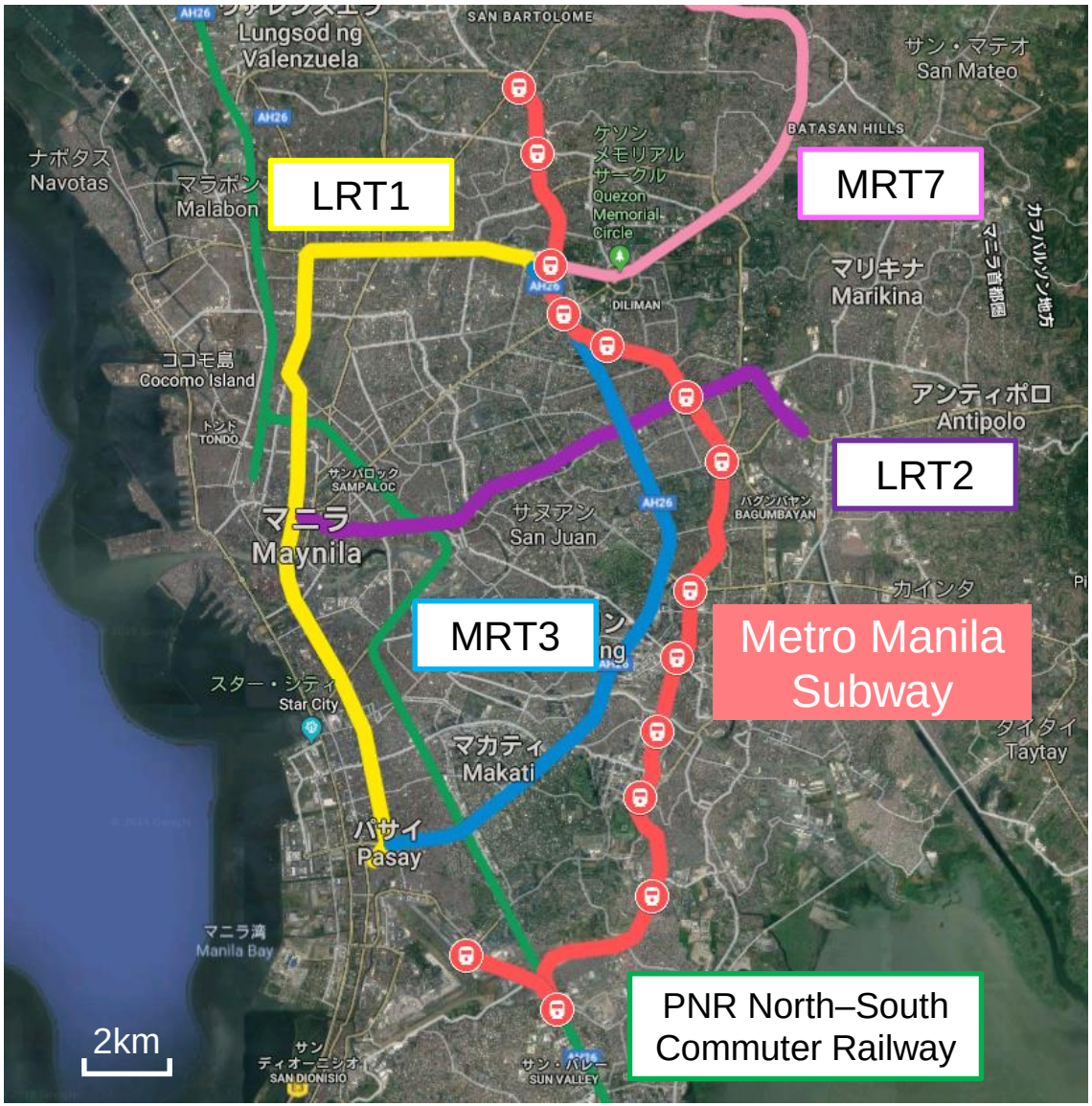
Bangkok MRT Orange Line



Jakarta MRT North-South Line (Phase2)



Metro Manila Subway Line 9



Challenge 1: Collaboration Between Railways and Area Development

In order to cope with the rapid population increase and rapid urbanization, many housing required. To provide accessibility to those housing, railway development to the new town becomes one of the social issues.

- Prevention of urban sprawl development by private-sector-led PPP (Hanoi)
- Local community development plan have not been well-established (Hanoi, Manila)
- No coordination between Railway PPP and TOD (Jakarta, Manila)
- Concrete policy and procedure for land readjustment for development are not established. (Hanoi, Bangkok)

Further discussion in 2.1

Challenge 2: Securing Financial Resources for Railway Development

Due to government financial constraint, recent urban railway investments are usually relying too much on PPP.

- Due to limitation in tax-based budget, measures to utilize private funds are under consideration in the case of Jakarta
- Property tax system is not well-functioning (Bangkok, Jakarta, Manila)
- The suitable role for the private and the government in PPP is not clearly determined (Hanoi, Bangkok)

Further discussion in 2.2

Challenge 3: Providing a High-Quality Railway System

The system of the railway which has been introduced does not meet the user demand

- Formulation of integrated railway and area development master plan (Hanoi)
- Overlapping route plans (Jakarta)
- Heavy Congestion in Low-capacity MRT3 (Manila)
- No organization to supervise multiple projects, including LRTs and subway (Manila)

Further discussion in 2.3

Challenge 4: Integration of Railway Development with Social Infrastructure

The required railway-related infrastructures, such as station plaza, are not in consideration

- Infrastructure investment plans from the government and the private investors are independently developed without coordination (Manila)
- The construction of rail (LRT1, MRT3, MRT7) and bus transfer terminals at North Avenue is delayed due to legal conflict (Manila)

Further discussion in 2.4

Challenge 5: Creating a Sustainable Urban Railway System

Loss and bankruptcy of railway companies are one of the most common issues in Asian Countries

- There are many cases of PPP failure in Asian urban railway projects.
- Lack of expertise in railway operations

Further discussion in 2.5

Chapter 2 Examination Items for Railway Development

2.1 Collaboration Between Railways and Area Development

2.2 Securing Financial Resources for Railway Development

2.3 Providing a High-Quality Railway System

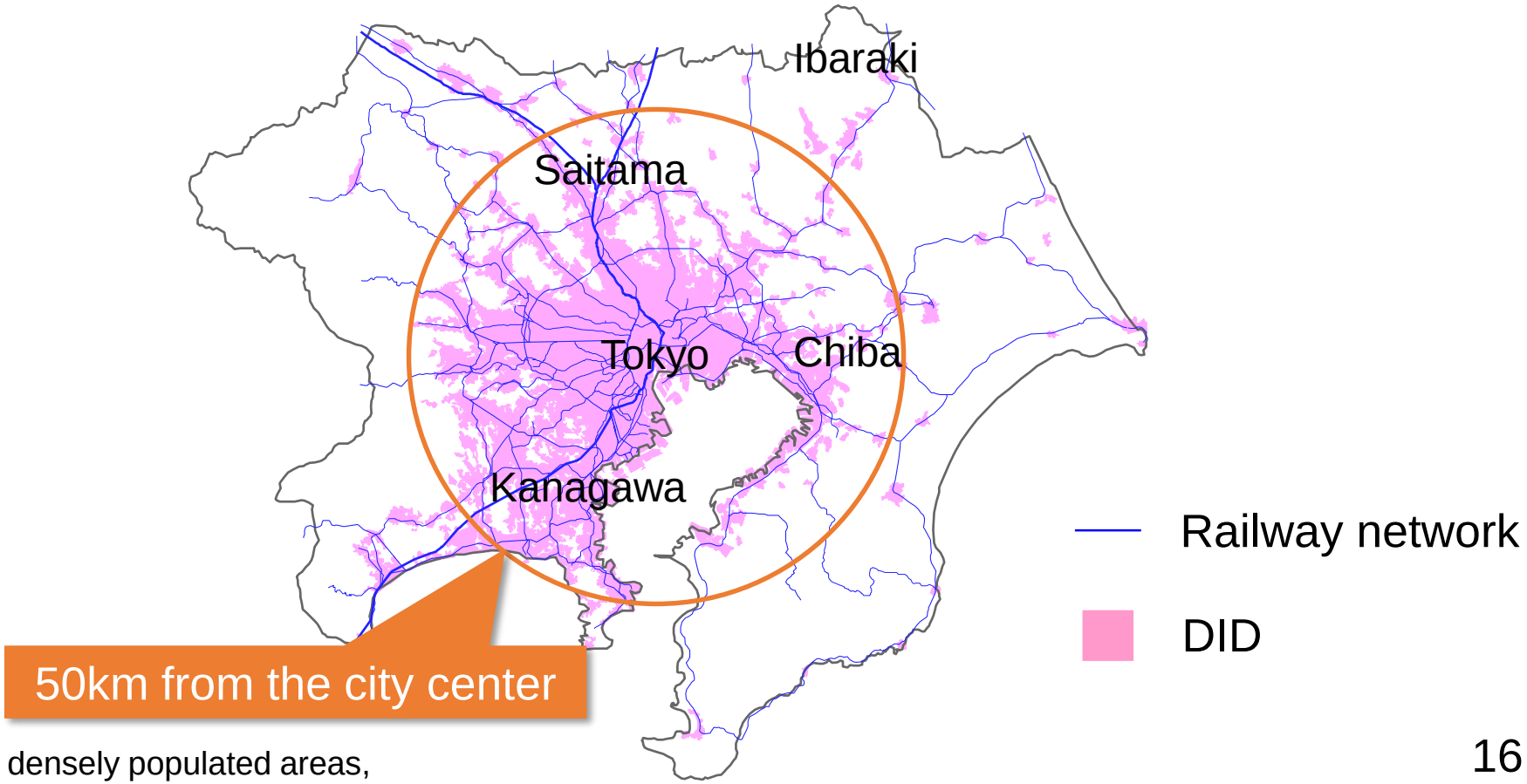
2.4 Integration of Railway Development with Social Infrastructure

2.5 Creating a Sustainable Urban Railway System

2.1 Collaboration Between Railways and Area Development

Railway-Oriented High-Density Urban Development

The Tokyo metropolitan is developed by extend DID area to suburban along the railway lines



DIDs: densely populated areas,
Defined by an area of density of 4,000 people/㎢ or more, or a basic unit blocks with population of 5,000 or more

TOD

TOD (Transit Oriented Development) = Public Transportation-Oriented Developments

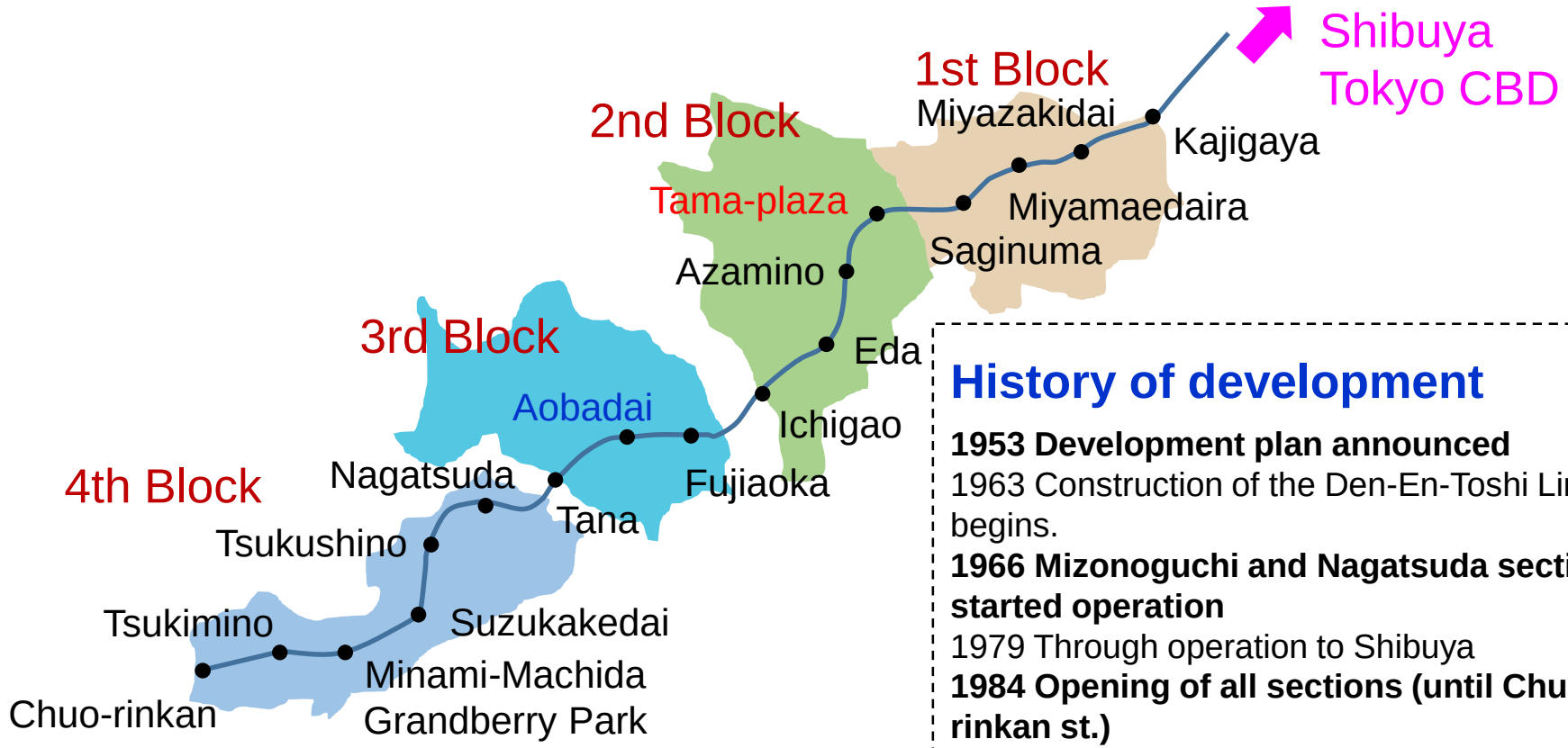
Urban development which aims to promote public transit, not to increase automobile dependency

Example of TOD in Japan

TOD along Den-En-Toshi (Garden City) Line:

Integrated railway (Den-En-Toshi Line) and land development (with land readjustment program), taken by only one developer, Tokyu Railway.

- Total area ≈ 5,000ha, Population ≈ 620,000 (March 2017)
- The largest private land development project in Japan

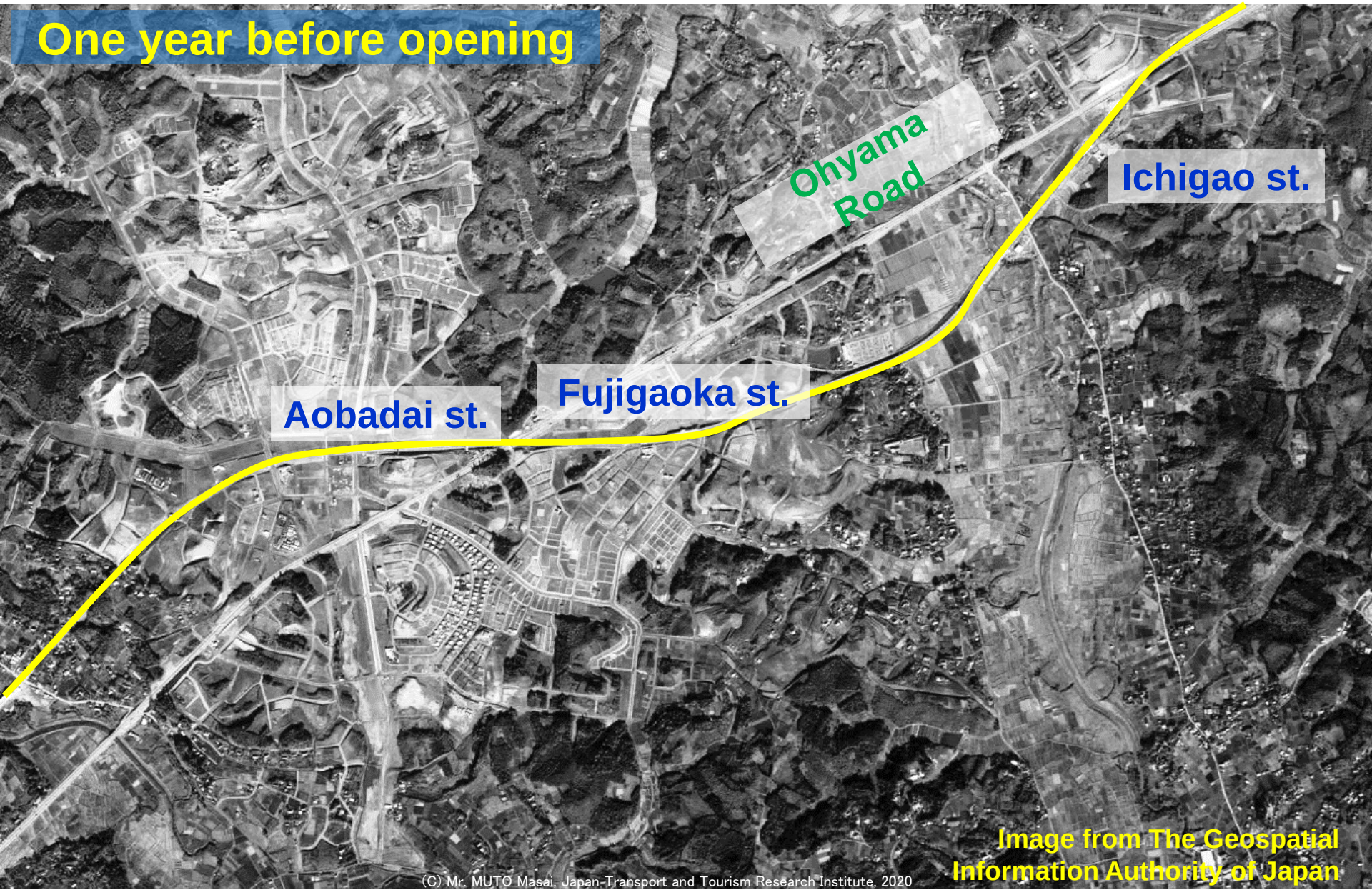


https://www.tokyu.co.jp/company/business/urban_development/denentoshi/
https://www.tokyu-cnst.co.jp/company/brandmessage.html

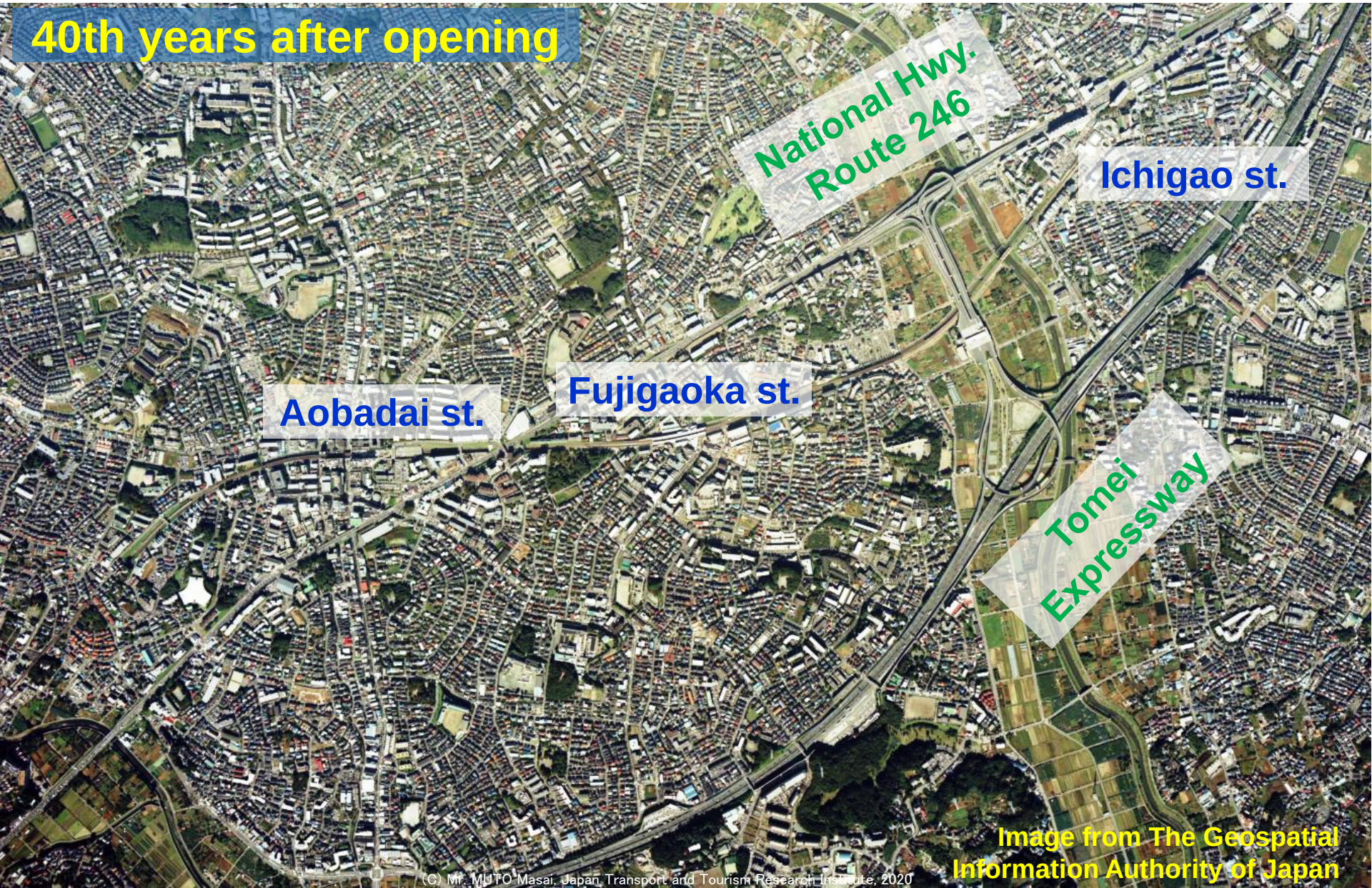
History of development

1953 Development plan announced
1963 Construction of the Den-En-Toshi Line begins.
1966 Mizonoguchi and Nagatsuda section started operation
1979 Through operation to Shibuya
1984 Opening of all sections (until Chuo-rinkan st.)
2006 Completion of land readjustment program

Den-En-Toshi Line, near Aobadai Station, 1965



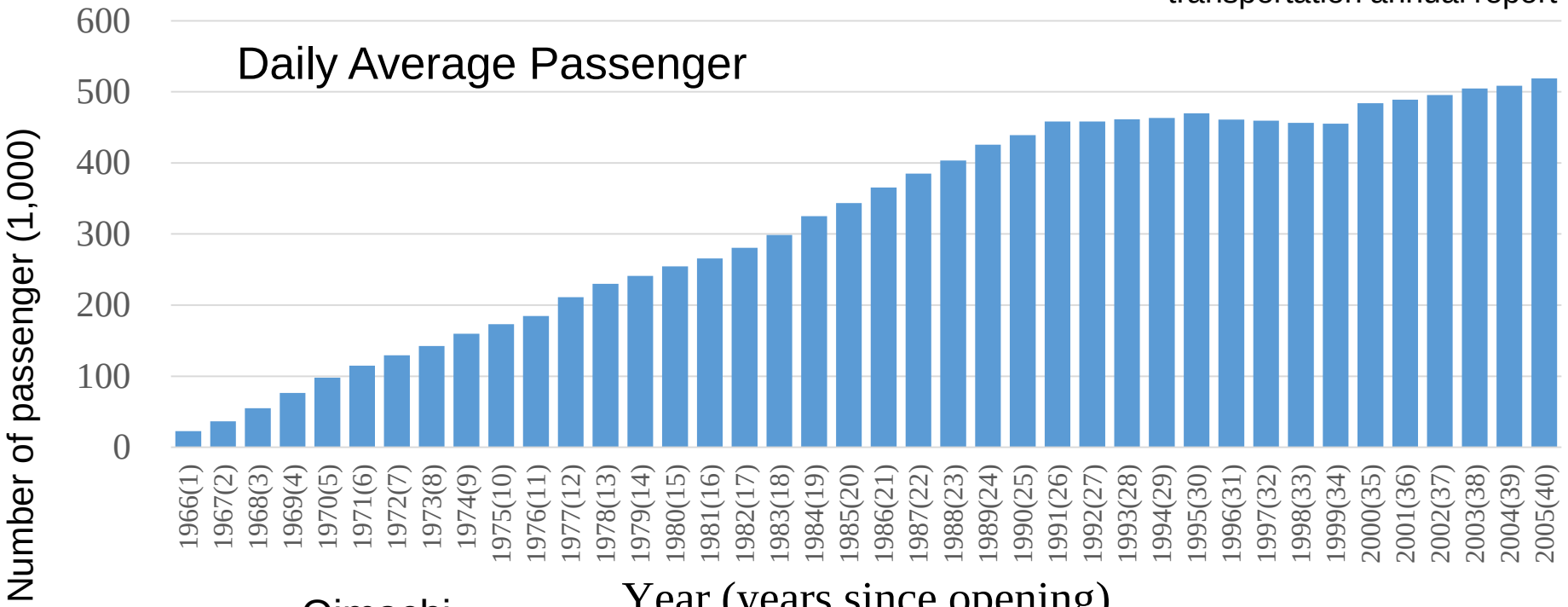
Den-En-Toshi Line, near Aobadai Station, 2005

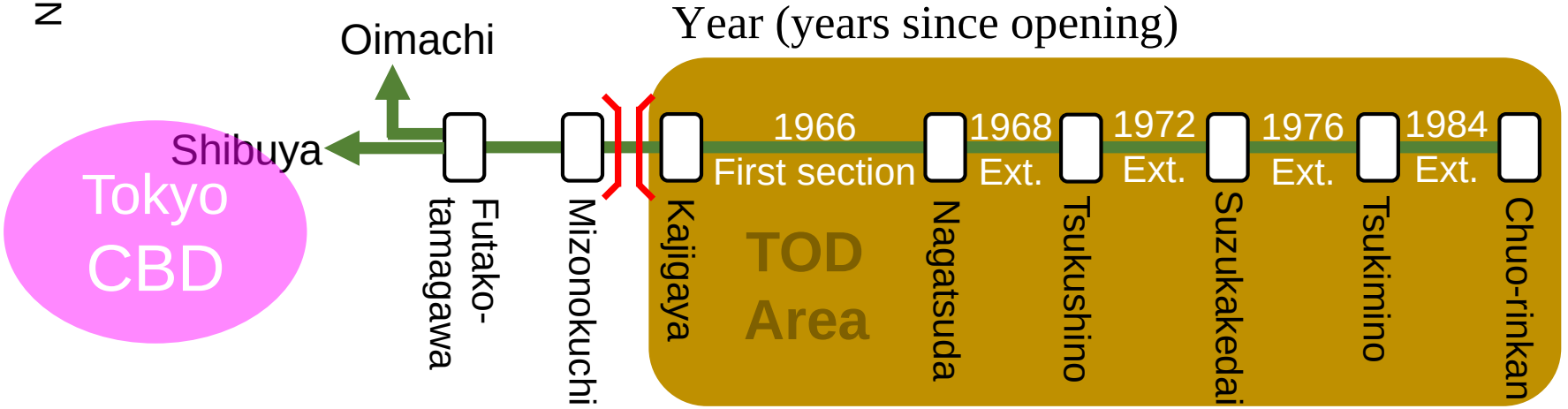


Number of Users in Den-En-Toshi Line

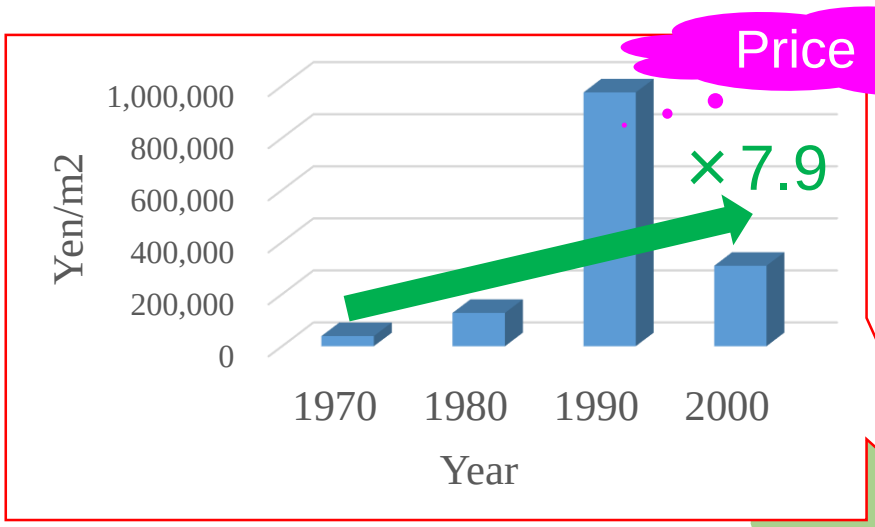
Kajigaya st. - Mizonoguchi st. Section

Based on the urban transportation annual report

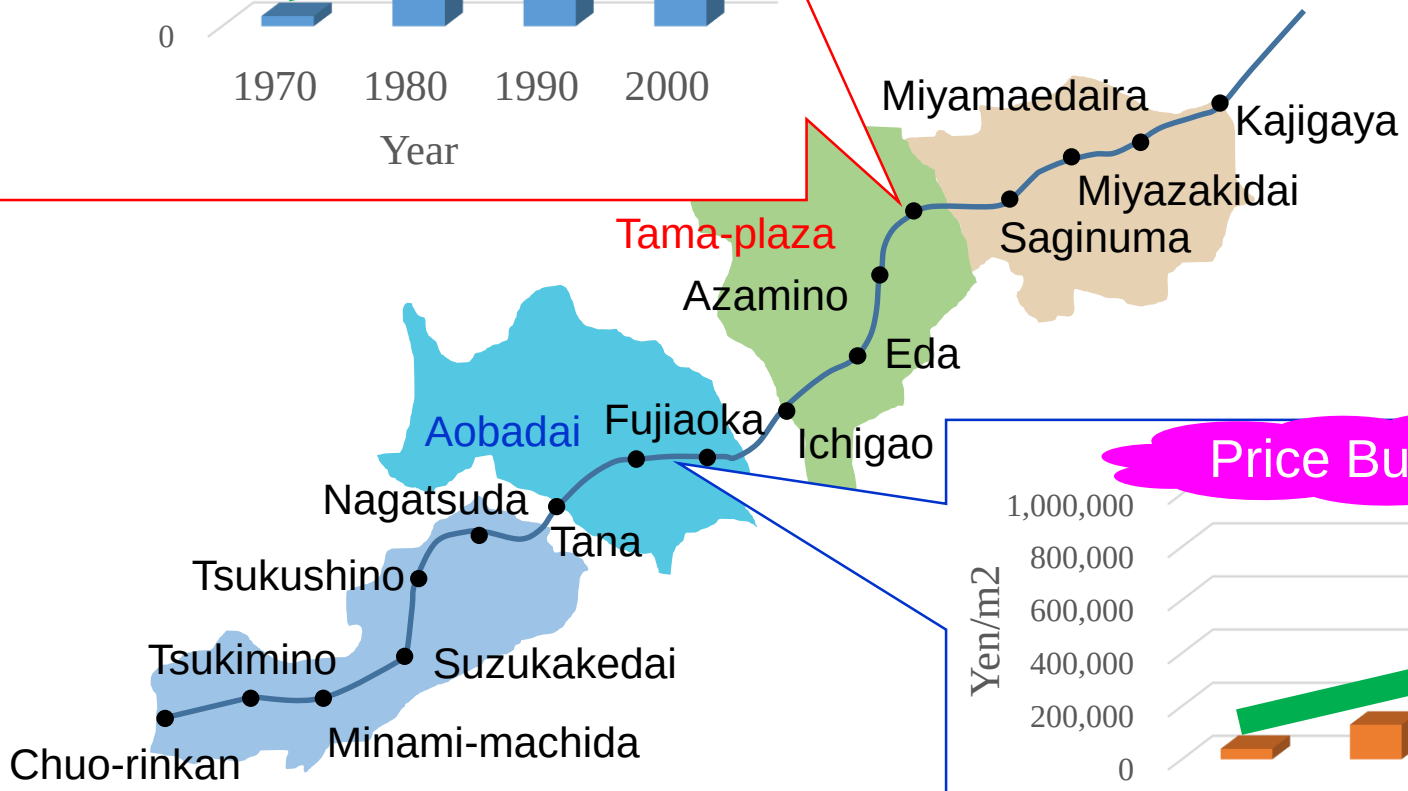


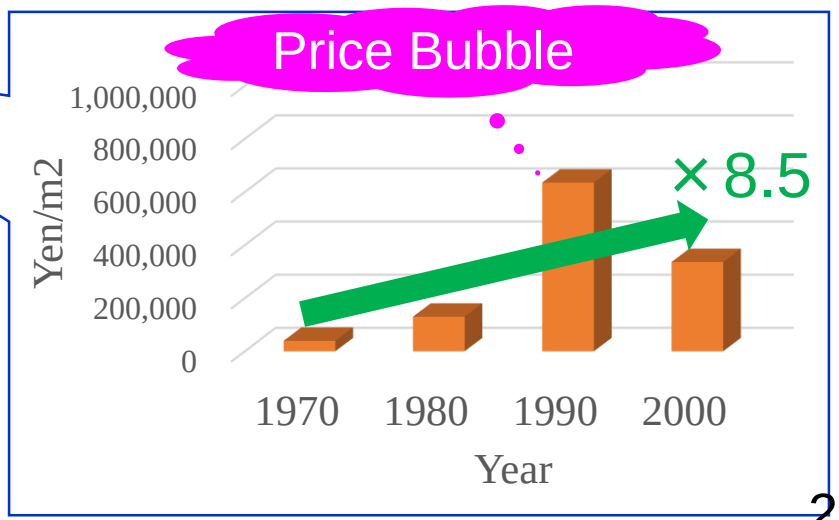


Land Prices Increase along Den-En-Toshi Line



Changes in residential land prices around stations





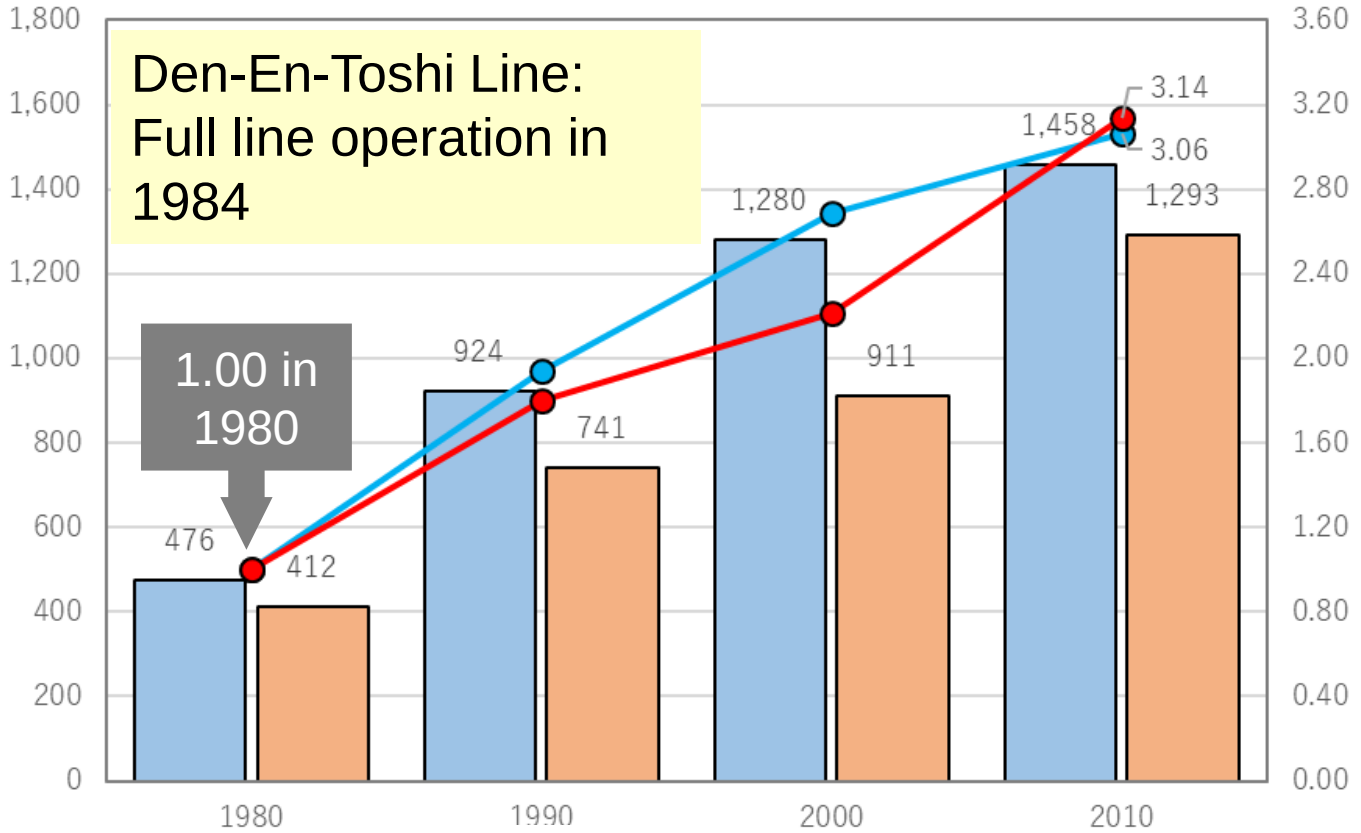
Based on the public assessed value frome MLIT

Shares of railway business and real estate business

Profit from railway and real estate business of the Tokyu Railway

As railway and land development along railway are progressing, profit from the railway and real estate industries are also increasing.

Unit: 100 million yen/year



Source: Annual Railway Statistics Report

Background of successful TOD along Den-En-Toshi Line

Residential area development along railway line → Increase in railway demand → Increase in land price

- **During the high-economic growth period in Japan**

Rising in income level, Widespread of housing loan systems (from public financial institution)

- **Strong promotion of urban development plans**

Railway company took initiatives in land readjustment program

Strategically Promoting Business through Unified Brand Concepts

Daily life support and service business for local residents

Mr. Keita GOTO

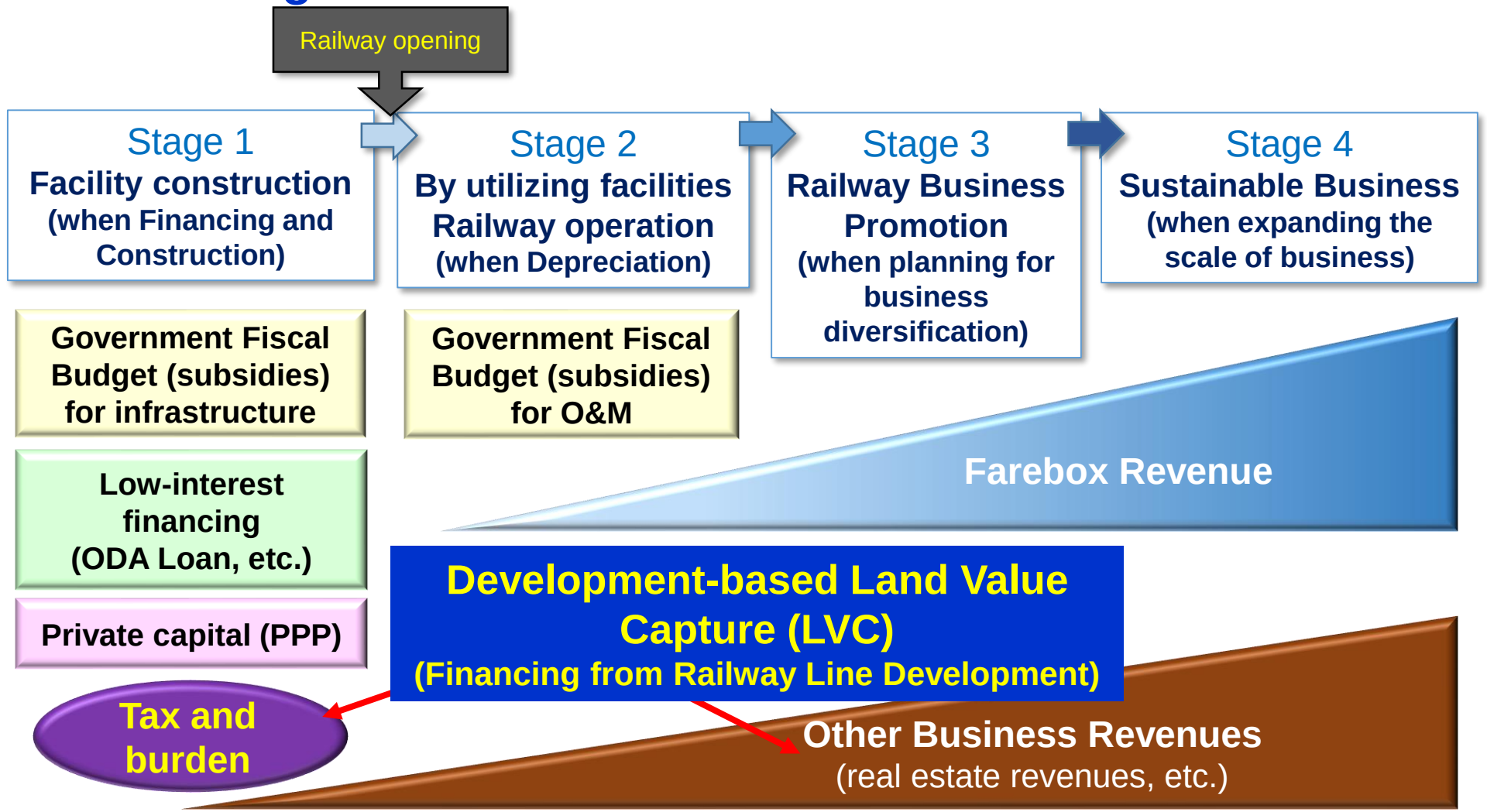
2.1 Collaboration Between Railways and Area Development

◆ Points to be considered in this section

- Residential area along railway line can be developed by,
  - Implementing land readjustment program
  - With the initiative from railway company
- As a result,
  - Land price rose
  - Railway demand increase
- This can be one of the a good examples of the Collaboration Between Railways and Area Development

2.2 Securing Financial Resources for Railway Development

Stages in financing from railway construction to long-term management



Development-based Land Value Capture

Development-Based Land Value Capture (LVC)

The return of the profitability that will be obtained, or has been obtained by development along railway lines to the railway business

Development-Based LVC Scheme
(1) Tax-Based Scheme

Scheme	Contents	Examples
Land & Property Tax	Taxes impose on the value of a land or building. These taxes should be increase based on the development.	(in Japan) Fixed Asset Tax, City Planning Tax, Real Estate Income Tax
User Fee / Beneficiary Charge	Taxes and burdens imposed in advance by central/local government to property owners who will benefit directly from public investment	Beneficiary Charge in Midōsuji Line, Minatomirai 21 Line (Japan) Business Rate Supplement (UK) Development Cost Charge (Canada) Impact Fee (USA)
Financial Measures through Future Tax Increment	Development is funded by municipal/local government loans/bonds. Loans/bonds will be paid by the future increases in tax revenues, such as property tax.	Tax Increment Financing (TIF) (USA)

Blue: will be further discussed

Based on Suzuki, H., Murakami, J., Hong, Y. H., & Tamayose, B. (2015). Financing transit-oriented development with land values: Adapting land value capture in developing countries. The World Bank.

User fee (1)

Beneficiary Payments Scheme, Japan

A part of Minato Mirai 21 Line construction cost was procured as a payment from large-scale developers along the line

Minato Mirai Line Investment Cost Breakdown

Capital (Mainly from local governments)	27 billion ¥
Beneficiary Payments	74 billion ¥
Japan Railway Construction, Transport and Technology Agency	129 billion ¥
Loans and Borrowings	27 billion ¥
Total	257 billion ¥

(Source: Yokohama City)

Developers: Mitsubishi Estate, Mitsubishi Heavy Industries, Yokohama City, Urban Renaissance Agency (UR), etc.

Minato Mirai 21 Line
- Construction started in 1992
- opened in 2004
- 4.1km, 6 stations (all underground)

Source: https://www.mm21railway.co.jp/info/route_map.html

User fee (2)

Business Rate Supplement (London, UK)

To support the construction of The Crossrail, the Greater London Authority levy the additional business rate (property tax) for non-residential (commercial) property rateable value above £70,000 with additional of 2 pences per pound (2%) of rateable value.

- 2008 Crossrail Act enacted, 2009 Business Rates Supplement Act enacted
- Crossrail Total budget of £17.6 billion ($23.1 billion)
- £6.6 billion (¥870 billion) were raised through Business Rate Supplement

Crossrail (Elizabeth line from 2021)
- 118km, 41stations
- Test run scheduled in 2020

https://www.bbc.com/news/uk-england-london-48054789, 26 April 2019
https://www.london.gov.uk/what-we-do/business-and-economy/promoting-london/paying-crossrail-business-rate-supplement
http://www.crossrail.co.uk/

User fee (3)

Development Cost Charge (DCC) (Vancouver, Canada)

In any new development, municipalities and regional districts levy DCC on private developers. DCC are then collected as reserve funds for the future infrastructure investments (public transportation included).

TransLink (The South Coast British Columbia Transportation Authority)

- A special corporation that plans, procures funding, operates, and manages public transportation
- Supervise buses, ferries, urban railways, and intercity railway operators
- Have taxation right (issued $4 million of bonds in 2018)

Development type	Applicable date and rate 2020/1/15	2021/1/1
Detached houses (one household)	$2,100/unit	$2,975/unit
Detached houses (two households)	$1,900/unit	$2,470/unit
Apartment	$1,200/unit	$1,545/unit
Office	$1.00/ft2	$1.00/ft2

Based on Miyamoto and Tsuchiya: 131st JTTRI Colloquium “Urban Railway and Area Development in North America," 2019.7.31

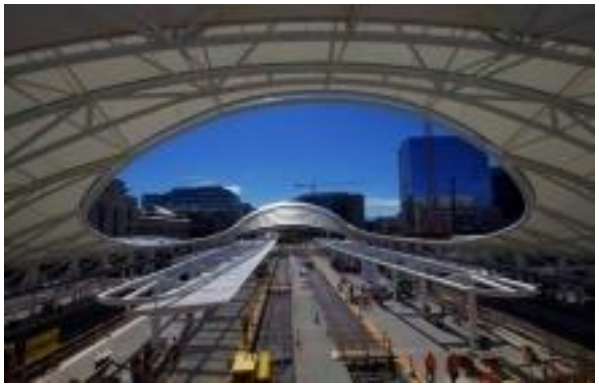
Financial Measures through Future Tax Increment

Tax Increment Financing (TIF) (USA)

Due to the effects of development along railway lines and stations, tax revenue, such as property tax, is expected to increase. Infrastructure investment funding is procured by borrowing the expected future increases in tax revenues into financial resources.

Denver Union Station Redevelopment

- By setting up TIF area, charges can be collected from the increase in property tax (new development), sales tax, and bed tax
- TIFIA (Transportation Infrastructure Finance and Innovation Act) loan provides approximately 30% ($145.0 6M) of project cost, then repaid by above charges.



Denver Union Station
Main station of the transcontinental railway, built in 1856

Based on: 1. https://www.transportation.gov/tifia/financed-projects/denver-union-station
2. Miyamoto and Tsuchiya: 131st JTTRI Colloquium “Urban Railway and Area Development in North America,2019.7.31

Development-Based LVC Scheme
(2) Development-Based Scheme

Method	Contents	Examples
Land sale /leasing	Sale or rental of land or its development rights at the risen value after the public investment or regulatory changes	Rail Plus Property (R+P) program (Hong Kong)
Air right sale	Governments sell development rights extended beyond the limits specified in land use regulations (e.g., FAR) to raise funds to finance public infrastructure and services.	Tokyo Station Rehabilitation (JP) TDR (USA) CePAC (Brazilian)
Land Readjustment	Through land readjustment, landowners loose some of their land in exchange of the new development. Some acquired lands are sold to finance public infrastructure.	Den-En-Toshi Line, Tsukuba Express Line (JP)
Comprehensive Urban Redevelopment	Landowners and developers establish a collaboration to consolidate fragmented lands to create roads and public spaces. Local government revises land-use regulations in redeveloped area, such as FAR bonus, or provide funding for public projects	Shiodome Redevelopment, Toranomon redevelopment (JP) King Cross Station Redevelopment (UK)

FAR (Floor area ratio): Ratio of a building's total floor area to the size of the land on which it is built

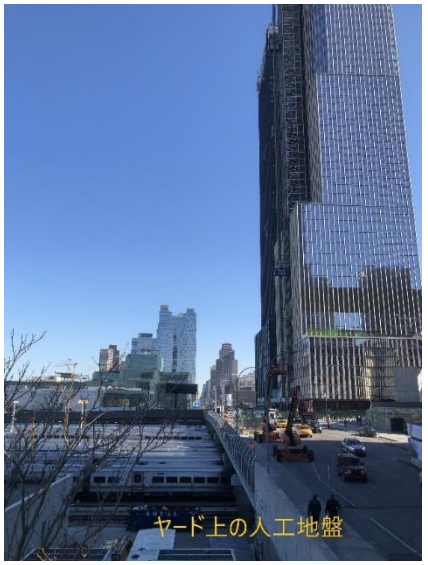
Blue: will be further discussed

Based on Suzuki, H., Murakami, J., Hong, Y. H., & Tamayose, B. (2015). Financing transit-oriented development with land values: Adapting land value capture in developing countries. The World Bank.

Air Right Sale (1)

Hudson Yard Development (New York, USA)

- Redevelopment project in railyard area (≈146ha)
- Other incentives to private developers
  - Subway no.7 extension
  - Provision of new public spaces



Air right sales: **T**ransferrable **D**evelopment **R**ight **(TDR)**

Yellow: Eastern Rail Yards TDR

Air right purchase from railyard

Based on TDR, Up to 33.0 FAR can be transferred (mainly commercial area)

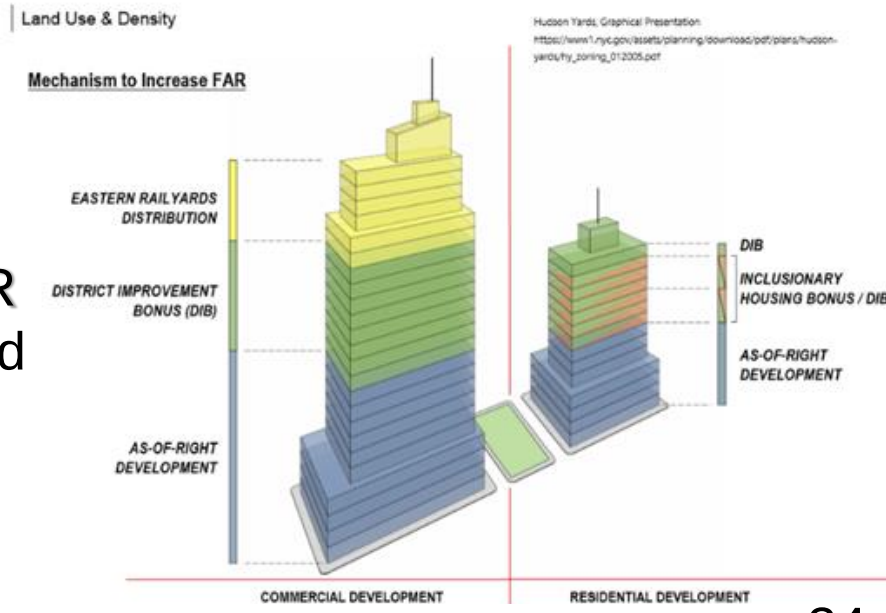
Green: District Improvement Bonus FAR

Up to 8.0 FAR (800%) can be purchased

$100 per ft^2 at the beginning of 2005,

Increase by inflation, current price = $134.63

Blue: Baseline FAR



Based on Miyamoto and Tsuchiya: 131st JTTRI Colloquium "Urban Railway and Area Development in North America,2019.7.31

Air Right Sale (2)

CePAC:Certificados de Potencial Adicional de Construção (Certificates of Additional Construction Potential) (Sao Paulo and other cities, Brazil)

Urban development funding procured through the sale for air rights using the FAR transfer system.

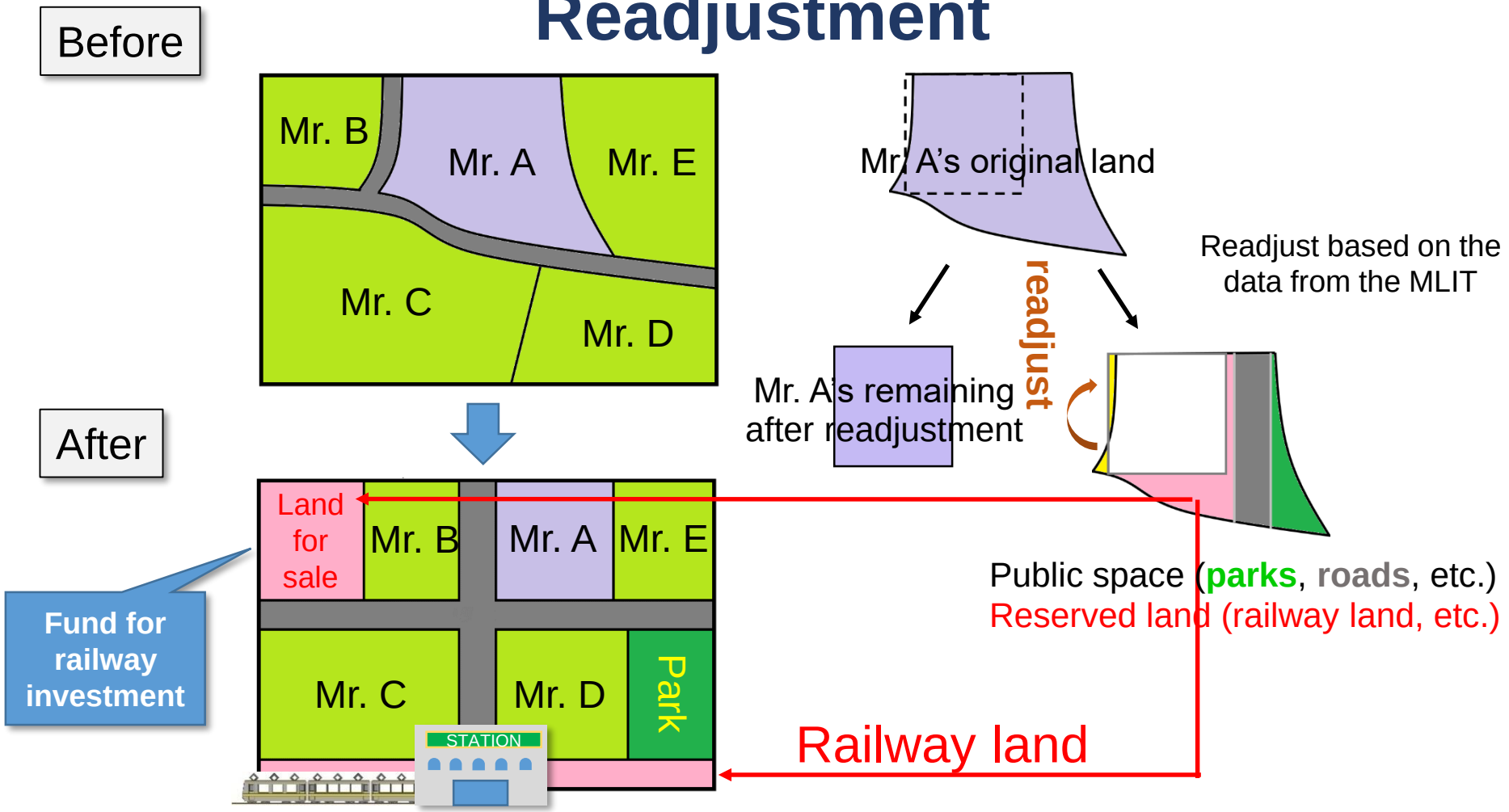
- Baseline FAR in Sao Paolo = 100-200%
- If the landowner wishes to construct the building beyond the baseline FAR, the certificate for an additional building is required.
- The certificate is traded at the market price at the Sao Paulo Stock Exchange
- The certificate sales goes to Urban Development Fund

Água Espraiada area

- Purchase at $1,181 million (February 2013)
- Allocated for transportation infrastructures development, including monorails

H.Suzuki, et al.; FINANCING TRANSIT-ORIENTED DEVELOPMENT WITH LAND VALUES
https://parcourresearch.com/case-studies/ouc-agua-espraiada/
Julie Kim;CePACs and Their Value Capture Viability in the U.S. for Infrastructure Funding,Lincoln Institute of Land Policy Working Paper WP18JK1,2018.9

Securing railway ROW through Land Readjustment



Although the amount of land decreases after the readjustment, landowners have no loss because their land value will rises from better accessibility

Land Readjustment

Tsukuba Express and Area Development (along Tokyo Pref. - Ibaraki Pref., Japan)

- Integrated planning and implementation of the railway development and land readjustment program through legislation
- In readjustment zone, some land has been acquired in advance so that the land for railway construction can be easily readjusted

Act on Special Measures concerning Comprehensive Advancement of Housing Development and Railway Construction in Metropolitan Areas (1989)

- Urban development plan based on land readjustment program by public entities (Urban Renaissance Agency, Municipalities along the railway line)
- Increased in population and rail users
  (rail user, 2006: 195k/day, 2015: 340k/day)

Tsukuba Express (Metropolitan Intercity Railway Company)

- Joint capital from local governments along railway lines
- 58.3km, 20 stations
- Opening 2005

Comprehensive Urban Redevelopment (1)

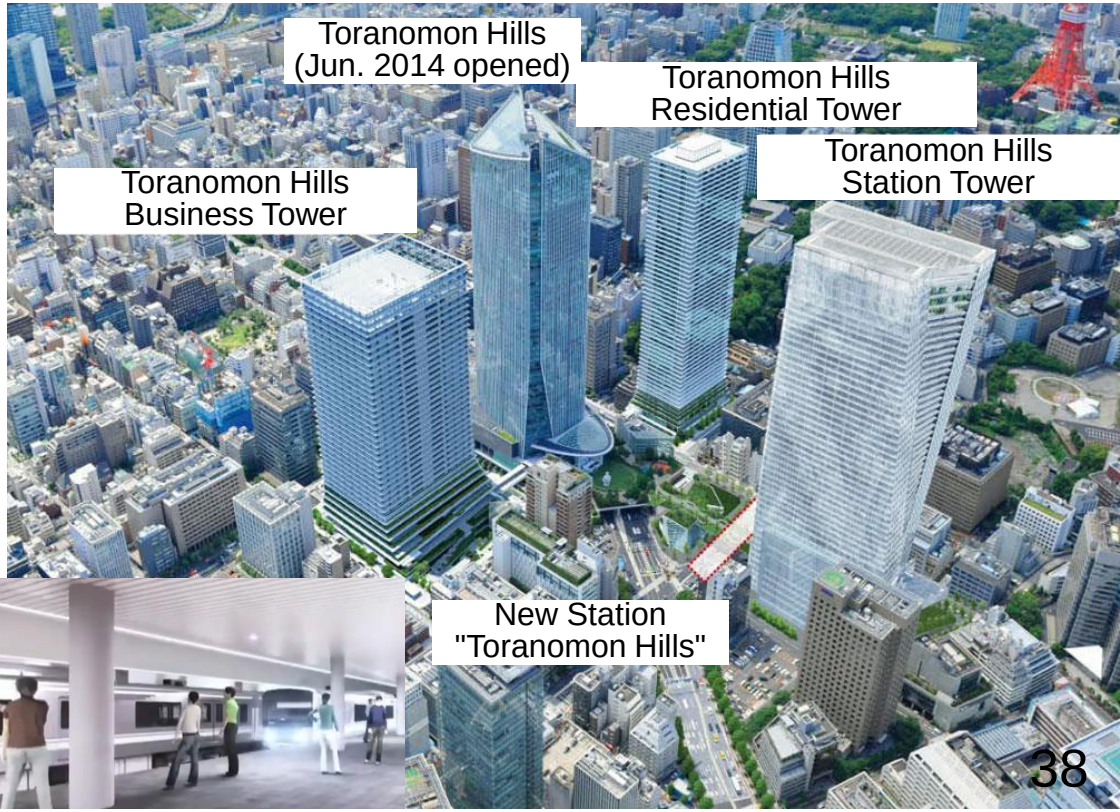
Toranomon Redevelopment (Tokyo, Japan)

- Incentive to private developers from FAR bonus
- Local government provides the new subway station, as well as the shuttle BRT to Olympic Games venues
- Local disaster prevention functions (support for those who have difficulty returning home, independent-distributed energy systems)

Redevelopment Summary

- Maximum FAR bonus of 1990%
- Planned as an international business center
- Private investment of about 400 billion yen
- Construction of “Toranomon Hills Station” (Completed in June 2020)

Source: Mori Building



Comprehensive Urban Redevelopment (2)

King's Cross Station Redevelopment (London, UK)

A joint development of a rail operator, LCR (London and Continental Railways) and other private companies

- Railway terminal stations redevelopment project in a conjunction with the construction of the High Speed 1 (HS1) (1996)
- LCR and DHL (logistics company) own the land. LCR is granted the real estate development around the station by the government.
- LCR, DHL and other developers jointly established the development company (2008)
- Redevelopment creates 22,100 jobs and 2,000 residents
- From railway operators, LCR has reorganized into property development company

St. Pancras Station
(next to King's Cross)
Eurostar terminal station

Granary Square

Source: 1. H.Suzuki, et al.; FINANCING TRANSIT-ORIENTED DEVELOPMENT WITH LAND VALUES
2. https://www.kingscross.co.uk/

2.2 Securing Financial Resources for Railway Development

◆ Points to be considered in this section

- In railway business, there is a long gap between investment period and recovery period. In many cases, this gap could be longer than expected.
- To compensate for this, central and local government need to support railway development by grants, subsidies, and non-interest loans.
- From the viewpoint of the central and local government, the benefits are
  - Increase in the property tax income due to increase in land price
  - Accessibility improvement for local residents.
- From the examples of LVC, LVC has been proven to be an effective method to raise funding for the investment during the early stage of railway development.

2.3 Providing a High-Quality Railway System

Characteristics and Functions of Urban Railways in the Tokyo Metropolitan Area (TMA)

- **Availability of railway master plan at the metropolitan area level**

Urban railway master plan in the TMA

- **Availability of mass transit systems with variety in functions**

High-speed rail, express and local trains, subways, monorails, AGT, etc.

- **Through operation**

Direct service between suburban rail and urban subway

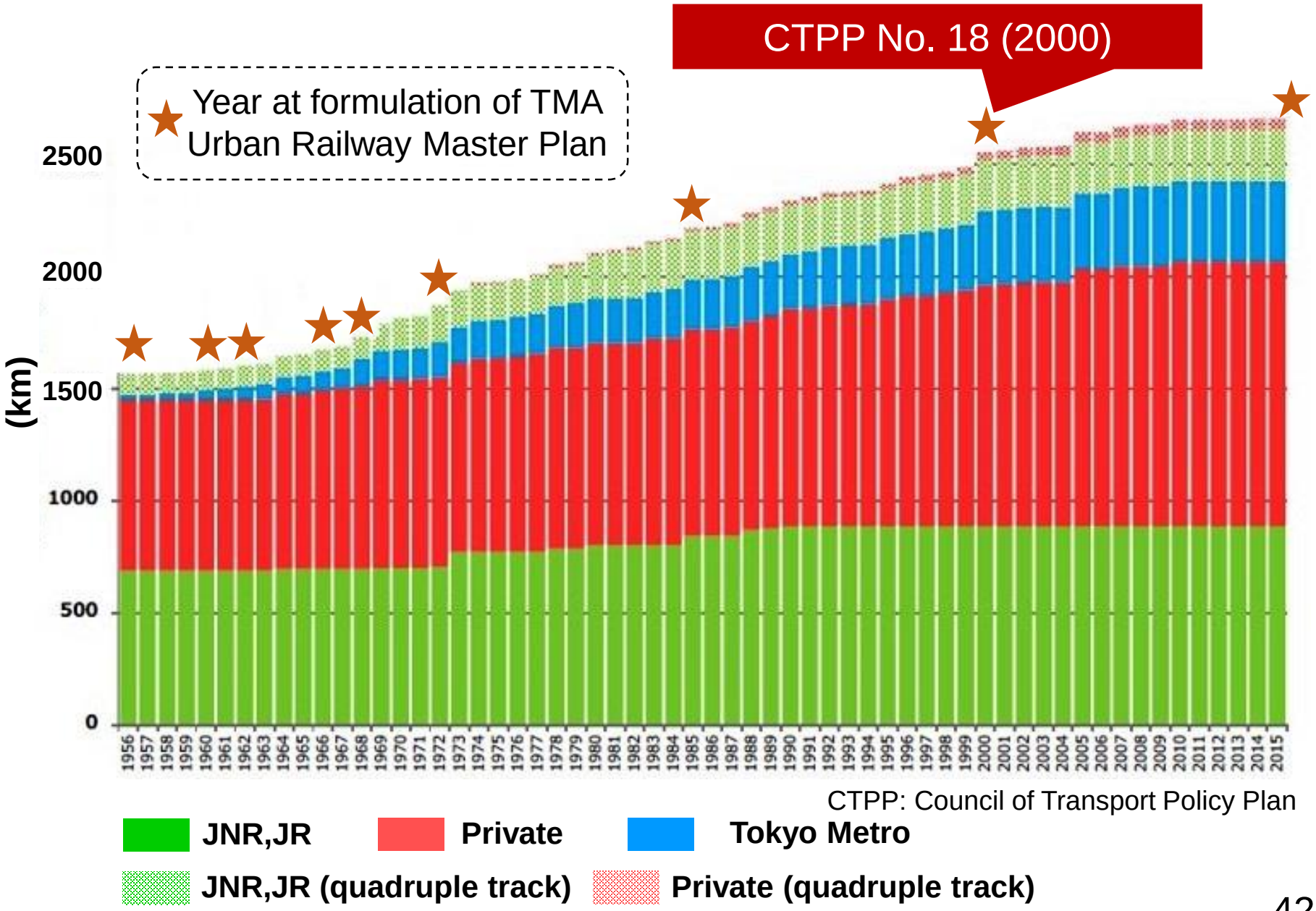
- **High-capacity loop line**

Circulating terminal stations at the edge of urban centers

- **Cooperation between railways and buses**

Bus as a feeder mode

TMA urban railway network



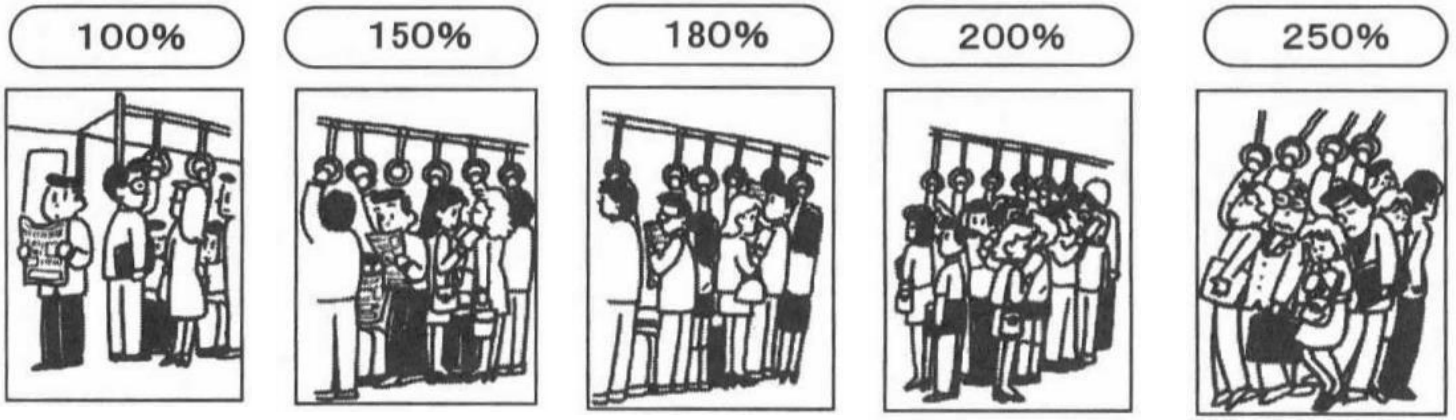
CTPP: Council of Transport Policy Plan

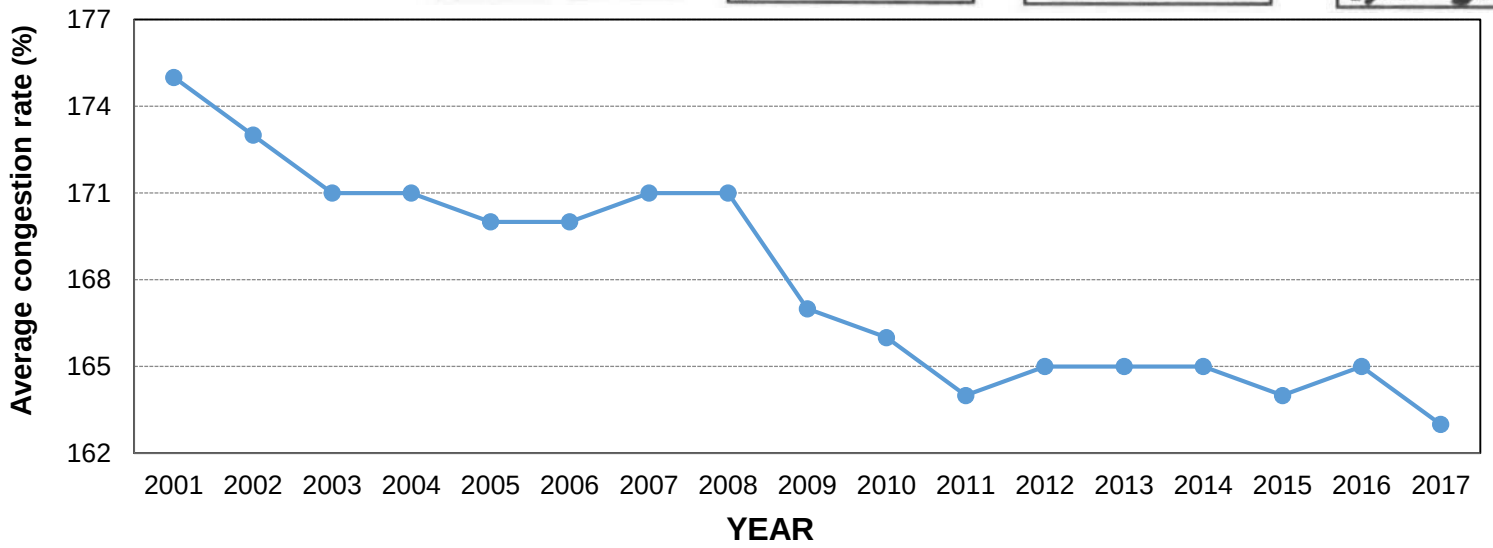
CTPP No. 18: Highlights (1)

Setting policy issues

Alleviation of in-train congestion

Targeted peak-hour congestion rate of 150% or less for major sections, and 180% or less for other lines





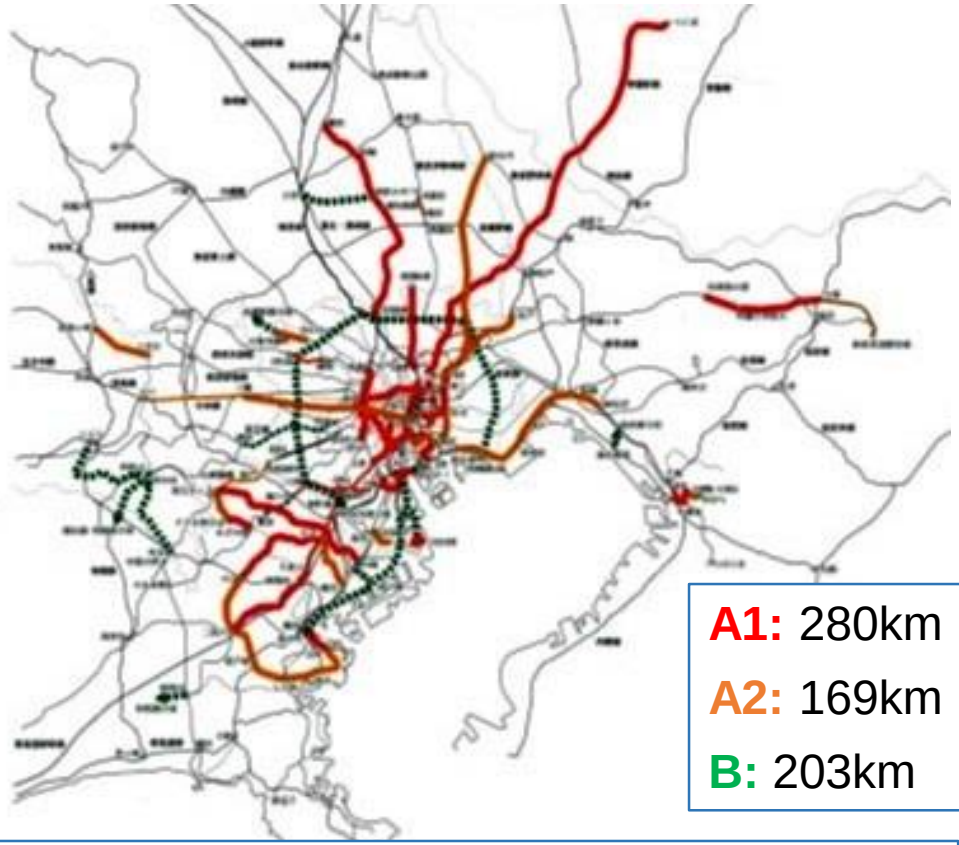
CTPP No. 18: Highlights (2)

Investment Priority

A1, **A2**, and **B** priority settings

Priority evaluation criteria
- Demand trend
- Socio-economic impact
- Cost Effectiveness
- Financing (revenue and expenditure)
- Vision of implementing body

Overall Score



A1: 280km
A2: 169km
B: 203km

[Setting Investment Priority: Target Year = 2015]

A1: Routes that are appropriate to be opened by the target year

↳ In 2015, about 80% (223km) of A1 was opened

A2: Routes that are appropriate to start construction by the target year

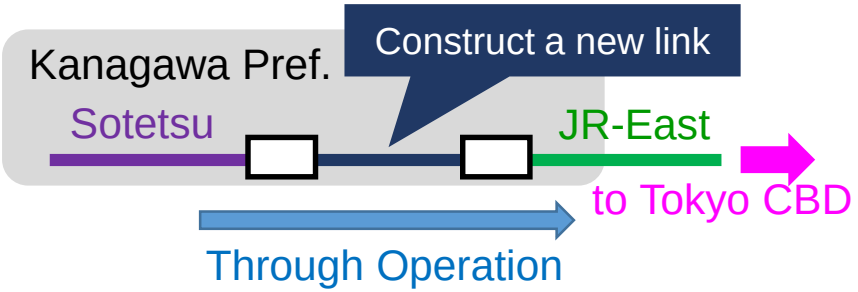
B : Routes to be considered (after considering the needs and investment method)

CTPP No. 18: Highlights (3)

Legislation to support CTPP No. 18

Act on Enhancement of Convenience of Urban Railways, etc. (2005)

Law enacted to support through operation between two (or more) lines



Railway Operator
(existing railway company)
Sotetsu and JR

Infrastructure usage fee
(based on the benefit)

Vertical separation

Railway Investment Entity
(public entity)
JTRR

Loan
Repay

Central Gov. 1/3

Local Gov. 1/3

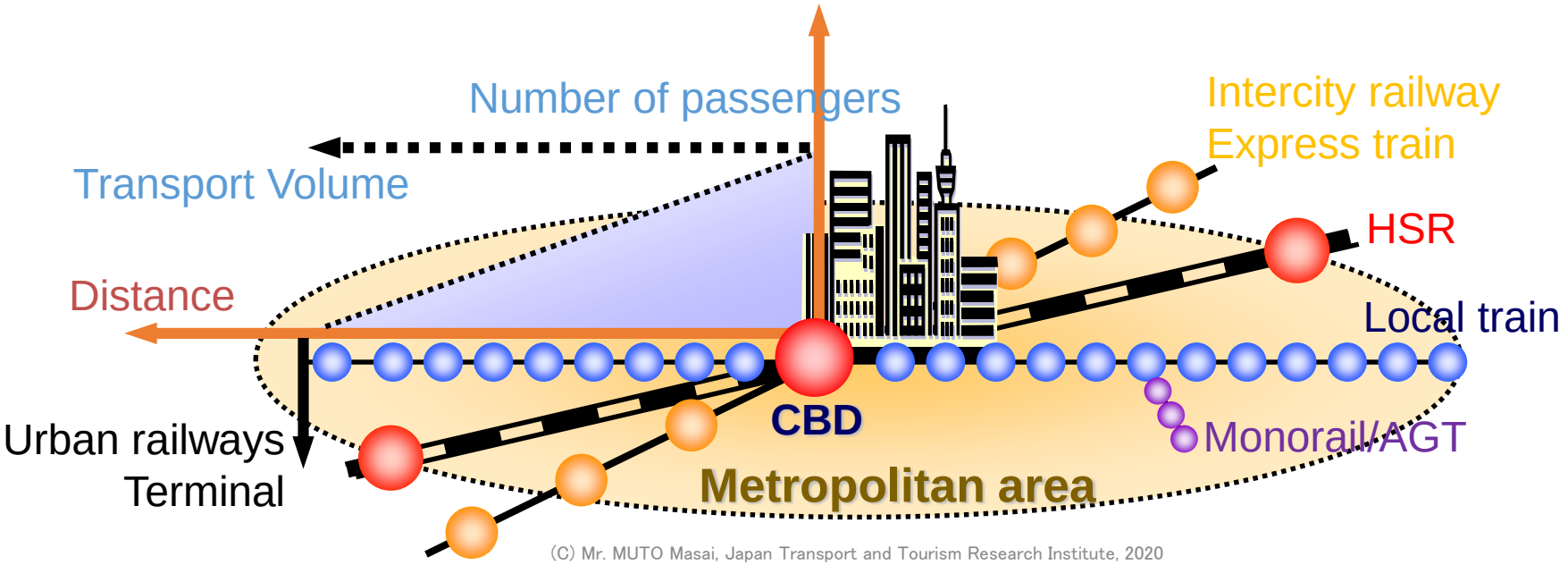
Loans 1/3

Sotetsu/JR through service line opened in November 2019

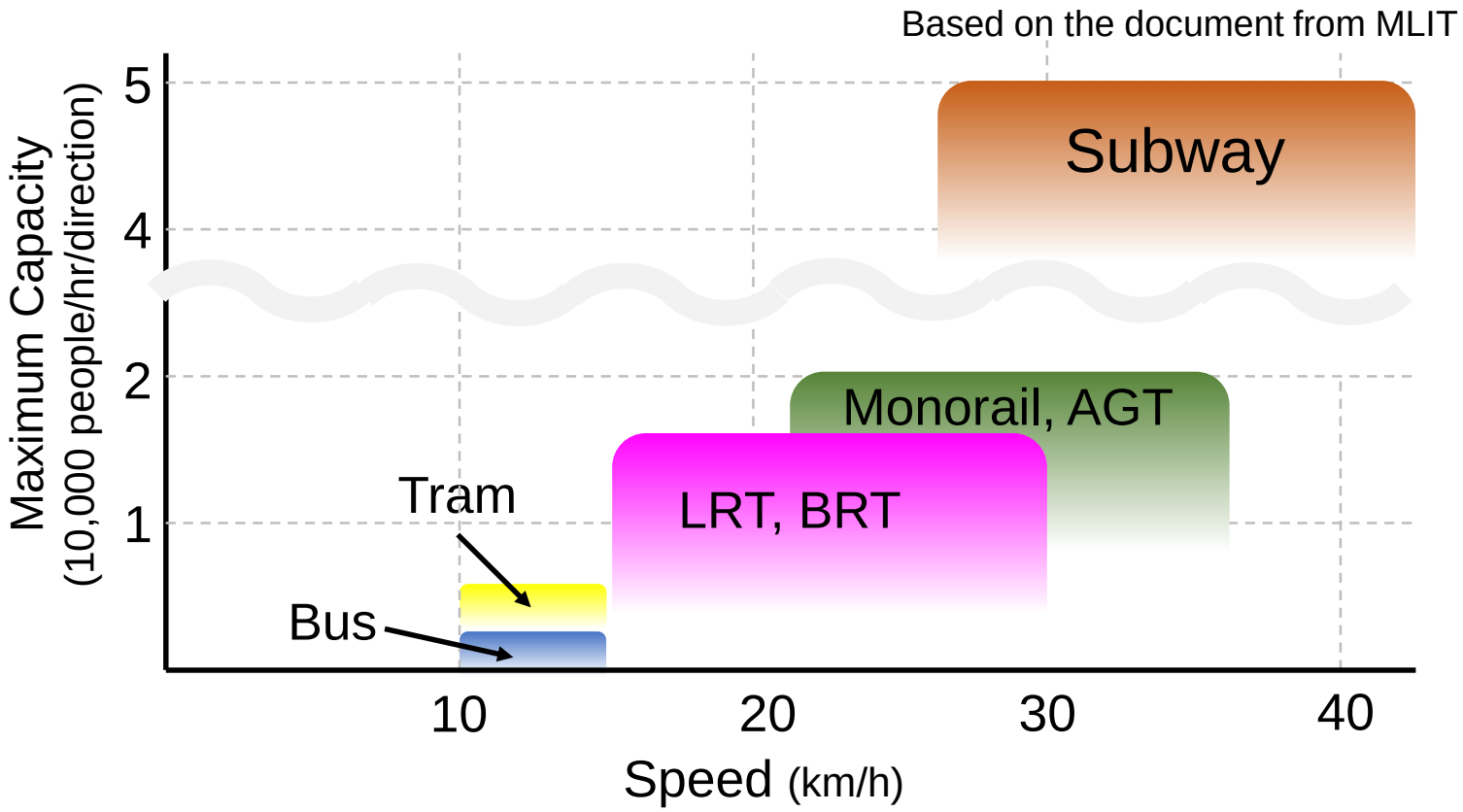
JTRR: Japan Railway Construction, Transport and Technology Agency

Hierarchical Urban Railway Network in Tokyo

Type of railway	Distance between stations	**Operating speed**
Shinkansen (high-speed railway)	30 - 50 km	120 - 130 km /h
Inter-city railway (JR) Express train (private railway)	5 - 6 km	50 - 60 km /h
Local train (private railway)	1 - 2 km	40 - 45 km / h
Subway	0.5 - 1 km	30 - 35 km / h
Monorail/AGT	0.5 - 1 km	20 - 30 km / h

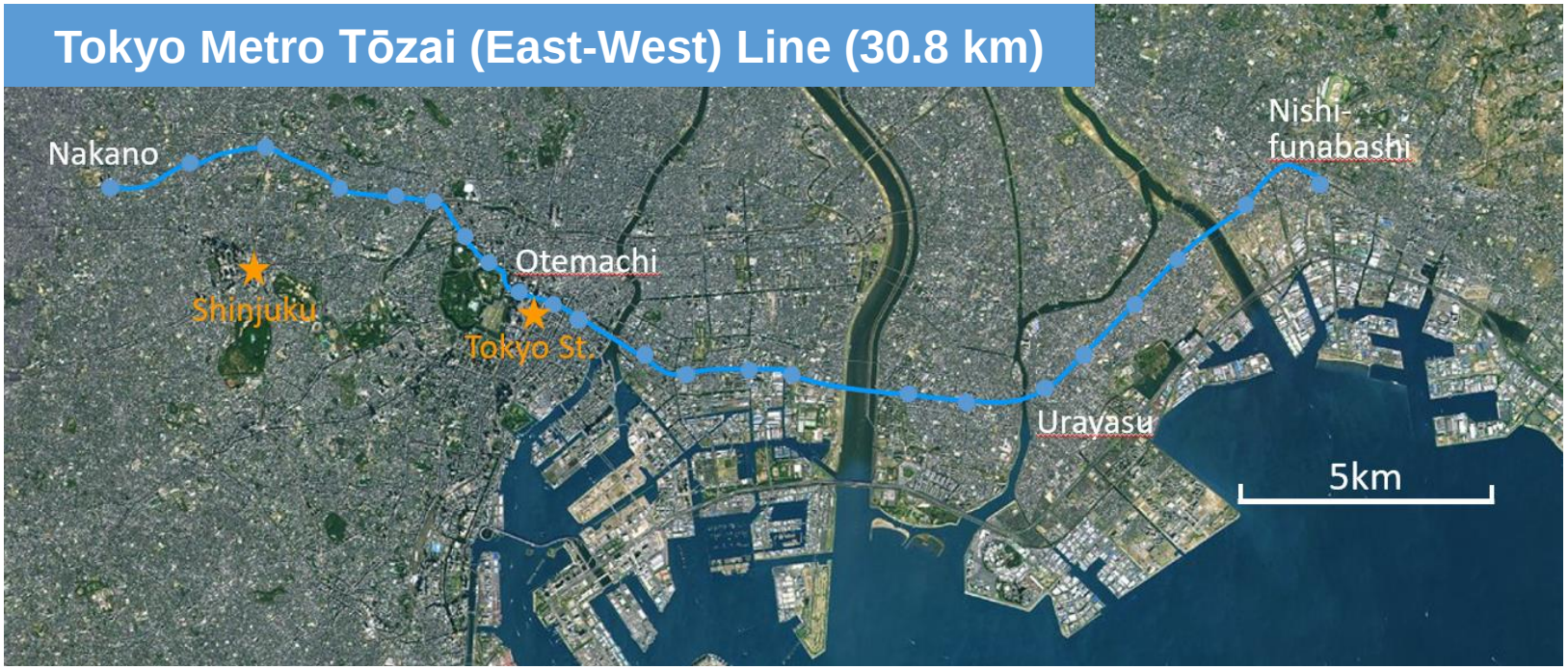


Mass Transit System by Capacity-Speed Chart



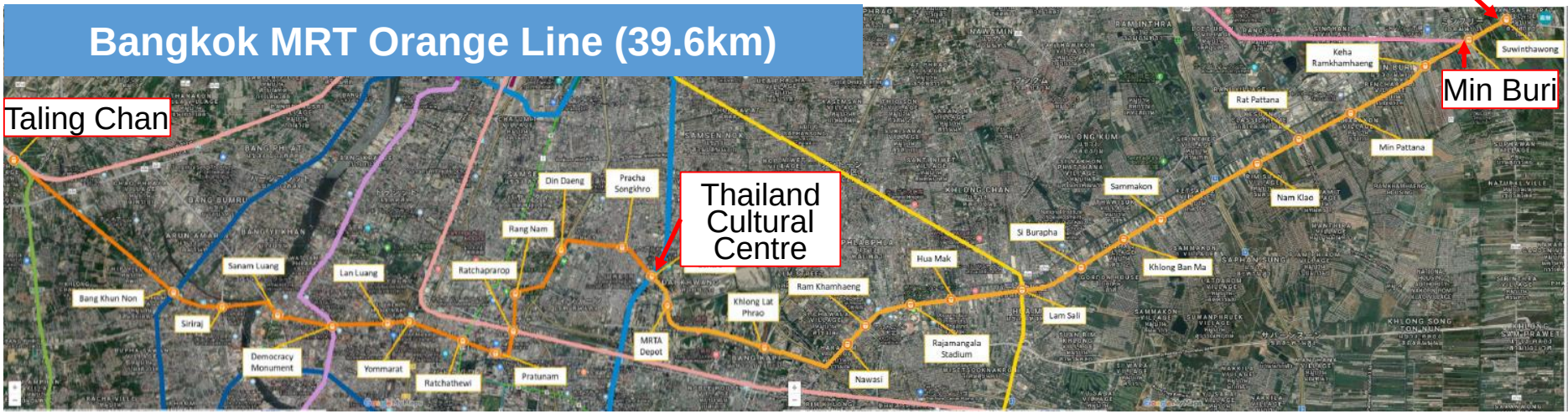
Mass transit systems should be determined based on the future demand and land constraint (location)

Tokyo Metro Tōzai (East-West) Line (30.8 km)



USING EXACTLY
SAME SCALE

Bangkok MRT Orange Line (39.6km)

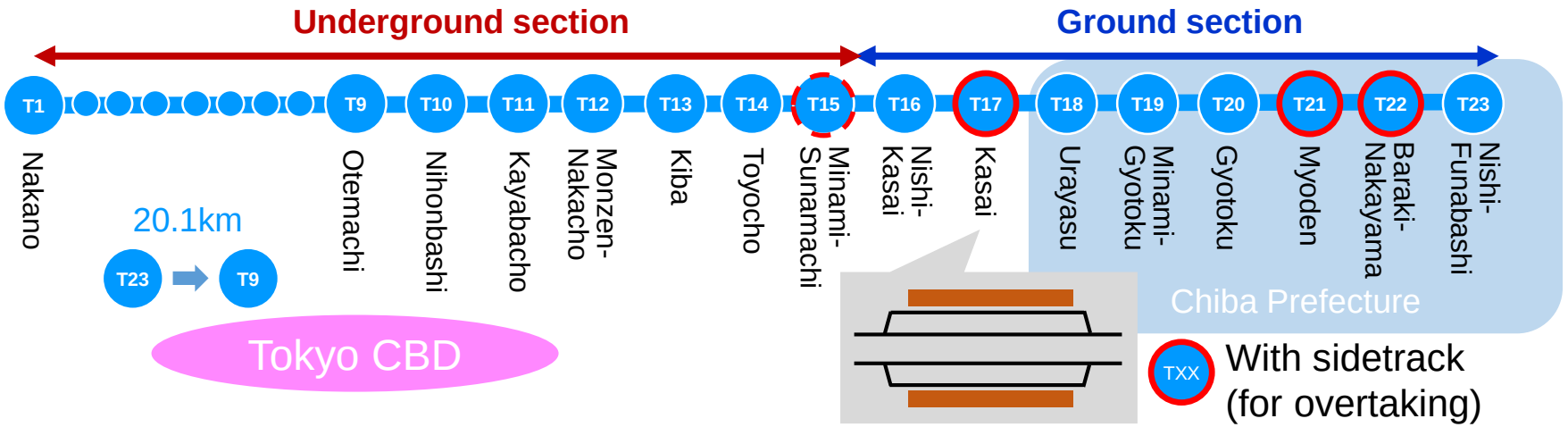


Commuter Line: High Capacity with Express Service

Tokyo Metro Tōzai Line (East Section)
High capacity operation with rapid service

T23 → T9

10-car train
Inbound peak hour headway:
7:00-7:59 = 19 trains



Rapid Service (23~26min.)

Commuter Rapid (29~36min.)

Local (31~43min.)

Sectional volume (round trip: thousand people/day)

527	628	656	656	613	551	518	462	399	361	336	311	287	280

Based on the urban transportation annual report 2013

Highest congested section in the TMA

Through Operation

As tracks from different railway company are connected, trains from any company can serve through another company's track without stopping

◆Advantages

[For users]

・Transfer is no required

・Faster travel to/from CBD

[For the operator]

・Increase in demand

・Smaller transfer stations (less platform)

・Encourage development along railway lines

・Train depots can be built in less populated area

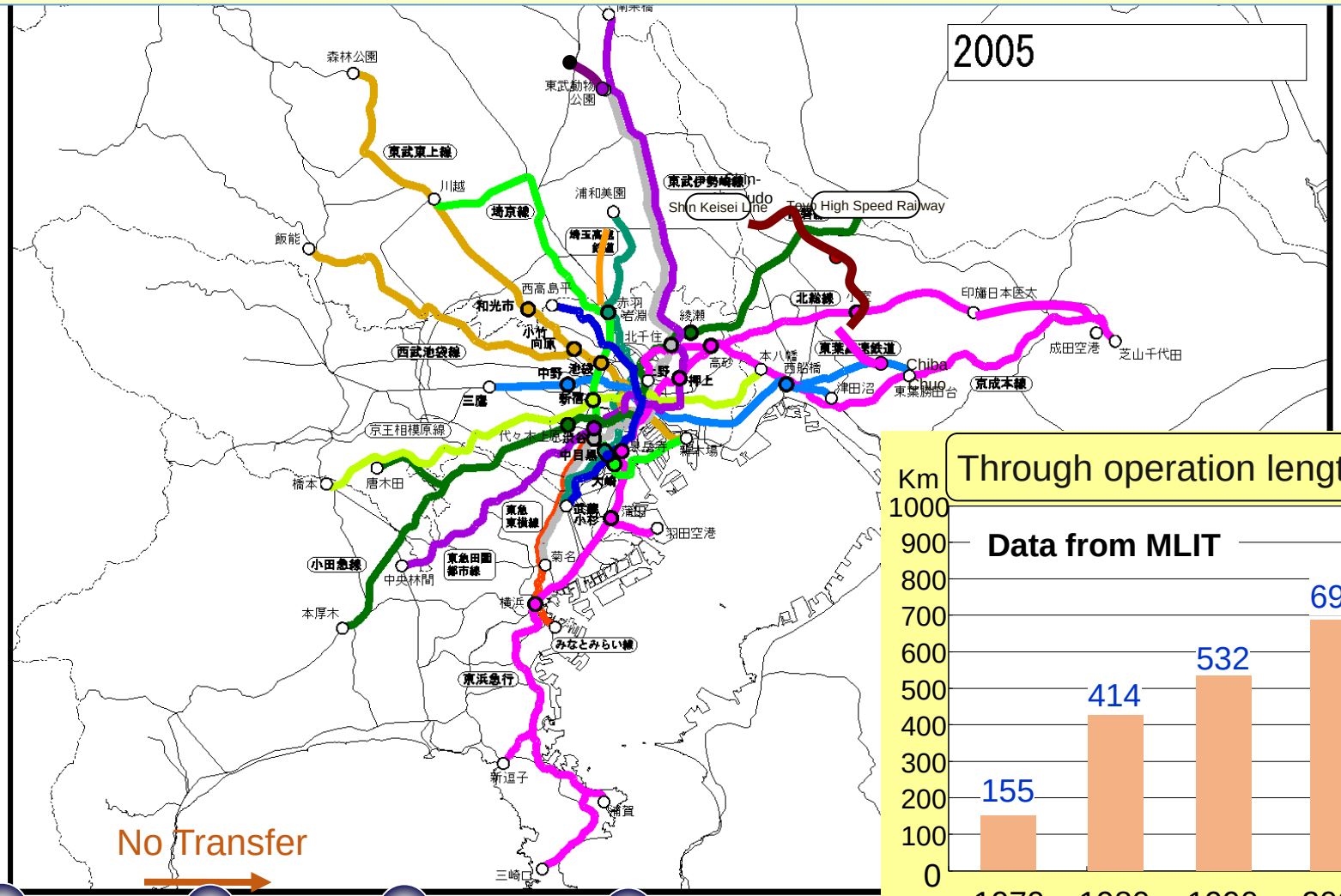
◆Conditions

・Gauge must be match

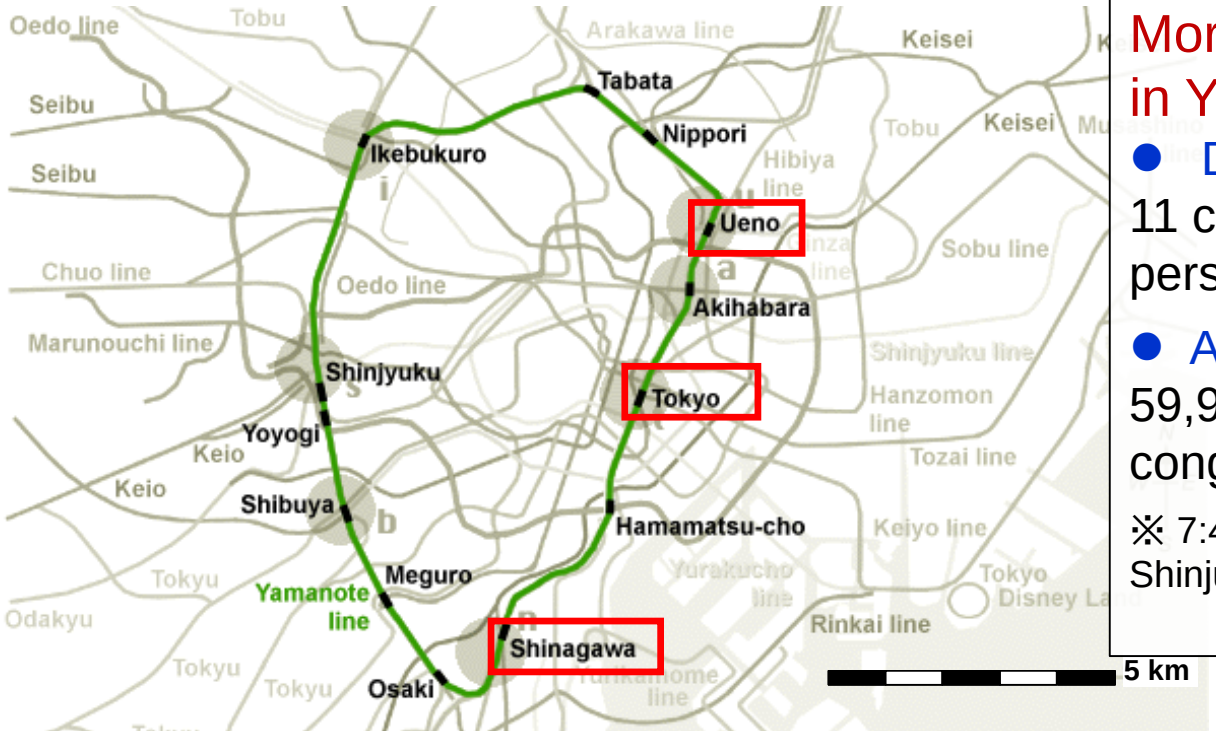
・Signaling, Train set must be compatible

Through Operation in Tokyo

From various railway companies in Tokyo
➡ Creating integrated railway network



Yamanote Line:
Loop Line Connecting Other Rail Terminals



Morning peak hour※ condition in Yamanote Line

- Design Capacity

11 cars × 23 trains = 37,444 person/hr

- Actual Volume

59,900 people/hr (160% congestion rate)

※ 7:45 to 8:45 between Shin-Okubo and Shinjuku

(FY2017 data)

- Railway development by private railway company is restricted inside the loop of Yamanote Line
- Travel inside the loop by through service from suburban rails to subway lines
- HSR terminals in CBD

Forming Hierarchical Urban Railway Network

Cooperation between railways and buses

- Bus, taxi, private car and bicycle are important feeder services for urban railways.
- After the opening of the railway, trunk line bus which runs parallel to the railway should be converted to feeder bus.
- In Japan, in the past, there was an extensive investment in bus terminal. Therefore, there is an incentive to re-route the bus network

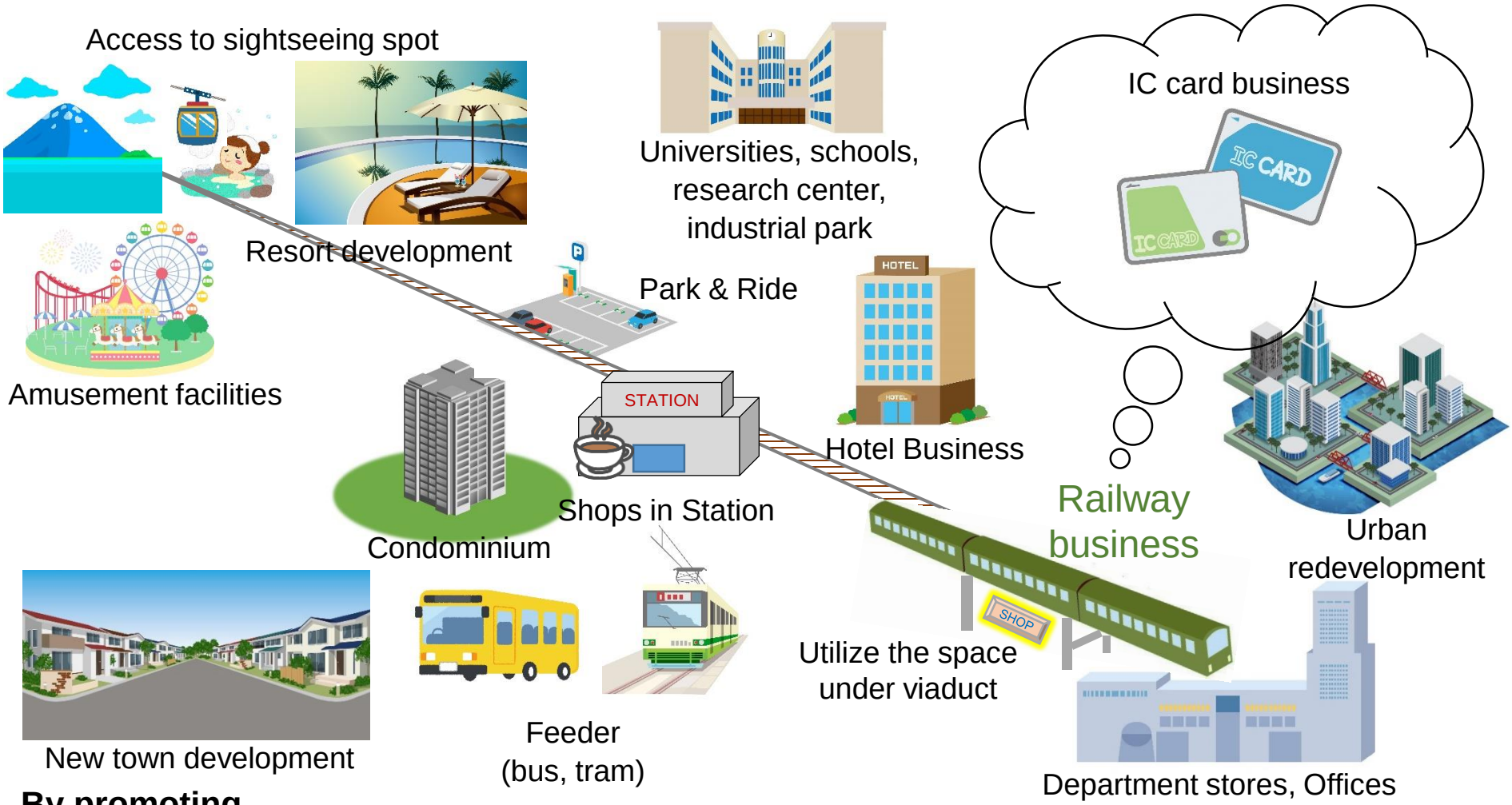
2.3 Providing a High-Quality Railway System

◆Points to be considered in this section

- To improve efficiency in transportation, not only urban railways, but the combination of different types of mass transit system is suggested
  - ➢Rail systems with sufficient transportation capacity for major corridors
  - ➢Express operation for faster travel from major stations in suburban area
  - ➢BRT/LRT as a feeder
  - ➢Most of the CBD should be accessible by rail network
- Through operation between suburban rail and urban rail has has advantages such as shortening of time and area development benefit

2.4 Integration of Railway Development with Social Infrastructure

Multi-business model of Japanese railway companies



By promoting

CBD: Commercial and Entertainment
Suburb: University and Leisure facility

Weekday: Reverse direction trip
Weekend: More demand

Connection between railway station and surrounding area

- As offices and commercial areas are developed around the station, tunnels, overbridges and skyways should should be considered so that user can walk without crossing the road.
- In Japan, there are many underground shopping districts connecting stations and surrounding commercial areas
- Japanese railway companies earn a huge revenue from shop and restaurant rents inside the station.

Station Plaza

- The station square is designed not only for feeder modes, but also for development around the station.
- In Japan, there is a design manual for the station plaza. The design must meet the future demand of pedestrians, private cars, kiss & ride, buses, taxis, bicycles, etc.
- Railway companies and local government share an investment cost. Central government also provide some subsidies. In some cases, railway operators and developers bear all the costs.

Sendai Station East Entrance Station Plaza

Park & Ride, Vehicle Sharing

Railroad Grade Separation

- Grade separation is introduced to reduce road congestion and traffic accidents
- Rail elevation is easier and cheaper than elevating roads
- In Japan, there is law stated that rail entity and road entity must share the cost of grade separation. Central government also provides subsidy.

[Continuous grade separation project cost sharing]
Rail entity shares the cost equal to the benefit (level crossing O&M cost reduction, reduction in accident). The rest is the burden to road entity.

From homepage of Bureau of Construction, Tokyo Metropolitan Government

2.4 Integration of Railway Development with Social Infrastructure

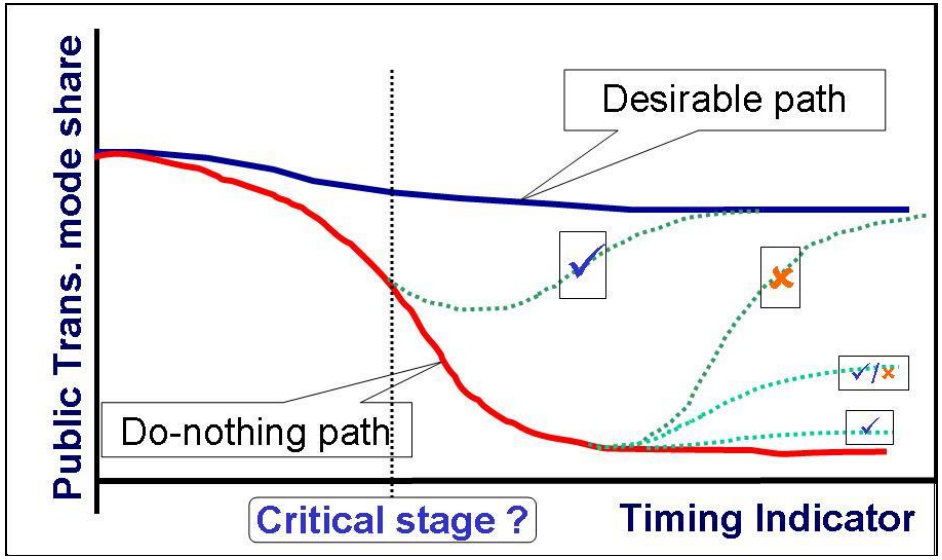
◆Points to be considered in this section

- For railway companies, there are opportunities to expand their business in other sectors
- Japanese railway companies earn a huge revenue from shop and restaurant rents inside the station.
- Station plaza is required for
  - Access space for feeder transport
  - Access to development around the station

2.5 Creating a Sustainable Urban Railway System

Public transportation development in each development stages

- With economic grows, the car ownership rate increases and the public transportation usage rate decreases.
- At the right time, development in urban railways will reduce the share of automobile to the desirable level, but beyond that time, it will be difficult to increase the share of public transport to desirable level.
- Too early development of urban railway creates a risk of bankruptcy to railway operator due to high initial cost and low fare setting from low income level.
- Too slow means the spread of low density land-use in suburban area by car-oriented development, particularly using motorcycles.



Example of Railway Development by PPP in Asian Countries

EPC: Engineering, Procurement, Construction
O&M: Operation and Maintenance
M&E: Mechanical and Electrical

Notes:
- Government.
- Public corporation
- Private enterprise

Project	Scheme	EPC		O&M	Ownership	
		Civil	M&E		Civil	M&E
KL PUTRA	BOT	PUTRA		PUTRA		
Bangkok Blue Line	BOT	MRTA	BEM	BEM	MRTA	BEM
Delhi Airport Express	BOT	DMRC	DAMEPL	DAMEPL	DMRC	DAMEPL
Kaohsiung MRT	BOT	Local Govt.	KRTC	KRTC	Local Gov.	KRTC
Seoul Subway 9	BTO	Local Govt.	Metro9	Metro9	Local Govt.	
Seoul DX line	BTO	Central Govt.	Shinbundang Railroad	Shinbundang Railroad	KRNA	
Manila MRT3	BLT	MRTC		DOTC	MRTC	
Shanghai Metro line 11	Public	Shanghai Shentong Metro		Shanghai Shentong Metro		
Taipei MRT Xinyi Line	Public	DORTS		TRTC	DORTS	
HCMC MRT 1	Public	MAUR		HURC		
JKT MRT	Public	PT MRT Jakarta		PT MRT Jakarta		

7 routes are financed by PPP, 4 routes are financed by government

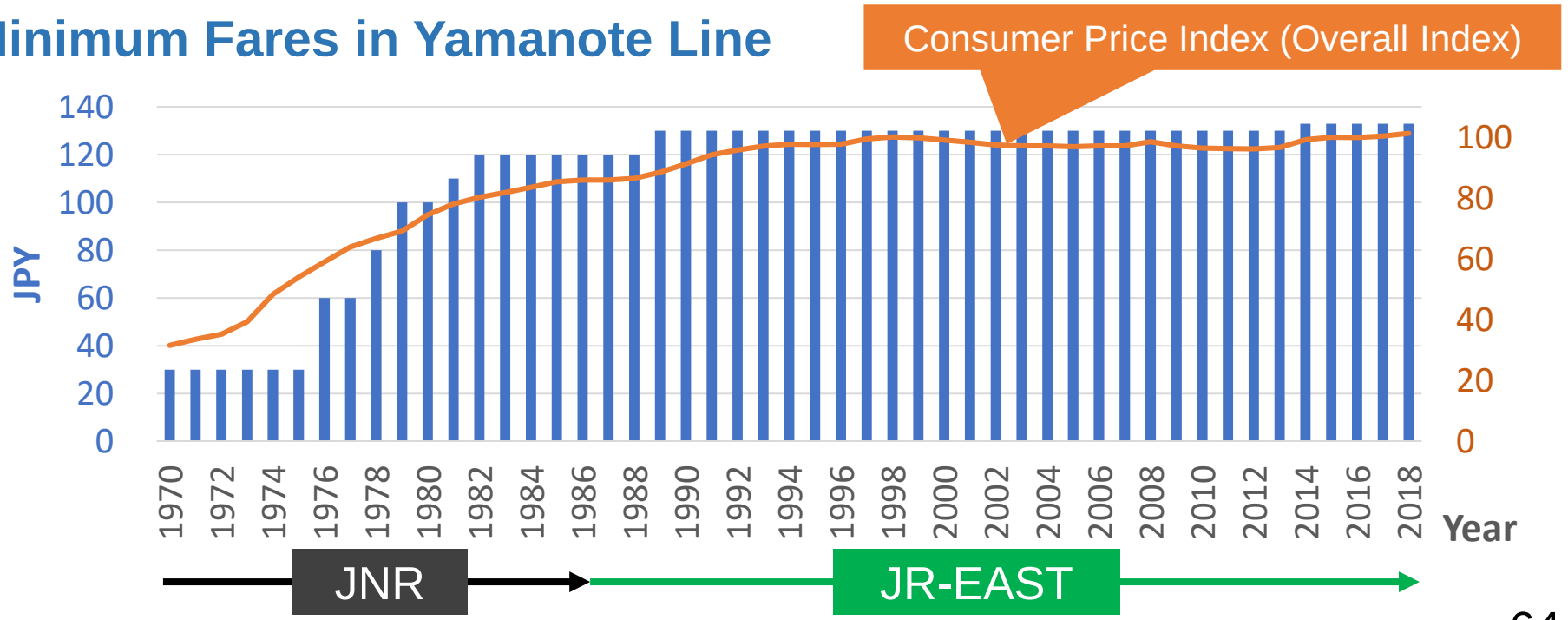
Example of railway business by PPP in Asia

- Urban rail PPP projects in Asia: Many failure cases
  - ➢ Demand risk from low initial demand
  - ➢ Construction risks from rising of construction costs as well as project delay
  - ➢ Poor risk management from railway operator
- If there is no support from the government, return period in railway business is too long to attract private investor
- PPP is one of the great options, but lesson learn from failure cases should be carefully examined.

Economically Sustainable Fare Setting

- **Fare Regulations and Political Decisions**
  - Political decision tends to set the fares too low
  - Fare setting should consider the total cost, which includes an appropriate profit in the total cost
- **Fare Setting with The Consideration of Economic Growth**
  - Price indexing system

Minimum Fares in Yamanote Line



Business-Class Commuter Car

Why don’t higher income people shift from car to rail?

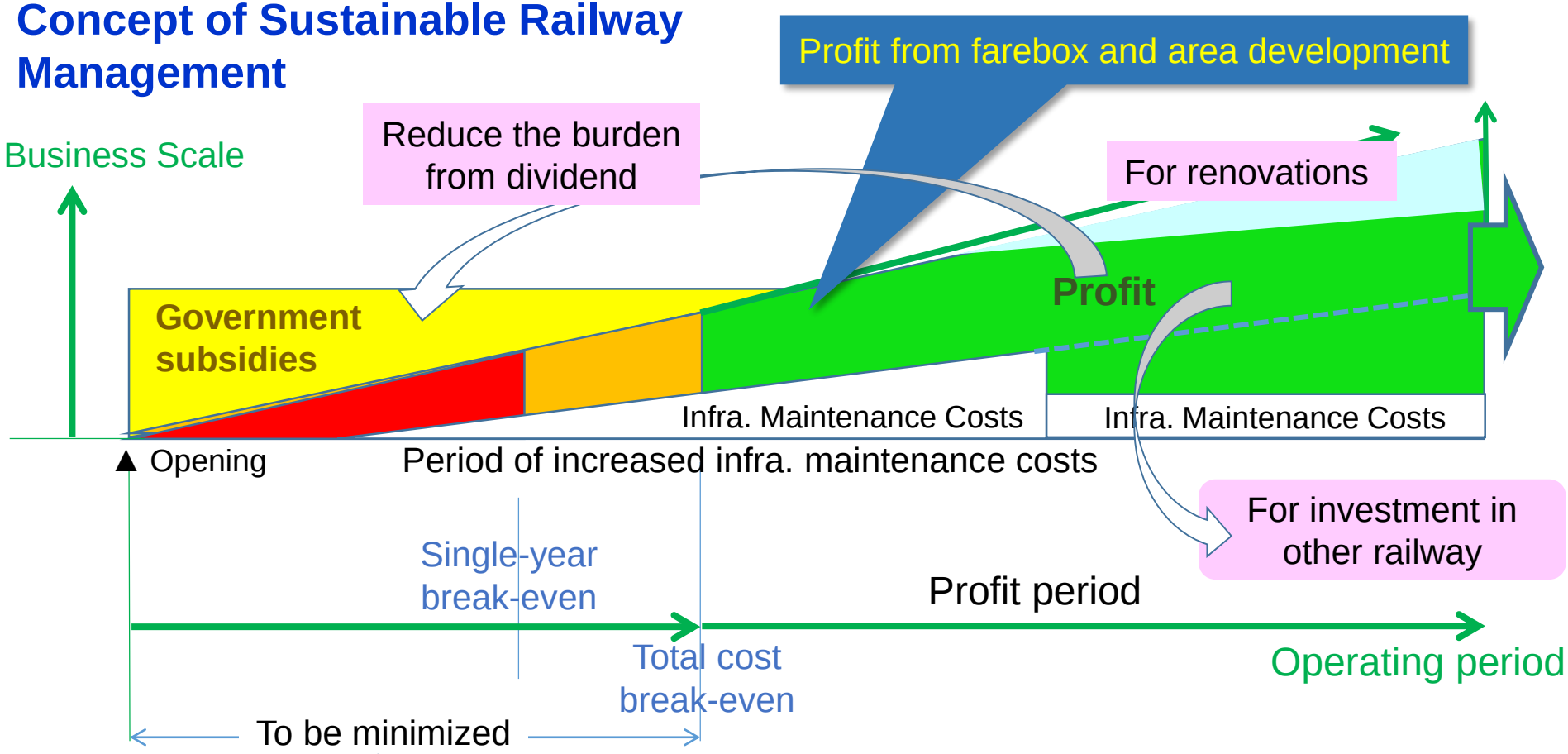
JR-EAST Green Car

Fare =
Basic Fare + 3 to 10 USD

Seibu Laview

Towards Sustainable Urban Railway Management

Concept of Sustainable Railway Management



- Borrow from low-interest loan source
- Operating cost reduction
- Increase profit (demand creation and expansion in related business)
- Efficient operation (infrastructure maintenance cost reduction)

2.5 Creating a Sustainable Urban Railway System

◆Points to be considered in this section

- It is difficult to develop a transportation network with only PPP as a main source of investment.
- Government support is essential for a smooth progress of the project
  - ➢ Project coordination
  - ➢ Providing subsidies
  - ➢ Land use plan adjustment
  - ➢ Deregulation of development projects
  - ➢ Financial support to public infrastructure development
- It is important to keep in mind that the railway is a profitable business

Financial Support Measures

(1) ODA Yen Loan

Main organizations: JICA (Japan International Cooperation Agency)
Application conditions: any developing countries

Example	Conditions	Overview	Total Loan
Construction of Jakarta Mass Rapid Transit Project	STEP	The construction of the first subway in Indonesia will help the increasing demand for transportation, alleviate traffic congestion, improve the investment environment, and reduce environmental impact.	137.3 billion yen
Metro Manila Subway Project	STEP	The first subway in the Philippines developed to respond the increasing transportation demand and alleviate serious traffic congestion in the Metro Manila area.	793.5 billion yen
Dhaka Mass Rapid Transit Development Project	Untied	Construction of mass rapid transit (MRT6 Line) in Dhaka City to meet transportation demand in Dhaka urban area	349.4 billion yen

STEP (Special Terms for Economic Partnership): Japanese supplier only
Untied: Can procure from any other countries

Loan rate (in general),
ODA Yen Loans < ADB < IBRD (World Bank)

Financial Support Measures

(2) Overseas Loan

Main organizations: JICA (Japan International Cooperation Agency)
Application conditions: any private enterprise in developing countries

Example	Overview
The Project for Improvement of Terminal Building at Palau International Airport	The project loan to a local corporation which includes expansion, renovation, operation, and maintenance of passenger terminal building at Palau International Airport

Financial support measures

(3) Overseas Investment

Main organizations: JBIC, JICA, JOIN
Application conditions: Investing institute is not the main investor

Example	Overview	Investment
UK Intercity Express Programme	(JBIC) A pound-based loan to ATEL, a consortium of Hitachi, Axa UK and John Laing •Created to design, manufacture, and maintain the train set •Vehicle leasing and maintenance services to East Coast Main Line rail operators	£860 million (114 billion yen)
Suburban railway operation in Rio de Janeiro	(JOIN) Joint investment by Mitsui, JR West and JOIN for suburban railway operations in Rio de Janeiro	9.9 billion yen

JBIC: Japan Bank for International Cooperation
JOIN: Japan Overseas Infrastructure Investment Corporation for Transport & Urban Development

There are many financial support measures from Japan

Selected Subsidy Systems for Urban Railway Development in Japan

System	Information	Regulations	Central Govt. Subsidy	Local Govt. Subsidy
Underground Mass Rapid Transit Subsidy	Partial subsidies for a new line construction costs as well as a large-scale improvement/renovation costs	(Related Instructions)	Maximum 35%	Maximum 35%
Airport Access Railways Subsidy	Partial subsidies for construction and renovation of airport access railways as well as railways to new town development	(Related Instructions)	18% (airport access rail), 15% (new town access rail)	Same as central government
Urban railway Service Improvement Subsidy	Subsidization of projects to improve service in an existing urban railway	Urban railways, etc. Convenience Improvement Business Act	1/3	1/3
Social Capital Development Grant	Supporting the Development of Social Infrastructure by Local Governments	(Related Instructions)	1/2 (after exclude the burden of railway operator)	1/2 (after exclude the burden of railway operator)
Infrastructure Subsidy	Promoting the construction of Monorails and AGT lines	Law Concerning the Promotion of Urban Monorail Development	1/2 of the infrastructure cost	The remaining amount from central govt. subsidy shown in the left

Operation Support Measures

Through accumulate experience in high volume and high frequency operation, the support to human resource development can be provided.

- **Taiwan High Speed Rail (2003-2004)**
  JR Central and JR West provided trainings based on the experience and past achievement of Shinkansen systems in Japan

Data from MLIT

- **India High Speed Rail (2016~)**
  Supporting the establishment of training centers to High Speed Rail Corporation of India as well as the formulation and implementation of training programs.

Data from MLIT

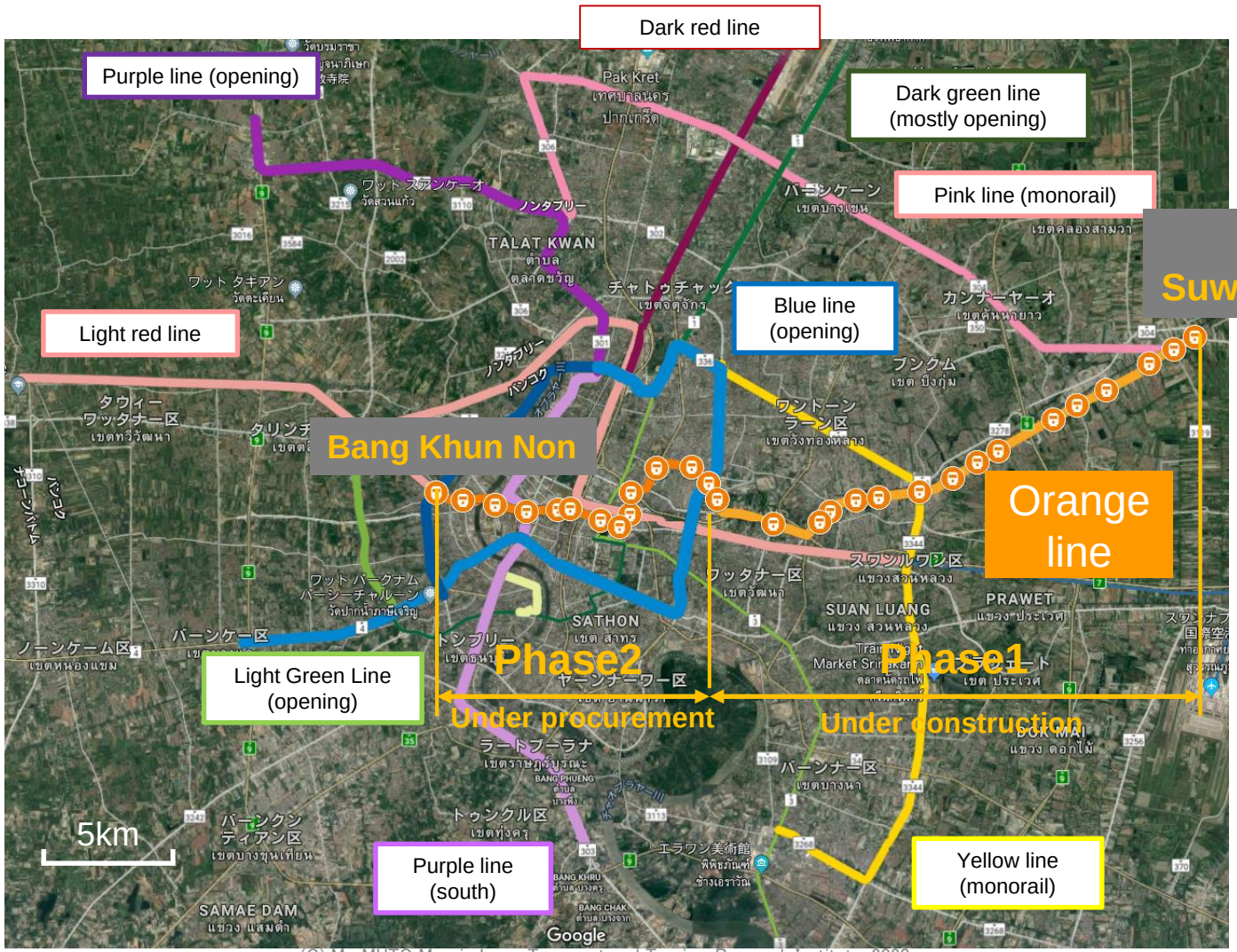
- **Hanoi Metro (2017~)**
  Tokyo Metro established a local corporation for urban railway consulting.

Japanese Embassy at Vietnam Homepage

Chapter 3: Toward Responding to Urban Transport Issues

Bangkok MRT Orange Line

Bangkok's East-West Urban Railway (Phase 1 under construction, 39.6km)



MRT Orange Line: Current Progress

- Total length 39.6km (30.6km underground tunnel), 30 stations

Phase1 (East Section) Thailand Cultural Center - Yaek Suwinthawong

- Supervised by Mass Rapid Transit Authority of Thailand (MRTA):
  All civil works investment from government fiscal budget
- Cabinet approval in April 2016
- Total cost of about 110 billion baht (about 340 billion yen)
- Construction progress rate 51.33% (as of the end of November 2019)
- Opened: 2023 (scheduled, some sections may operate first)

Phase2 (West section) Bang Khun Non - Thailand Cultural Center

- January 2019: PPP Commission, SEPO, has approved PPP investment plan for civil works (west section), M&E (whole line), O&M (whole line)
- Under procurement process
- Opened: 2025 (scheduled)

Reference: https://www.mrta-orangelineeast.com/en/home
https://www.mrta.co.th/en/projectelectrictrain/orangeline/
https://www.arayz.com/columns/tokusyu_201807/3/
https://www.bangkokpost.com/business/1627166/agency-oks-final-orange-line-rail
https://www.jri.co.jp/MediaLibrary/file/report/researchfocus/pdf/11006.pdf

Toward Responding to Urban Transport Issues

- **Current Status**
  - Railway Investment → (mostly) Government Budget
- **Government Perspective**
  - Typical O&M separated contract is PPP net-cost oriented, thus O&M concessionaire bears the demand risks

System whereby concessionaires operate their business using a certain income (e.g. fare income) as the source

- **Problems**
  - Increasing in business risk makes it difficult to create a sustainable railway business
  - To securing the profitability, the systematic promotion of development along railway lines is in urgent needed
    - However, the current regulation and policy are still insufficient and the organization in-charge has not been clearly decided
- **Countermeasure (proposal)**
  - Implementation of development projects around stations in PPP (government and private companies)
  - Securing public spaces, including station plaza and park & ride
  - Implementing a railway-area development pilot project based on the Japanese model

Policy of deepening the examination

JTTRI Future Prospect (DRAFT)

JTTRI
[The Morichi Committee "Research Group on Railway and Area Development"]
Research and development support for strategies and business schemes
Academic experts, MLIT, JICA, UR, JRTT, Railway Companies, etc.

ASEAN Transport Policies
A Support for the development of urban railways in ASEAN
Manila/Bangkok/Jakarta/Hanoi/Others

Consideration of policy support measurements
MLIT, MOFA, METI, embassy of various countries, etc.

Consideration of public financial support measures
JICA, JOIN, JBIC, JRTT, NEXI, etc.

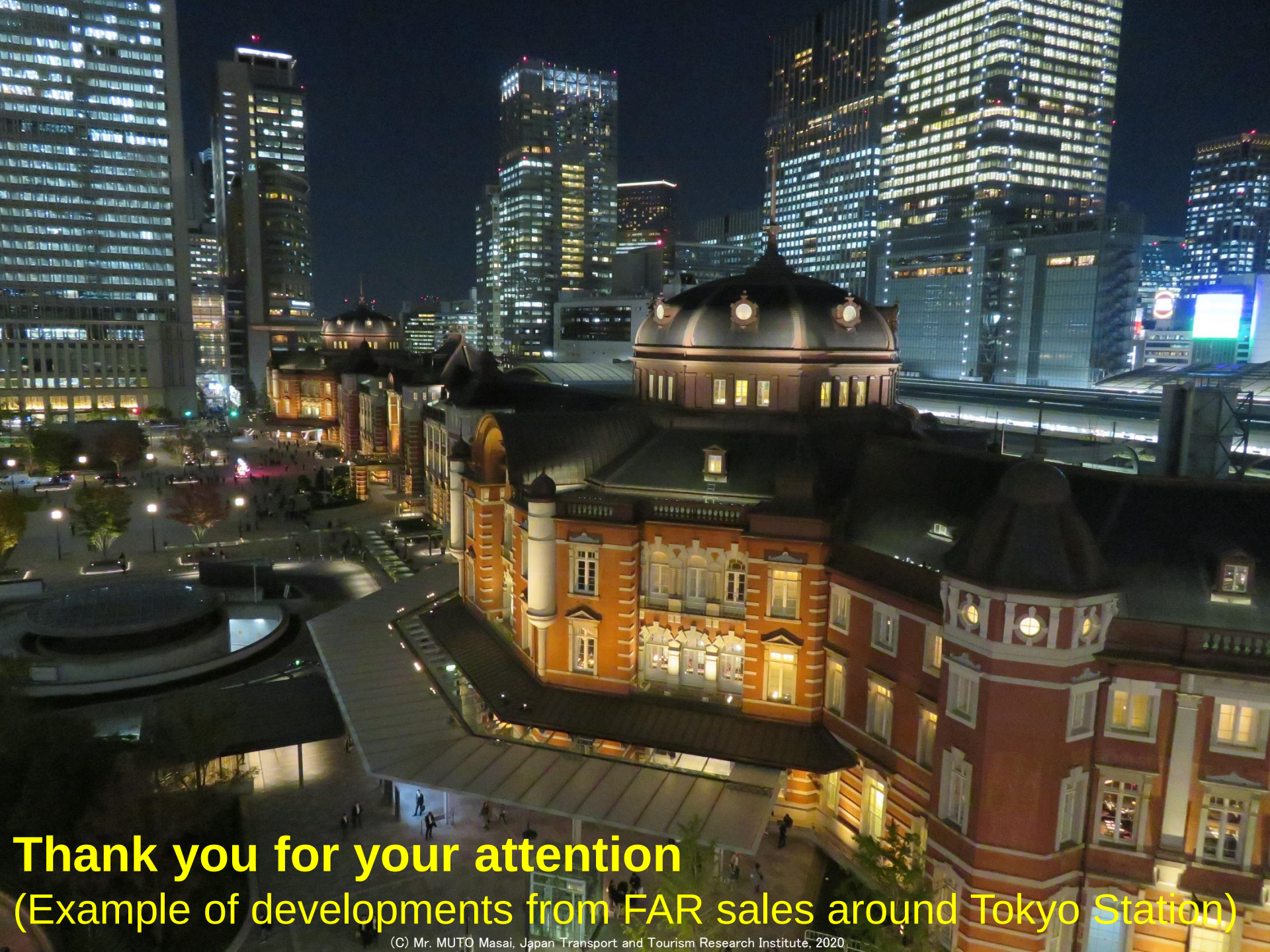
Support and cooperation

Support and cooperation

JTTRI ASEAN Office
Coordination with ASEAN countries through inter-governmental agreement, and support for the development of urban railway projects

Urban Railway Development and Related Companies
Trading companies, railway operators, consultants, construction company, etc.

Support for Urban Railway Development Projects in ASEAN



Thank you for your attention

(Example of developments from FAR sales around Tokyo Station)