

**The 158th Transport Policy Colloquium -ASEAN-India Regional Report-**

# **Analysis of HSR development schemes in Southeast and South Asia**

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1. Introduction (background and purpose)
2. Project overview (basic information, purpose, history, status)
3. Project schemes (scheme diagrams, Financing, engineering, procurement, construction)
4. Characteristic initiatives and tasks (freight transport, land acquisition, technical standards, station area development)
5. Summary / considerations

# 1. Introduction

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# HSR projects in Southeast and South Asia

## ○ Ongoing projects

Project	Project country	Partnering country	Ground-breaking ceremony	Status
Bangkok – Nong Khai HSR	Thailand	China	December 2017	Under construction
Mumbai – Ahmedabad HSR	India	Japan	September 2017	Under construction
Jakarta – Bandung HSR	Indonesia	China	January 2016	In operation
HSR Linking 3 Airports	Thailand	-	-	Under contract review

Four ongoing projects, including one with Japanese involvement

## ○ Projects in the planning / concept development stages

- Malaysia and Singapore (Kuala Lumpur – Singapore)
- Vietnam (Hanoi – Ho Chi Minh)
- Indonesia (Surabaya extension)
- Thailand (Bangkok – Chiang Mai, Bangkok – Padang Besar)
- India (7 lines including Delhi – Varanasi, Mumbai - Nagpur)



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# Background

## ○ Background

- The Japanese government is promoting overseas deployment of infrastructure systems.
- Japan is involved in multiple urban and inter-city railway projects.  
(Thailand, Indonesia, Philippines, Vietnam, Myanmar, India, Bangladesh)
- The number of ongoing High-Speed Rail (HSR) projects are few and far between, and a project in India is the only case with Japanese involvement at present. Note that some countries have such projects in the planning and concept development stages.

What kind of information can we supply to facilitate future overseas HSR deployments?

## ○ Documents

- Scenario of a domestic railway company deploying business overseas through partnership with overseas railway operators (Akizuki, Konagai, Nomura Research institute, July 2010 edition)
- Quantitative risk analysis in urban railway PPP projects in Asia (Matsushita, Morichi, Inoue, 57<sup>th</sup> Japan Society of Civil Engineers Conference Presentation Collection)
- Challenges in adopting PPP into urban railway projects in major Asian cities (Sugo, JTTRI, Research Presentation Meeting, Winter 2019 (46<sup>th</sup>))
- Indian HSR Projects (Yamazaki, Taniguchi, Matsuda, Presentation Collection of the 57<sup>th</sup> JSCE Conference)
- Thailand's large-scale infrastructure projects using PPP (Aramaki, IDI Information May 2020 edition (No.878) [Summary version])
- Latest HSR around the World (JARTS, ISBN978-4-324-80130-7)
- IHRA, JETRO, IDE-JETRO, International Railway Journal, Railway Gazette, other publicly-available information

⇒ No studies have comparatively analyzed multiple HSR development schemes.

# Purpose and overview

## ○ Study purpose

- To identify HSR development schemes in Southeast and South Asia
- To identify characteristics and challenges that can be used as reference in planning HSR development

## ○ Study overview





- Method : Document study and interviews with project stakeholders
- Target : Four HSR projects below and one semi-HSR project  
 (The Laos project has been included as its development scheme is similar to that of the Indonesian project.)

Project	Project country	Partnering country	Fund	Loan	Technological cooperation
(1) Bangkok – Nong Khai HSR	Thailand	China	-	-	✓
(2) Mumbai – Ahmedabad HSR	India	Japan	-	✓	✓
(3) Jakarta – Bandung HSR	Indonesia	China	✓	✓	✓
(4) Laos – China Railway (*semi-HSR)	Laos	China	✓	✓	✓
(5) HSR Linking 3 Airports	Thailand	Public-private partnership (PPP)			

## 2. Project overview

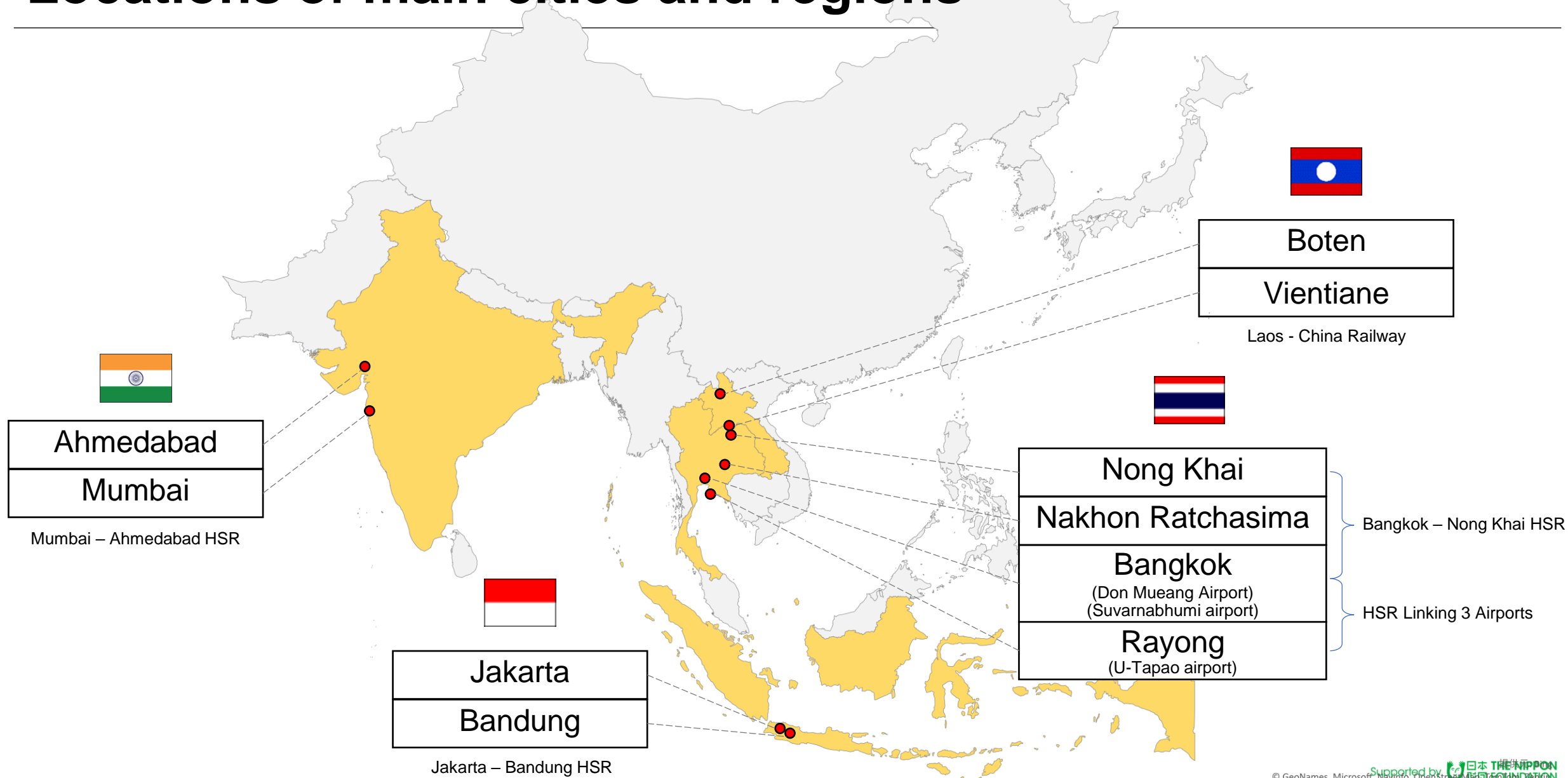
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# (Reference) General information / Main data of existing railways

Item	Unit	Thailand 	India 	Indonesia 	Laos 
General information (as of 2020 - 2022)					
Area	km <sup>2</sup>	514,000	3,287,469	1,920,000	240,000
Population	Million people	66	1,417	270	7
GDP	Billion USD	495	3,385	1,058	19
Per-capita GDP	USD	7,089	2,389	3,912	2,595
Main data of existing railways (as of 2011 - 2012)					
Operating distance	km	4,071	65,436	3,862	3.5
Annual passenger transportation volume	Million people	46	8,421	203	0.04
	Million passenger-kilometer	8,032	1,098,100	18,210	-
Annual cargo transportation volume	Million tons	11	1,008	22	-
	Million ton-kilometer	2,563	691,700	7,303	-



# Locations of main cities and regions



# Project overview (1) Bangkok – Nong Khai HSR

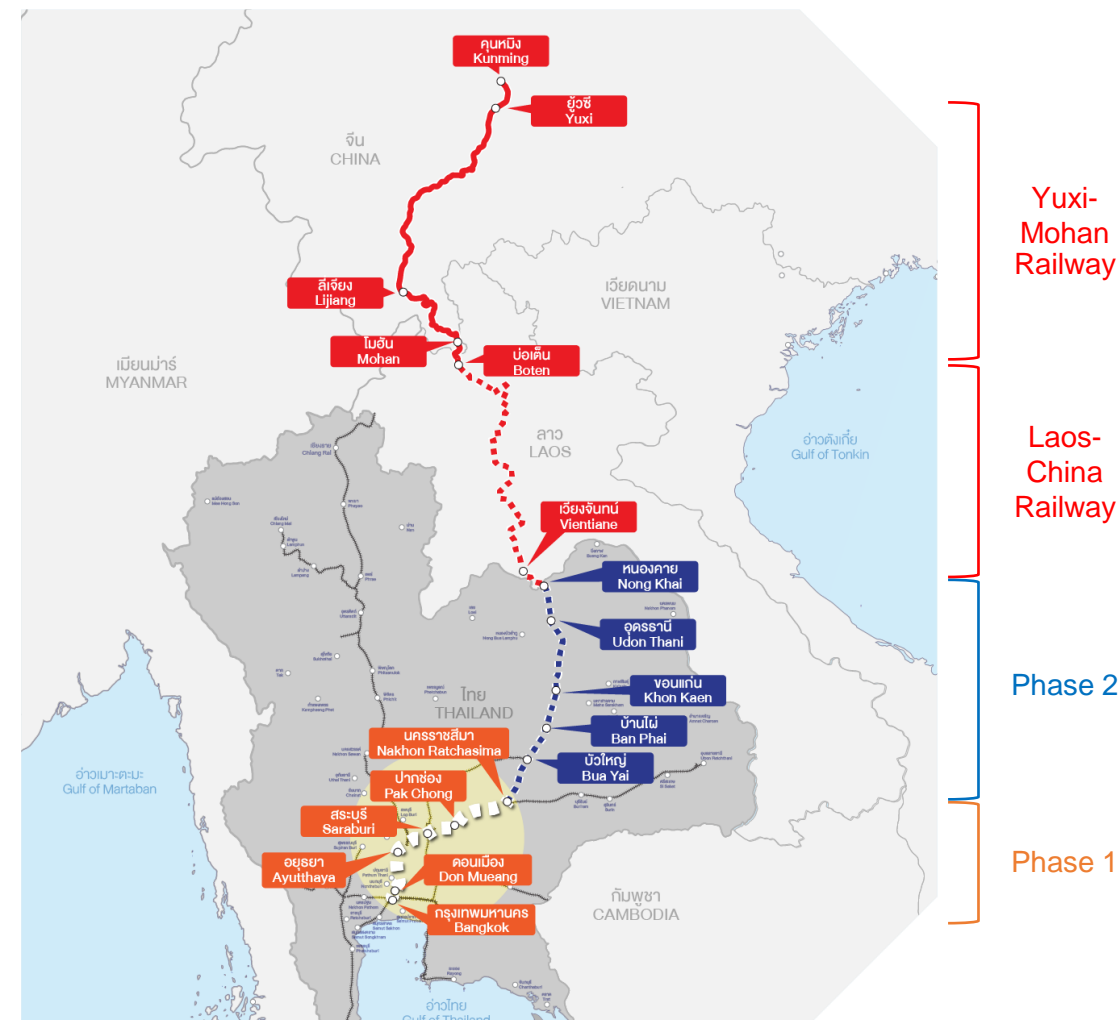
## Basic information

	Phase 1	Phase 2
Section	Bangkok - Nakhon Ratchasima	Nakhon Ratchasima – Nong Khai
Total length	253 km	356 km
Number of stations	6	5
Gauge	1,435 mm	
Maximum operating speed	250 km/h	
Project cost* (Approximate)	179.4 billion THB (Approx. USD 5 billion)	300 billion THB (Approx. USD 8.3 billion)
Project body	State Railway of Thailand (SRT)	

\*:Initial project cost

↑  
Report subject: Phase 1

## Route



Picture source : Bangkok - Nong Khai HSR project website

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# Project overview (1) Bangkok – Nong Khai HSR

## Project purpose and significance

- Providing HSR access to north-east Thailand as a means of public transport and establishing connection with railway networks in Laos and China
- Developing national economy including the north-east Thailand, promoting domestic and international mobility / tourism, and achieving modal shift

## Main developments

- Around 2010: The Thai government approved a HSR development plan and began considering the Northeastern Line as a joint project with China.
- 2014: The Thai and Chinese governments signed a memorandum of understanding about HSR development.
- 2016: A joint committee of Thai and Chinese officials agreed on Phase 1 development.
- 2017: The Thai Cabinet approved the Phase 1 development.

## Current status

- Currently under construction with 30% progress in civil work (as of December 2023)
- Tracks, electrical & mechanical (E&M) systems and rolling stock are being designed.
- The Thai government is exploring its operational scheme.



Construction progressing in a elevated section  
(pictured in July 2023)

# Project overview (2) Mumbai – Ahmedabad HSR

## Basic information

Section	Mumbai - Ahmedabad
Total length	508 km
Number of stations	12
Gauge	1,435 mm
Maximum operating speed	320 km/h
Project cost* (Approximate)	1.08 trillion INR (Approx. USD 17 billion)
Project body	National High Speed Rail Corporation Limited (NHSRCL)

\*: Initial project cost

## Route



Picture source : NHSRCL website

# Project overview (2) Mumbai – Ahmedabad HSR

## Project purpose and significance

- Building an **inter-city** high-speed mass transportation system to **boost transportation capacity** against the backdrop of rapidly-increasing rail transportation demand
- Reducing travel time, creating job opportunities, growing economy, pioneering new industries and promoting tourism

## Main developments

- 2009: The Indian Railway Vision 2020 was drawn up for the development of a HSR network, recommending that HSR initially connect Mumbai and Ahmedabad.
- 2009: The Indian government carried out a pre-FS, envisaging the TGV system, wide gauge (1,676mm) and track sharing with existing lines in urban areas.
- 2012: The Japanese government carried out a pre-FS, envisaging the use of the Shinkansen system, standard gauge (1,435mm) and dedicated HSR tracks.
- 2013: **Japan and India conducted a joint FS**, comparing several HSR systems and devising a basic plan based on the Shinkansen system.
- 2015: **Japanese and Indian leaders met** to sign a memorandum of understanding about the use of the Shinkansen system for the Mumbai – Ahmedabad HSR.

## Current status

- Under construction in packaged deals covering civil work and special bridges
- Contracts partially signed for tracks and depots, and contracting work underway for electrical systems and rolling stocks

# Project overview (3) Jakarta – Bandung HSR

## Basic information

Section	Jakarta – Bandung
Total length	142 km
Number of stations	4
Gauge	1,435 mm
Maximum operating speed	350 km/h
Project cost* (Approximate)	88 trillion IDR (Approx. USD 6 billion)
Project body	Indonesia China High-Speed Railways Limited (KCIC)

\*: Initial project cost

## Route



Picture source : Google Map edited by the author

# Project overview (3) Jakarta – Bandung HSR

## Project purpose and significance

- Building a railway-based **inter-city** high-speed mass transportation system
- Achieving modal shift, resolving traffic congestion, reducing travel time, establishing regional / national development and reducing environmental impact

## Main developments

- 2010: The Indonesian and Japanese governments signed a memorandum of understanding on the Metropolitan Priority Area (MPA) for Jakarta. The vision names the Jakarta – Bandung HSR as a priority project.
- 2012: The Japanese government (MLIT, METI) carried out pre-FSs.
- 2013: The Japanese government (JICA) carried out a FS upon request from the Indonesian government.
- 2015: The Indonesian government announced the cancellation of its HSR plan, citing a **high project cost**.  
The Indonesian government announced China's participation in project examination, with the Chinese government conducting a FS.  
President Joko said he does not wish to see the Indonesian government make financial outlay or provide loan guarantee.  
The Indonesian government **approved a Chinese proposal that did not involve its financial outlay or loan guarantee**.

## Current status

- In operation (launched in October 2023), recording one million passengers in approx. 2 months after launch.

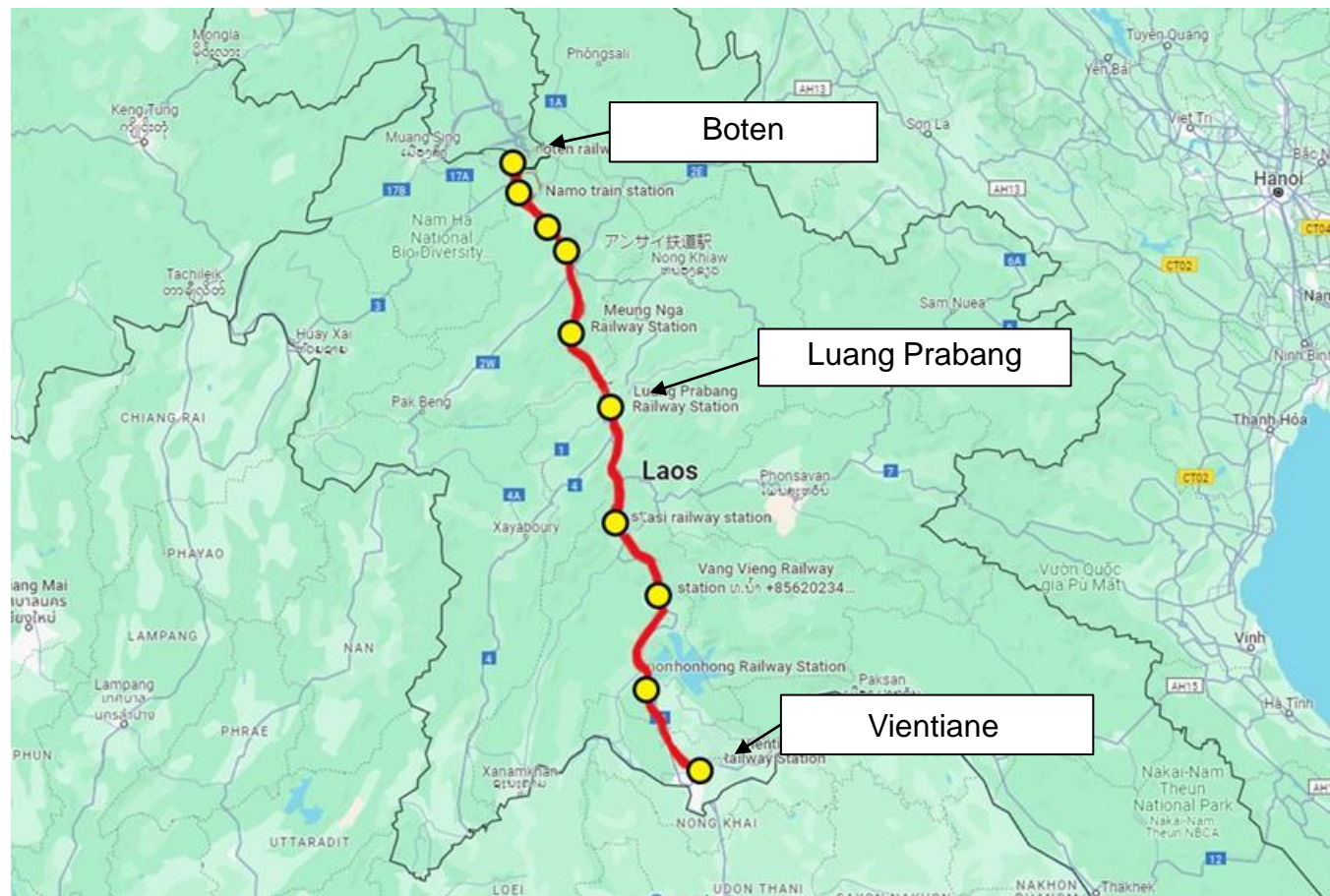
# Project overview (4) Laos-China Railway

## Basic information

Section	Boten - Vientiane
Total length	420 km
Number of stations (passenger stations)	10
Gauge	1,435 mm
Maximum operating speed	Passenger trains: 160 km/h Cargo trains: 120 km/h
Project cost* (Approximate)	- (Approx. USD 6 billion)
Project body	Laos-China Railway (LCR)

\*: Initial project cost

## Route



Picture source : Google Map edited by the author



# Project overview (4) Laos-China Railway

## Project purpose and significance

- **Improving connectivity to neighbouring countries** and becoming land-linked rather than land-locked
- Achieving social / economic development, building a modern transportation system, promoting logistics / tourism and promoting urbanization

## Main developments

- Around 2000: Laos began negotiating with the **Chinese government** about railway development.
- 2012: The Laos and Chinese governments signed a cooperation agreement on railway.
- 2015: The two governments reached an agreement on developing the Laos-China Railway and conducted a groundbreaking ceremony to coincide with **Laos's 40<sup>th</sup> anniversary of national foundation**.
- 2016: The Chinese government (China Railway Eryuan Engineering Group Co. Ltd.) conducted a FS.

## Current status

- In operation (launched in December 2021)
- Ten passenger train services operate each day departing and arriving at Vientiane.
- Non-regular cargo trains also operate.



Exterior view of the passenger train (pictured in July 2023)

# Project overview (5) HSR Linking 3 Airports

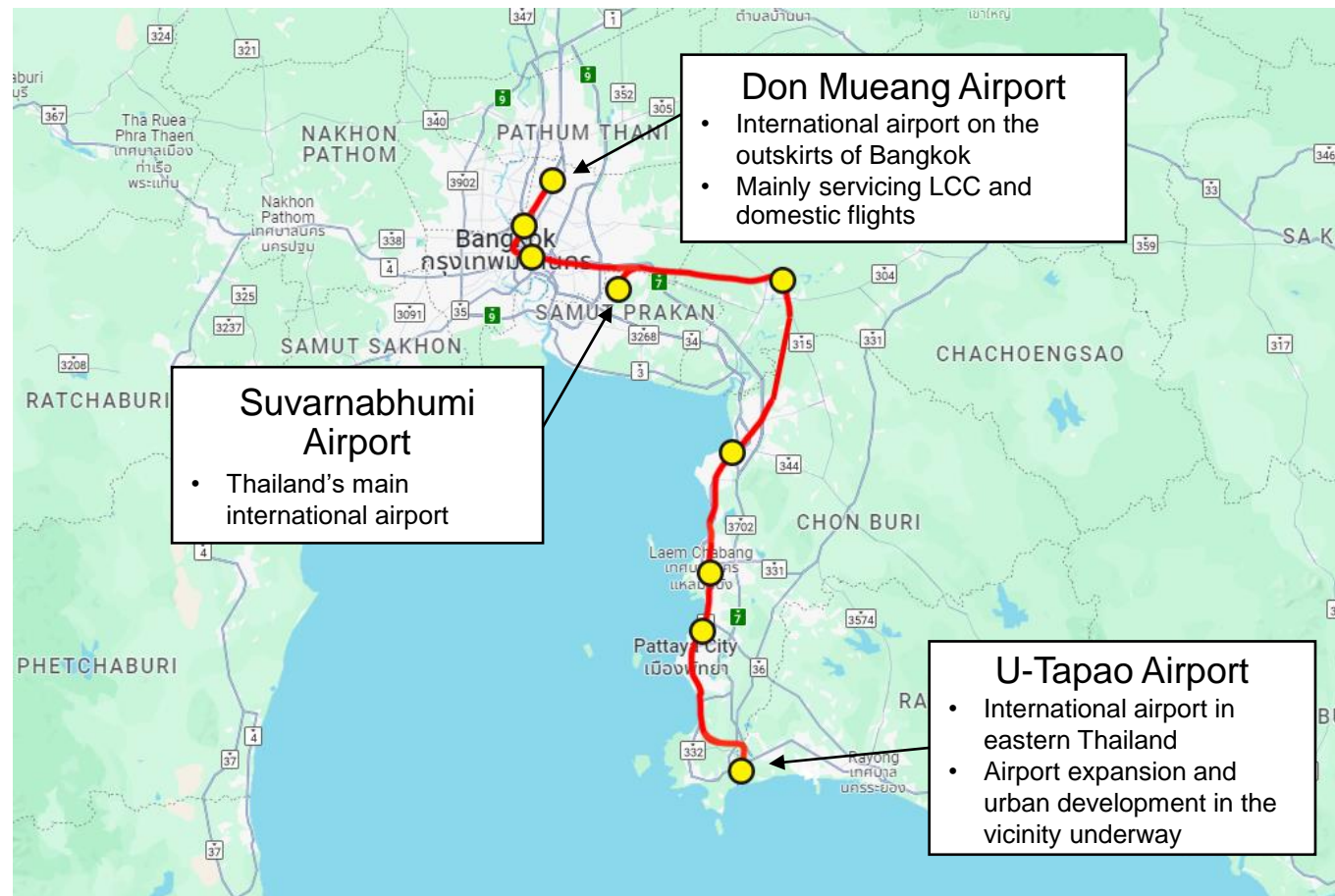
## Basic information

Section	Don Mueang Airport – Suvarnabhumi Airport – U-Tapao Airport
Total length	220 km
Number of stations	15 *2
Gauge	1,435 mm
Maximum operating speed	DMK • BKK: 160 km/h BKK • UTP: 250 km/h
Project cost*1 (Approximate)	224.5 billion THB (Approx. USD 6 billion)
Project body	State Railway of Thailand (SRT) and Asia Era One (AERA1)

\*1:Initial project cost

\*2:Including existing stations of the Airport Rail Link (ARL)

## Route



Picture source : Google Map edited by the author

# Project overview (5) HSR Linking 3 Airports

## Project purpose and significance

- Facilitating smooth transfer between 3 airports, planning the development of the Eastern Economic Corridor (EEC)
- Promoting the development of wayside cities, creating jobs and achieving national development including eastern Thailand

## Main developments

- The use of PPP for railway and other infrastructure development projects is recommended under the PPP master plan / PPP strategic plan.
- 2017: An HSR plan connecting the three airports was proposed as part of the Eastern Economic Corridor (EEC) development plan, prompting the Thai government (State Railway of Thailand) to carry out a FS and recommend the project under the PPP framework.
- 2018: The Thai Cabinet approved the development of the HSR linking 3 airports.
- 2019: The SRT and a private-sector consortium signed an agreement for implementing the project.

## Current status

- Construction has not started, with the agreement being reviewed.
- The COVID-19 pandemic has caused reduction in passenger use and skyrocketing cost of materials, forcing a review of payment terms between the public and private sectors and increasing the project cost.

# Summary of project overview

- The projects can be summarized as below with a focus on project background, purpose and relationship with partnering countries:

Project	Background and purpose	Relationship with partnering countries	Factors considered when choosing a partnering country
(1) Bangkok – Nong Khai HSR	<ul style="list-style-type: none"> <li>• Inter-city connection</li> <li>• Improving connectivity with neighbouring countries</li> </ul>	<ul style="list-style-type: none"> <li>• Consulting China since the initial planning stage</li> </ul>	Geographical proximity with the partnering country
(2) Mumbai – Ahmedabad HSR	<ul style="list-style-type: none"> <li>• Demand increase for railway transportation</li> <li>• Reinforcing transportation capacity and achieving inter-city connection</li> </ul>	<ul style="list-style-type: none"> <li>• Adopting a Japanese proposal combining the Shinkansen system (standard gauge, dedicated tracks) and low-interest yen loan</li> </ul>	Proposal that meets the needs of the project country
(3) Jakarta – Bandung HSR	<ul style="list-style-type: none"> <li>• Inter-city connection</li> <li>• Indonesian government reluctant to make fiscal outlay and provide loan guarantee</li> </ul>	<ul style="list-style-type: none"> <li>• Adopting a Chinese proposal that does not demand that the Indonesian government make fiscal outlay or provide loan guarantee</li> </ul>	Proposal that meets the needs of the project country
(4) Laos-China Railway	<ul style="list-style-type: none"> <li>• Improving connectivity with neighbouring countries</li> <li>• Commemorating Laos's 40<sup>th</sup> anniversary</li> </ul>	<ul style="list-style-type: none"> <li>• Consulting China since the initial planning stage</li> </ul>	Geographical proximity with the partnering country
(5) HSR Linking 3 Airports	<ul style="list-style-type: none"> <li>• Smooth transfer between airports</li> <li>• PPP promotion</li> </ul>	<ul style="list-style-type: none"> <li>• No specific partnering country (Selected by the private sector)</li> </ul>	None (Selected by the private sector)

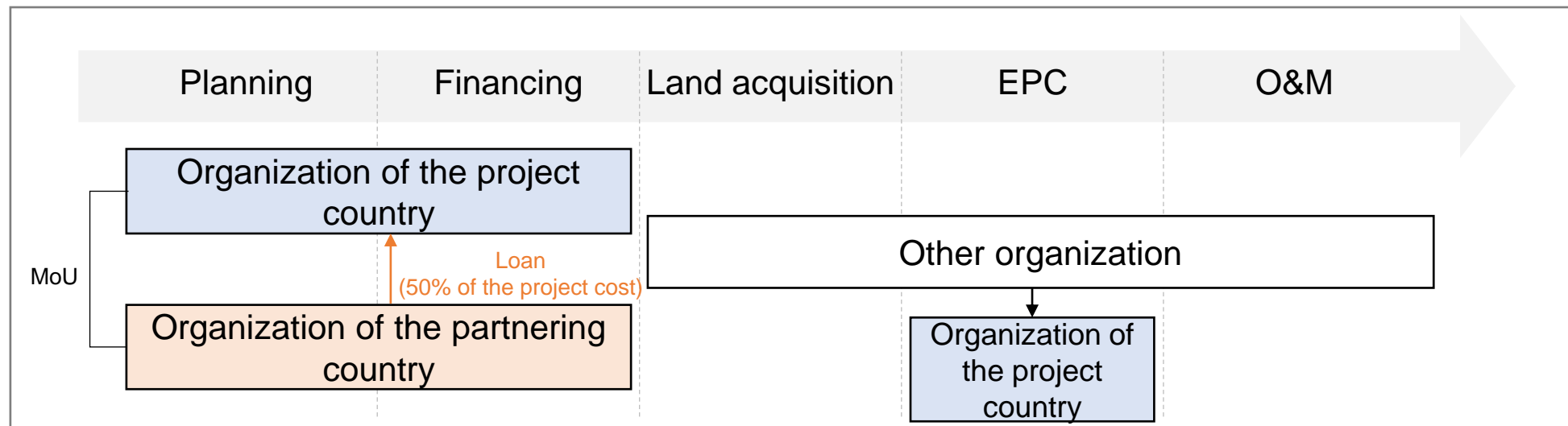
# 3. Project schemes

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# Project schemes – Common elements

## ○ Project scheme diagram

- Dividing the project flow into 5 stages and naming the main organizations
- Color-coding organizations of the project country, organizations of the partnering country and other organizations

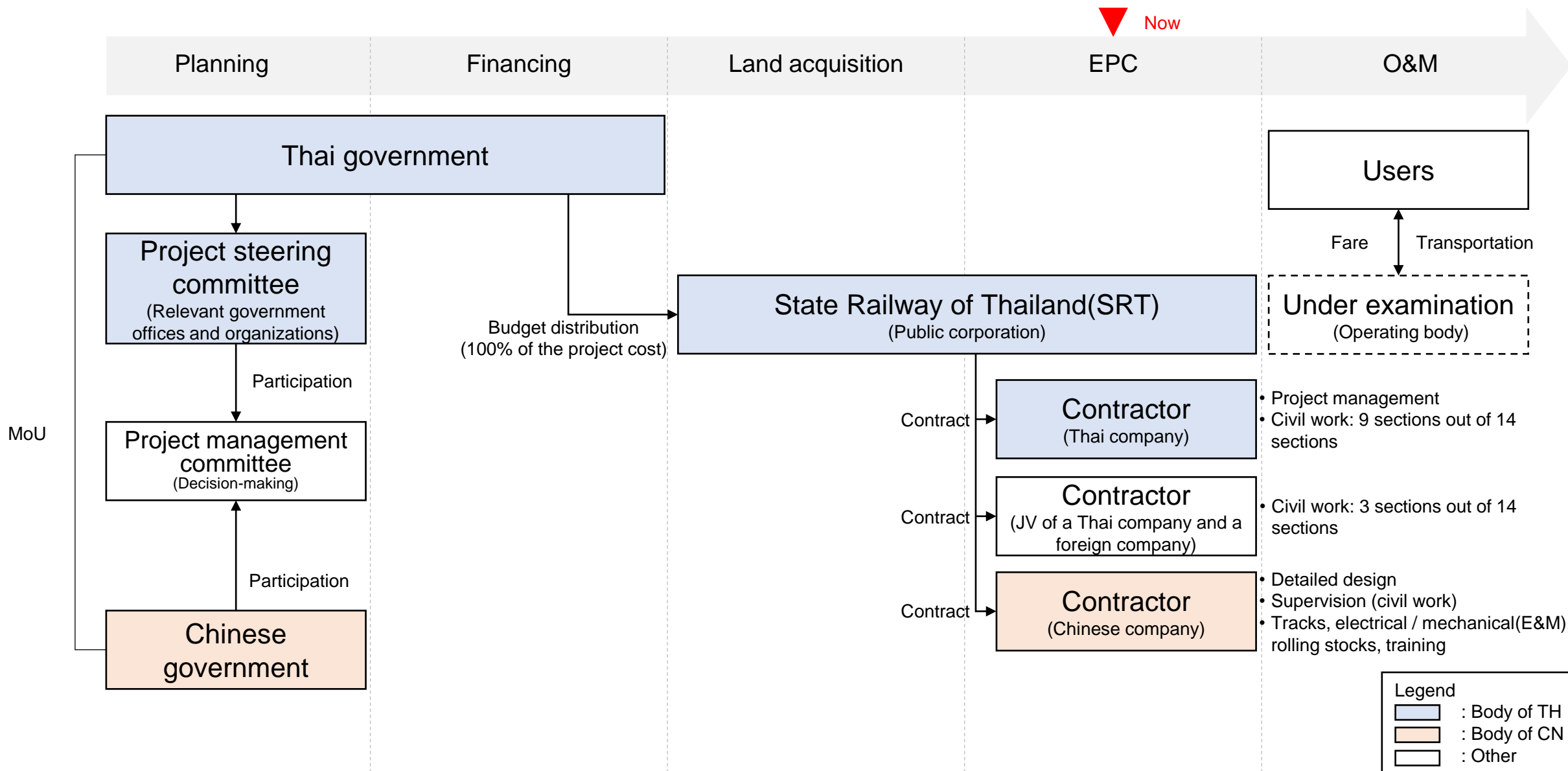


Project scheme diagram

## ○ Relationship between financing and EPC (Engineering, procurement, construction)

- Focusing on the involvement of project country and partnering country in each of the stages for comparative analysis

# Project schemes (1) Bangkok – Nong Khai HSR (Phase 1)



# Project schemes (1) Bangkok – Nong Khai HSR (Phase 1)

## Financing

- Funding: Thai government (100% of the project cost)
- Loan: None

## Engineering, procurement, construction (EPC)

- Project body: State Railway of Thailand (SRT)
- Thai company: Mainly handling project management (PM) and Civil work
- Chinese company: Mainly handling design and railway system

- The Thai government accepts project risks.
  - Public works approach
- Development structure reflecting Thai government's intentions (improving project execution capability, transferring Civil work technologies, creating jobs etc.)
  - Many Thai companies are participating in EPC.

### List of main services

• Project management	: Epsilon, Chotichinda, etc.
• Detailed design	: CRIC(China Railway International), CRDC(China Railway Design)
• Supervision(Civil work)	: CRIC(China Railway International), CRDC(China Railway Design)

### List of main engineering work

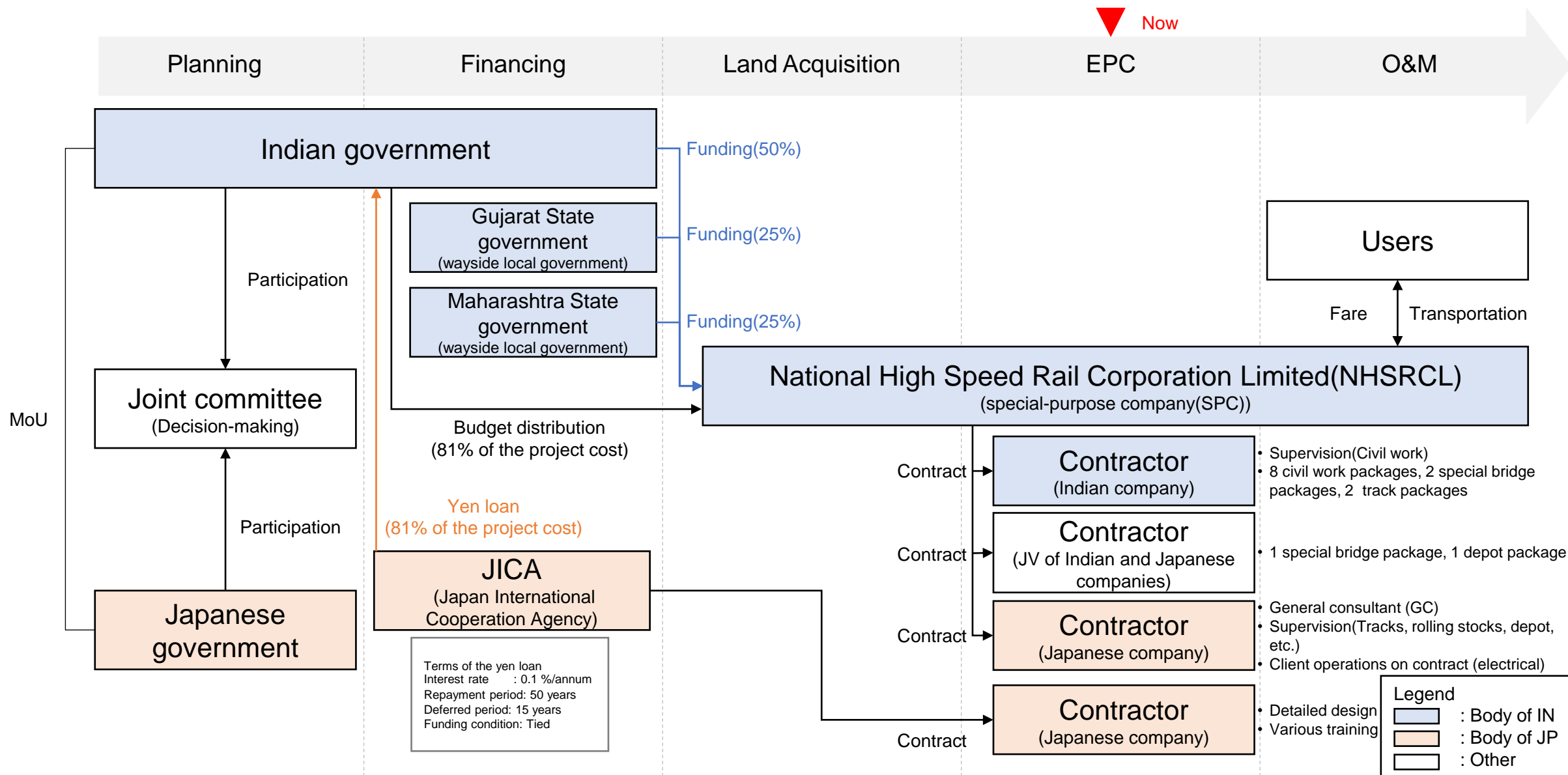
• Civil work 1-1 Section	: Department of Highways
• Civil work 2-1 Section	: Civil Construction Services & Products
• Civil work 3-2 Section	: Nawarat Patanakarn
• Civil work 3-3 Section	: Thai Engineers and Industry
• Civil work 3-4 Section	: Italian-Thai Development
• Civil work 4-2 Section	: Unique Engineering and Construction
• Civil work 4-4 Section	: Italian-Thai Development
• Civil work 4-6 Section	: Unique Engineering and Construction
• Civil work 4-7 Section	: Civil Engineering
• Civil work 3-1 Section	: ITD-CREC JV (Thai-Chinese JV)
• Civil work 3-5 Section	: SPTK JV (Thai-Malaysian JV)
• Civil work 4-3 Section	: C.A.N. JV (Thai-Chinese JV)
• Civil work 4-1 Section	: (TBA)
• Civil work 4-5 Section	: (TBA)
• Tracks · E&M · rolling stock · training	: CRIC(China Railway International), CRDC(China Railway Design)

### Distribution of roles in EPC

	PM	Design	Civil work	Tracks	E&M	Rolling stock
Thailand	✓	-	✓	-	-	-
China	-	✓	-	✓	✓	✓



# Project schemes (2) Mumbai – Ahmedabad HSR



# Project schemes (2) Mumbai – Ahmedabad HSR

## Financing

- Funding: Indian government (50%), Gujarat State government (25%), Maharashtra State government (25%)
- Loan: Indian government (81% of the project cost)

## EPC

- Project body : National High Speed Rail Corporation Limited (NHSRCL)
- Indian company: Mainly handling civil works, bridges and tracks
- Japanese company: Mainly handling part of services and engineering work
- Details of implementation of packaged work including electricals and rolling stock are unknown as they are under contracting procedure.

- The Indian government and wayside state governments accept project risks.

→ Public works project

- It was tied assistance under the terms of the yen loan, but the funding conditions were reviewed following underwhelming bids by Japanese companies.

→ As a result, many Indian companies are participating in EPC.

## List of main services

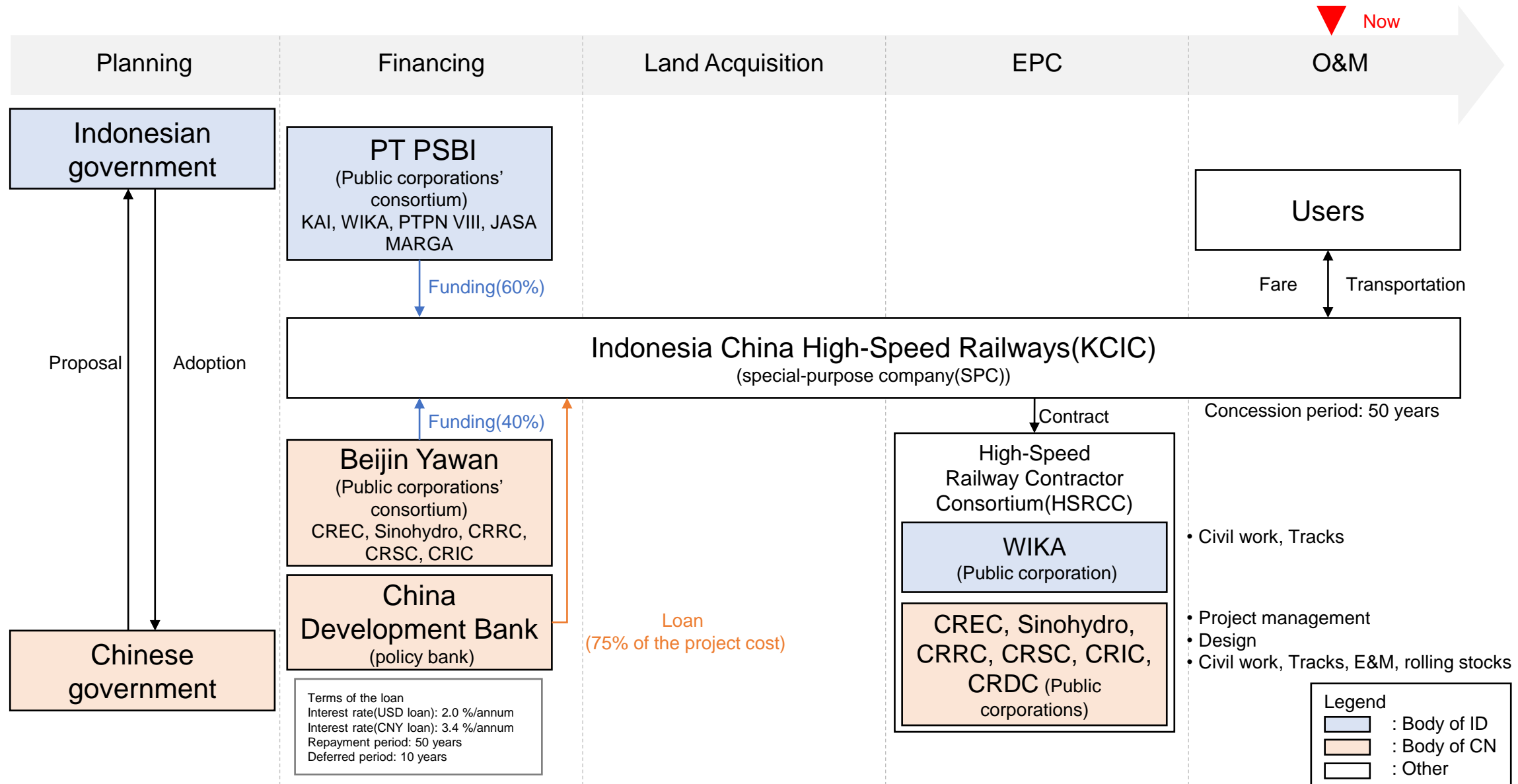
• Supervision(Civil work)	: Tata Consulting Engineers, etc.
• General consultant (GC)	: JICC *1
• Detailed design	: JICC
• Supervision (Tracks, rolling stocks, depot, etc.)	: JICC
• Client operations on contract (Electrical)	: JE *2

\*1 JIC·NK·OCG consortium, \*2Japan High Speed Rail Electric Engineering

## List of main engineering work

• Civil work C-1	: MEIL-HCC JV
• Civil work C-2	: Afcons Infrastructure Limited
• Civil work C-3	: Larsen & Toubro Limited
• Civil work C-4	: Larsen & Toubro Limited
• Civil work C-5	: Larsen & Toubro Limited
• Civil work C-6	: Larsen & Toubro Limited
• Civil work C-7	: IRCON DINESHCHANDRA JV
• Civil work C-8	: SCC-VRS JV
• Special bridges P-1(B)	: M.G. Contractors Pvt Ltd.
• Special bridgesP-1(C)	: M.G. Contractors Pvt Ltd.
• Tracks T-2	: IRCON International Limited
• Tracks T-3	: Larsen & Toubro Limited
• Special bridgesP-4	: L&T-IHI Consortium (India-Japanese JV)
• Depot D-2	: Sojitz-L&T Consortium(India-Japanese JV)
• Tracks T-1	: (TBA)
• Depot D-1	: (TBA)
• Electrical, rolling stock, maintenance rolling stock etc.	: (TBA)

# Project schemes (3) Jakarta – Bandung HSR



# Project schemes (3) Jakarta – Bandung HSR

## Financing

- Funding: Indonesian public corporations (60%), Chinese public corporations (40%)
- Loan: Indonesia China High-Speed Railways (KCIC) (75% of the project cost)

## EPC

- Project body : Indonesia China High-Speed Railways (KCIC)
- High-Speed Railway Contractor Consortium (HSRCC) handling EPC
- Funding companies from the two countries participated in HSRCC  
(Red text in the tables on the right)

- KCIC(funded by the two countries' public corporations) accepts project risks  
→ Jointly-funded project by the two countries
- HSRCC centrally handling EPC  
→ All five Chinese funding companies participated in EPC.
- It appears the project was developed / planned with a pre-conceived idea about the funding and EPC structures.

## List of funding companies

• WIKA	: General contractor
• KAI	: Indonesian national railways
• PTPN VIII	: 8 <sup>th</sup> state-run agricultural corporation
• JASA MARGA	: Highway management and administration corporation
• CRIC	: China Railway International
• CREC	: China Railway Engineering Corporation (construction company)
• Sinohydro	: Sinohydro Corporation (construction company)
• CRRC	: CRRC Corporation (railway rolling stock manufacturer)
• CRSC	: China Railway Signal & Communication

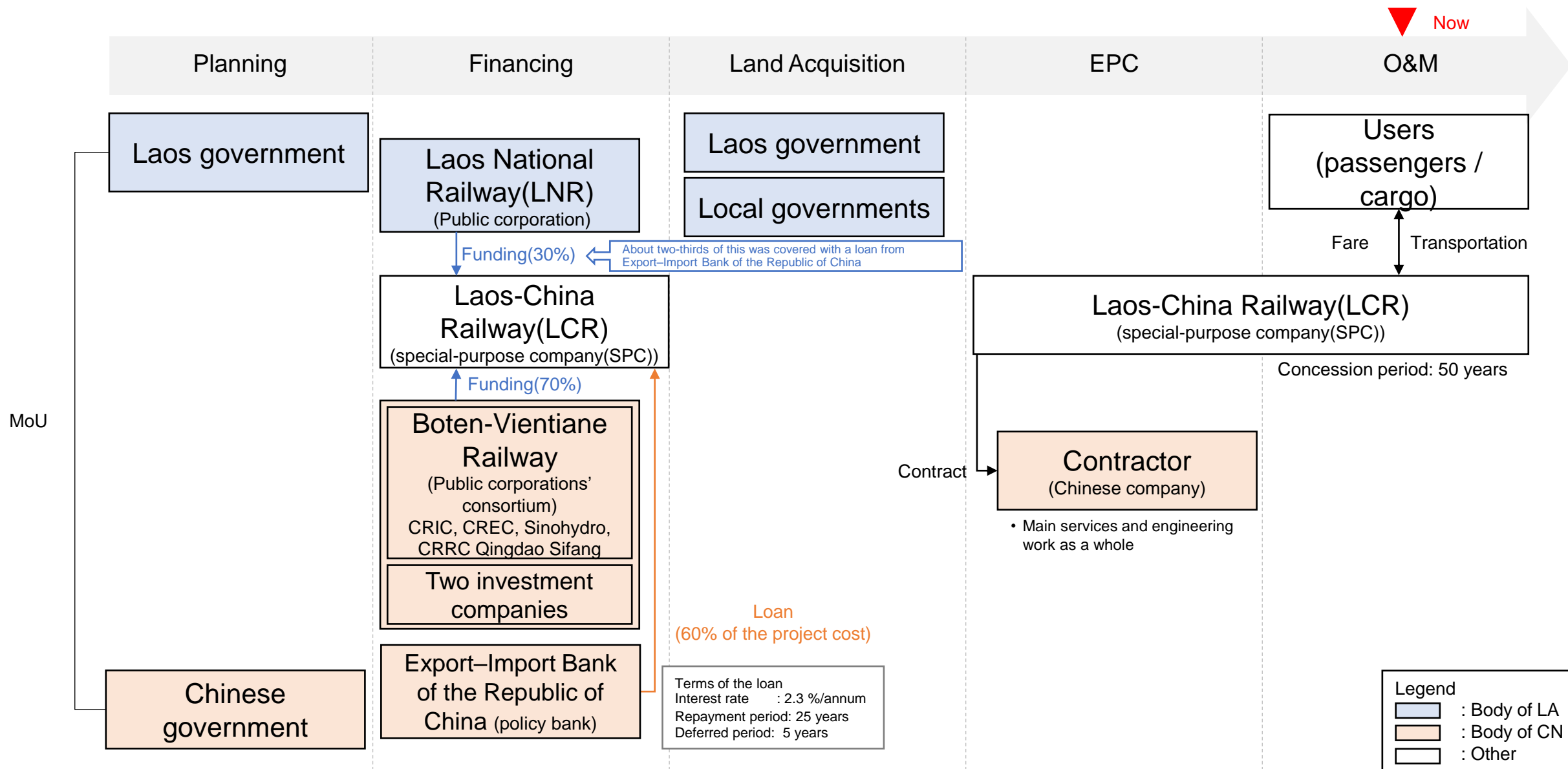
## List of HSRCC participants

• WIKA	: General contractor
• CRIC	: China Railway International
• CREC	: China Railway Engineering Corporation (construction company)
• Sinohydro	: Sinohydro Corporation (construction company)
• CRRC	: CRRC Corporation (railway rolling stock manufacturer)
• CRSC	: China Railway Signal & Communication
• CRDC	: China Railway Design (Design)

## Distribution of roles in EPC

	PM	Design	Civil work	Tracks	E&M	Rolling stocks
Indonesia	-	-	WIKA	WIKA	-	-
China	CRIC	CRDC	CREC, Sinohydro	Sinohydro	CREC, CRSC	CRRC

# Project schemes (4) Laos – China Railway



# Project schemes (4) Laos – China Railway

## Financing

- Funding: Lao public corporation (30%), Chinese public corporations (70%)
- Loan: Laos-China Railway (LCR) (60% of the project cost)

## Engineering, procurement, construction (EPC)

- Project body : Laos-China Railway (LCR)
- Lao company: Supplying goods and materials
- Chinese company: Handling main engineering work as a whole (Detailed implementation structure is unknown)
- Chinese funding companies participated in EPC (**Red text in the tables on the right**)

- LCR(funded by the two countries' public corporations) accepts project risks.
  - Jointly funded project by the two countries
- The contractor was selected by bidding, arranged by the bidding committee consisting of representatives from the two countries.
  - Multiple Chinese funding companies participated in EPC.

## List of funding companies

• LNR	: Laos National Railway
• Boten-Vientiane Railway	
➤ CRIC	: China Railway International
➤ CREC	: China Railway Engineering Corporation (construction company)
➤ Sinohydro	: Sinohydro Corporation (construction company)
➤ CRRQ Qingdao Sifang	: CRRQ Qingdao Sifang Locomotive & Rolling Stock
• Beijing Yukun Investment	: Investment company
• Yunan Investment Group	: Investment company

## Main EPC-related companies

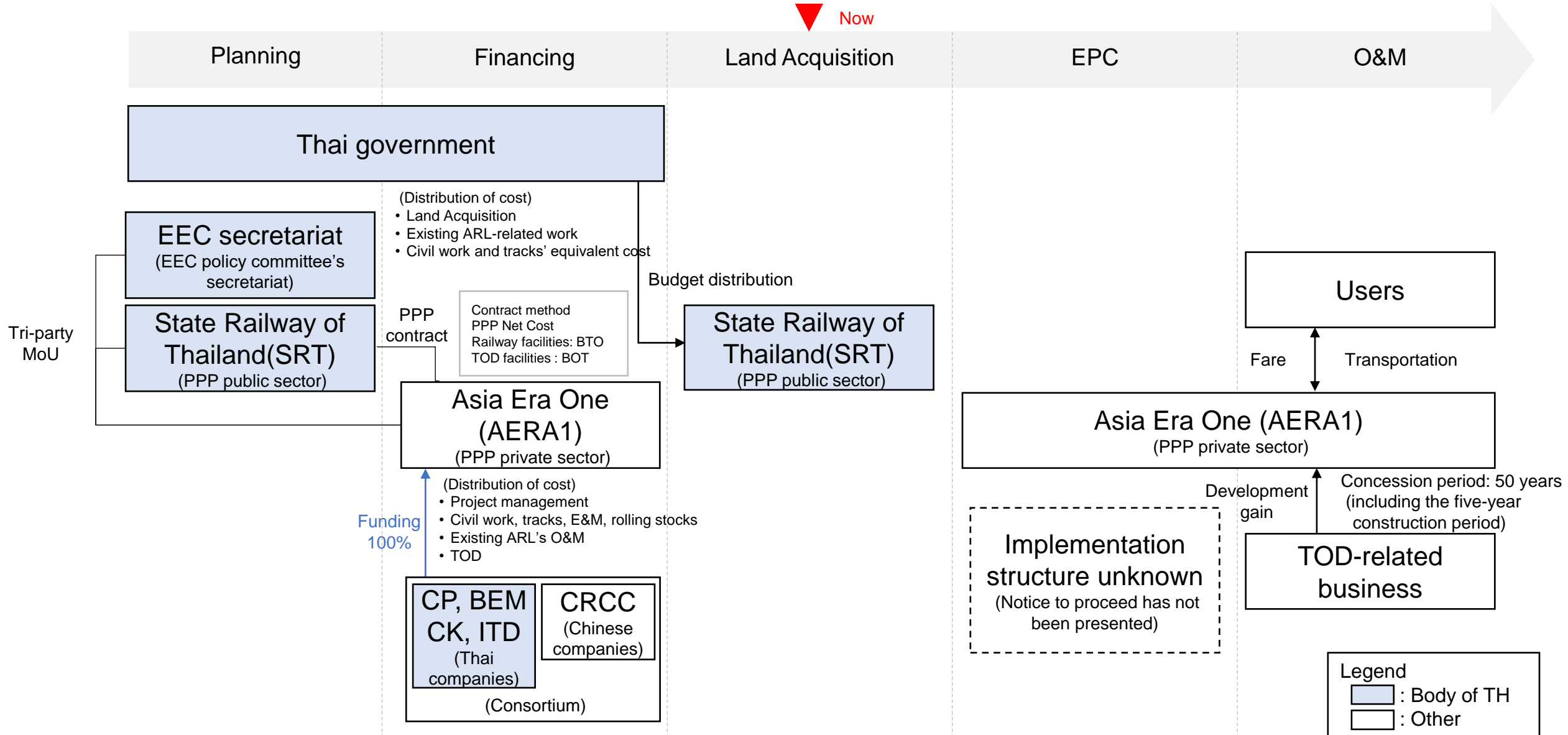
• CR No.5 Engineering Group	: China Railway No.5 Engineering Group (CREC-related company)
• CRIC	: China Railway International
• CR No.8 Engineering Group	: China Railway No.8 Engineering Group (CREC-related company)
• Sinohydro	: Sinohydro Corporation
• Power China	: Power Construction Corporation of China
• CR No.2 Engineering Group	: China Railway No.2 Engineering Group (CREC-related company)
• CRRQ Qingdao Sifang	: CRRQ Qingdao Sifang Locomotive & Rolling Stock

## Distribution of roles in EPC (Details are unknown)

- Lao companies : Supplying goods and materials
- Chinese companies : Handling main services and engineering work as a whole

# Project schemes (5) HSR Linking 3 Airports

▼ Now



# Project schemes (5) HSR Linking 3 Airports

## Financing

- Funding: Thai government, Asia Era One (AERA1)
- Loan: Public sector - None  
Private sector - Unknown

## EPC

- Detailed implementation structure will be considered by Asia Era One (AERA1)

- Project risks are shared between the public and private sectors.  
→ Public-private partnership (PPP) approach
- Among fund providers for AERA1, three construction companies (CK, ITD, CRCC) are thought to be involved in EPC, while the railway operation company (BEM) is to be handling O&M and the foundation corporation (CP) is to be involved in TOD.

### List of funding companies in the private sector

- |                                                                                                                                                                                                                                                                                                                          |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> <li>• CP (Charoen Pokphand Group) : Foundation corporation</li> <li>• CK (CH Karnchang) : Construction company</li> <li>• ITD (Italian-Thai Development) : Construction company</li> <li>• BEM (Bangkok Expressway and Metro):<br/>Operator of highways and urban railways</li> </ul> |
| <ul style="list-style-type: none"> <li>• CRCC (China Railway Construction Corporation)<br/>: Construction company</li> </ul>                                                                                                                                                                                             |

EPC's implementation structure is unknown.



# Project schemes summary

○ The projects can be categorized as below with a focus on project funding / loan and EPC structure:

Project	Project funding / loan	EPC structure	Project method category
(1) Bangkok – Nong Khai HSR	Funding: Thai government (100%) Loan: None	<ul style="list-style-type: none"> <li>Development structure in line with Thai government's intentions</li> <li>Participated by many Thai companies</li> </ul>	Public works method
(2) Mumbai – Ahmedabad HSR	Funding: India's national and state governments (100% in total) Loan: Indian government (81% of the project cost)	<ul style="list-style-type: none"> <li>From tied assistance to change of funding conditions</li> <li>Participated by many Indian companies</li> </ul>	Public works method
(3) Jakarta – Bandung HSR	Funding: Indonesian companies (60%), Chinese companies (40%) Loan: KCIC (75% of the project cost)	<ul style="list-style-type: none"> <li>Centrally handled by a contractors' consortium</li> <li>Five Chinese funding companies all participated in EPC.</li> </ul>	Joint funding by companies from both countries; The partnering country's funding companies are mainly handling EPC
(4) Laos – China Railway	Funding: Lao company (30%), Chinese companies (70%) Loan: LCR (60% of the project cost)	<ul style="list-style-type: none"> <li>Contractor selected by bidding</li> <li>Multiple Chinese funding companies participated in EPC</li> </ul>	Joint funding by companies from both countries; The partnering country's funding companies are mainly handling EPC
(5) HSR Linking 3 Airports	Funding: Thai government, Thai companies, Chinese company Loan: Public sector – none, private sector – unknown	<ul style="list-style-type: none"> <li>(Implementation structure unknown as the construction has not started)</li> </ul>	Public-Private Partnership (PPP)

## 4. Characteristic initiatives and tasks

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# Characteristic initiatives and tasks

The following factors have been examined thus far:

2. Project overview (Basic information, purpose, developments, current status)

Focuses: Project development background, purpose and relationship with partnering countries

3. Development schemes (Overall, financing, EPC)

Focuses: Project funding / loan, EPC structure

This chapter identifies and describes other characteristic initiatives and tasks that can be used for reference:

- Handling of freight transport
- Land Acquisition
- Technical standards
- Station area development

# • Handling of freight transport

Project	Description
(1) Bangkok – Nong Khai HSR	Freight transport was considered but ruled out for this route due to the following reasons: <ul style="list-style-type: none"> <li>Using the line for both passengers and freight transport would <b>increase the project cost compared</b> to a dedicated passengers line.</li> <li>Using the line for both passengers and freight transport would have an impact on <b>operation planning and route maintenance</b>.</li> <li><b>Existing lines running in parallel</b> are being redeveloped into double-track lines. Having the HSR for both passengers and cargo transport would make the investment redundant.</li> </ul>
(2) Mumbai – Ahmedabad HSR	A dedicated line for passengers and a dedicated line for freight have been developed due to the following background and concept: <ul style="list-style-type: none"> <li>Rapid increase in railway transportation demand on existing lines led to a decision to develop a dedicated line for passengers (HSR) and another dedicated line for freight to boost transportation capacity.</li> <li><b>The dedicated freight lines are developed with wide gauge (1,676mm), the same as existing lines, while the dedicated passenger line (HSR) are developed with standard gauge (1,435mm), the same as other countries' HSR.</b></li> </ul>
(3) Jakarta – Bandung HSR	-
(4) Laos – China Railway	<ul style="list-style-type: none"> <li>Planned as a combined line for both passengers and freight transport from the beginning</li> <li>Passenger transport generates about 20-30% of total revenue, while freight transport accounts for the remaining 70-80%. <a href="#">(Source: Interview)</a></li> <li>The line is expected to reduce the cost of freight transport between China and Mekong region, but <b>its service structure is unclear</b> at present, including freight train operation plans and freight charges. <a href="#">(Source: Interview)</a></li> </ul>
(5) HSR Linking 3 Airports	-

# • Land Acquisition

Project	Land Acquisition body	Description
(1) Bangkok – Nong Khai HSR	SRT	<ul style="list-style-type: none"> <li>SRT-owned lands alongside existing lines are used as the project sites.</li> <li>Prudence is required when dealing with locals who use the land alongside the existing lines in day-to-day activities. (Source: Interview)</li> </ul>
(2) Mumbai – Ahmedabad HSR	NHSRCL	<ul style="list-style-type: none"> <li>The embankment was originally considered for the railway construction, but land acquisition struggled due to protest from landowners. In many sections, the viaduct elevation was adopted instead of the embankment.</li> <li>In the Maharashtra state, where land acquisition was slow, there was a change of state government and premier in 2022, creating a <b>pro-development government</b> and accelerating land acquisition rapidly.</li> </ul>
(3) Jakarta – Bandung HSR	KCIC	<ul style="list-style-type: none"> <li>Land along highways owned by the state-owned company (Jasa Marga) and farmlands held by the state-owned corporation (PTPN VIII) are used for project sites.</li> <li>In the process of acquiring 1838 allotments, question was raised about insufficient supervision, resulting in the acquisition of lands not earmarked for railway construction, for example.</li> </ul>
(4) Laos – China Railway	Laos government, local governments	<ul style="list-style-type: none"> <li>Land acquisition was carried out by the Laos government and local governments, instead of LCR, 70%-funded by Chinese companies, in order to <b>ensure that the Laos government becomes the land owner</b>. The Laos government provided the cost of land acquisition <b>in addition to the cost of the railway development project</b>. (Source: Interview)</li> <li>At the time of construction, priority was given to advancing the construction work rather than compensating local rights holders and conducting environmental measures associated with land acquisition. <b>Compensation has not been completed even after the service launch</b>. (Source: Interview)</li> </ul>
(5) HSR Linking 3 Airports	SRT	<ul style="list-style-type: none"> <li>SRT-owned lands alongside existing lines are used as the project sites.</li> </ul>

# • Technical standards

Project	Description
(1) Bangkok – Nong Khai HSR	<ul style="list-style-type: none"> <li>China's technical standards are applied. (Source: Interview)</li> <li>Technical standards are provided in Chinese, making it time-consuming to fully understand them. (Source: Interview)</li> </ul>
(2) Mumbai – Ahmedabad HSR	<ul style="list-style-type: none"> <li>In response to a request by the Indian Ministry of Railways, JICA provided assistance in developing judicial systems, <b>technical standards</b>, safety assurance and development of stations and station areas in preparation for the introduction of India's first HSR. These have been used for detailed design.</li> </ul>
(3) Jakarta – Bandung HSR	<ul style="list-style-type: none"> <li>China's technical standards are applied. (Source: Interview)</li> </ul>
(4) Laos – China Railway	<ul style="list-style-type: none"> <li>China's technical standards are applied. (Source: Interview)</li> </ul>
(5) HSR Linking 3 Airports	<ul style="list-style-type: none"> <li>Technical standards is unknown (as the HSR system has not been selected).</li> <li><b>Multiple technical standards</b> may end up co-existing in Thailand, depending on which HSR system is adopted.</li> </ul>

In (2), supported by Japan, assistance is provided for developing legal systems, technical standards etc. in view of the project country's current status and needs.

In contrast, (1), (3) and (4), supported by China, have adopted Chinese technical standards with no confirmed initiatives for system development assistance.

# • Station area development

Project	Description
(1) Bangkok – Nong Khai HSR	<ul style="list-style-type: none"> <li>No specific development plan has been confirmed at present.</li> <li>Integrated development is anticipated due to the proximity of stations for HSR and existing lines.</li> </ul>
(2) Mumbai – Ahmedabad HSR	<ul style="list-style-type: none"> <li>JICA is providing <b>assistance in developing station areas</b> in order to boost Indian authorities' capacity to formulate a plan for station area development.</li> <li>Japanese and Indian stakeholders are participating in <b>station area development meetings</b>.</li> </ul>
(3) Jakarta – Bandung HSR	<ul style="list-style-type: none"> <li>Development plans for areas around major stations (commercial facilities, office buildings, hotels etc) are publicly released.</li> <li>In the mean time, some point out the <b>underdevelopment of feeder transport</b> between Bandung city centre and HSR stations. <a href="#">(Source: Interview)</a></li> <li>At the stage of trial operation prior to the launch of commercial operation, the Indonesian Ministry of Transportation announced partnership with relevant organizations for promoting initiatives to improve station accessibility.</li> </ul>
(4) Laos – China Railway	<ul style="list-style-type: none"> <li>Although there are development plans for areas around five major stations, no specific progress has been confirmed. <a href="#">(Source: Interview)</a></li> </ul>
(5) HSR Linking 3 Airports	<ul style="list-style-type: none"> <li>The railway project itself has no profitability outlook, so the rights for station area development were included in PPP contract. A private-sector plan envisages the development of commercial facilities and residential facilities, etc.</li> </ul>

In (2), which Japan supports, assistance for station area development was made available from the construction stage. In (3), supported by China, there is underdevelopment of feeder transport at the stage of trial operation. The two countries' stance on station area development is very different.

# 5. Summary / considerations

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# Summary / considerations (1)

- These projects can be categorized, based on project background and relationships with partnering country, into (A) projects in which geographical proximity with a partnering country is considered, (B) projects that involve inter-governmental agreement based on a partnering country's proposal and (C) projects that go ahead without a specific partnering country.
- These projects also can be categorized, based on funding and EPC structure, into (a) public works, (b) jointly funded projects by two countries, and (c) PPP projects.

	(A) Projects in which geographical proximity with a partnering country is considered	(B) Projects that involve inter-governmental agreement based on a partnering country's proposal	(C) Projects that go ahead without a specific partnering country
(a) Public works	Bangkok – Nong Khai HSR	Mumbai – Ahmedabad HSR	-
(b) Jointly funded projects by two countries	Laos – China Railway	Jakarta – Bandung HSR	-
(c) PPP projects	-	-	HSR Linking 3 Airports

(Considerations) In order to broaden Japan's scope of overseas deployment of its HSR system, it is important to formulate strategy, system and structure that facilitate participation in projects under diverse development schemes.

# Summary / considerations (2)

Examination focused on characteristic initiatives and tasks has found that:

- The project supported by Japan implemented the following types of initiatives at relevant stages:
  - Technical standards: Assisting the development of legal and technical standard systems at the design stage
  - Station area development: Assisting the development of station areas at the construction stage
- In contrast, the projects supported by China do not appear to implement similar initiatives based on document research and interviews with stakeholders.
  - Technical standards: Applying China's technical standards
  - Station area development: Declaring feeder transport's development policy at the stage of test operation

(Considerations) One of the differences between projects supported by Japan and those supported by China is the existence or absence of systematic software support in stages corresponding to project countries' status and needs. Japan's overseas deployment in the railway field, not limited to HSR, involves the application of diverse software supports. Those experience and achievements can be highlighted in promoting future overseas deployment.

**Thank you very much.**

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# **The 158th Transport Policy Colloquium -ASEAN-India Regional Report- Analysis of HSR development schemes in Southeast and South Asia**

## **Q&A**

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**January 15, 2024**

**Japan Transport and Tourism Research Institute ASEAN-India Regional Office**  
**Yusuke Minami, Research Fellow**

- This report examined five projects in Southeast and South Asia. If seen in a broader perspective, what elements would present universality or uniqueness of these projects?



(A broader perspective → Interpreted as a regional perspective or perspective of railway categorization)

- Universality
  - Diverse development schemes
  - Bi-polarization between public works projects and projects using overseas capital / private-sector capital
  - Tendency for the project cost to increase and the project duration to extend compared to what was initially planned
- Uniqueness
  - Partnering countries sharing project risks (Indonesia, Laos)
  - HSR under a greater impact from political factors compared to urban rail systems?

○The approach of combining railway development / administration with station area development (land development) is important in terms of improving project profitability. What are challenges in this approach?



- This approach would increase the overall project cost. If single entity is to handle both, the hurdle for raising and recovering fund becomes higher.
- In order to maximize gains from both railway operation and station area development, it is necessary to conduct systematic development from the perspective of project scheduling. (Maximum gain cannot be achieved if only one of the two is launched first)
- The challenge is whether a business entity can be established to efficiently and economically manage railway development, railway operation and station area development.

○The report highlights several directions that Japan should follow in the future. What do you think are Japan's strengths?



- Software support (already mentioned)
- Long-term and low-interest yen loans
- High-quality overseas infrastructure deployment (e.g. A Japanese company provides maintenance work to the Purple Line of Thailand's urban rail network. It has a lower rate of transport faults compared to other lines.)
- Safety, life cycle cost etc.