

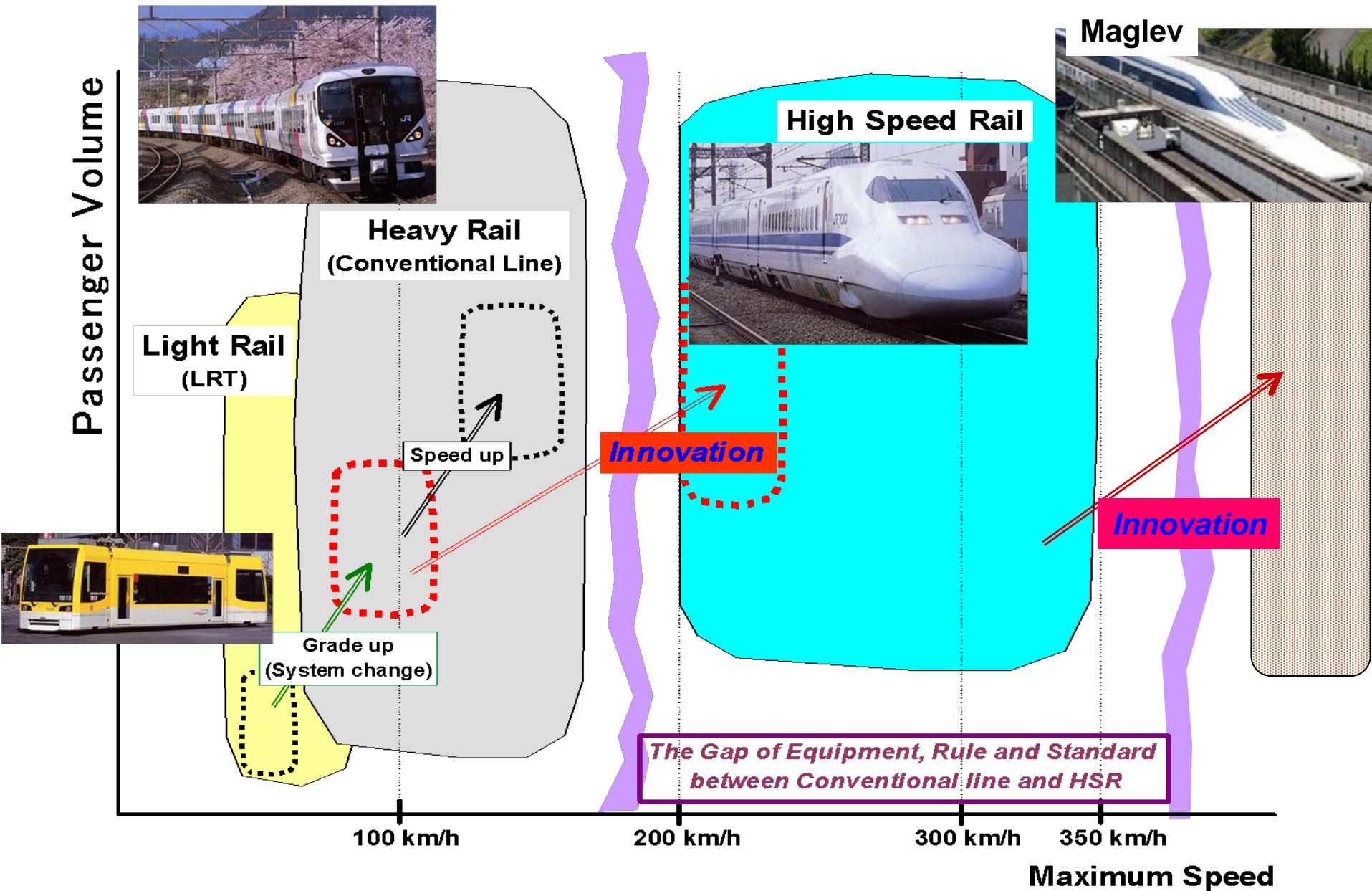


Introduction to High Speed Rail



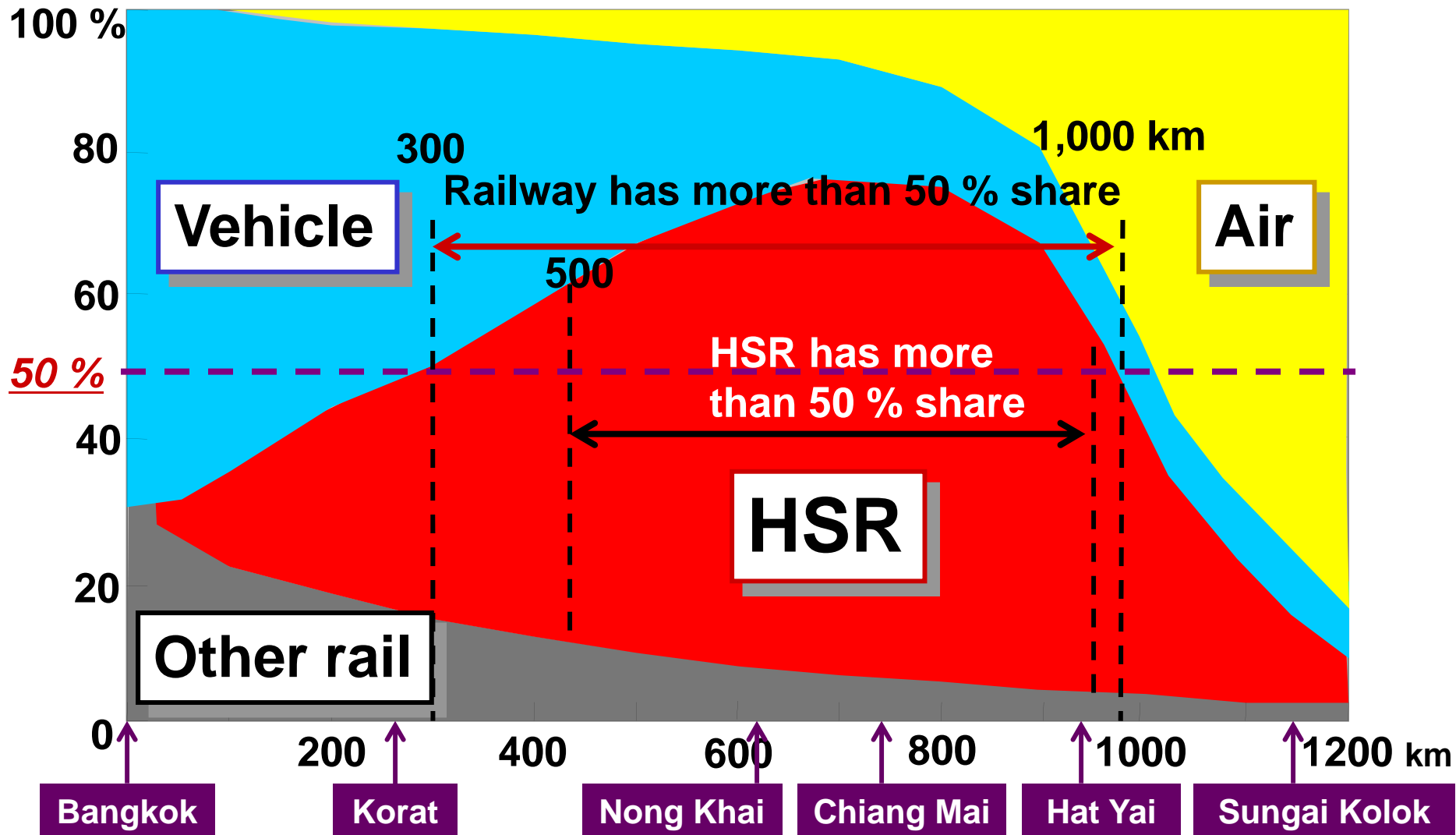
Overall understanding about HSR

Rail Classification by Speed & Capacity



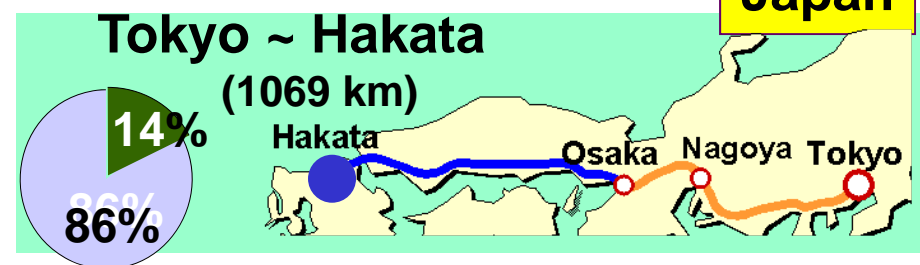
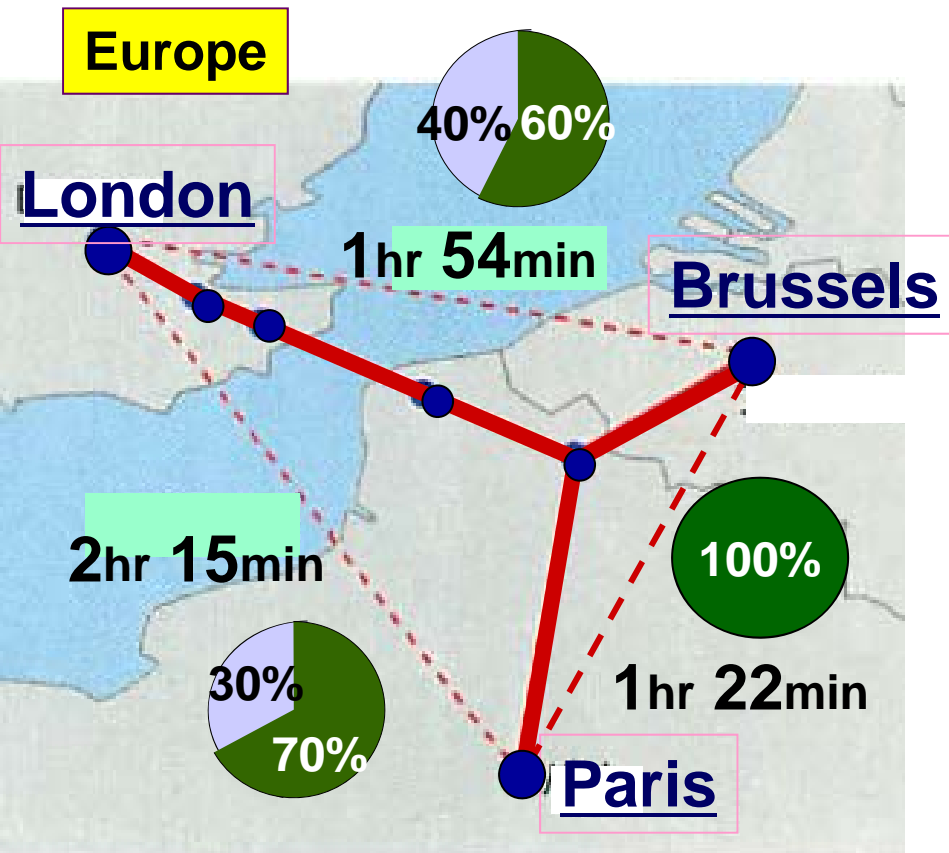
Target of HSR (Market share of railway)

Share and journey distance



Travel time and share

Rail is dominant over air for shorter than 3 hours' travel.



Shorter Travel time is the key in HSR design.

Change in train diagrams

2 trains / hour

Tokyo ~ Osaka

Headway at peak time

13 trains / hour

3 minutes interval

1964

2011

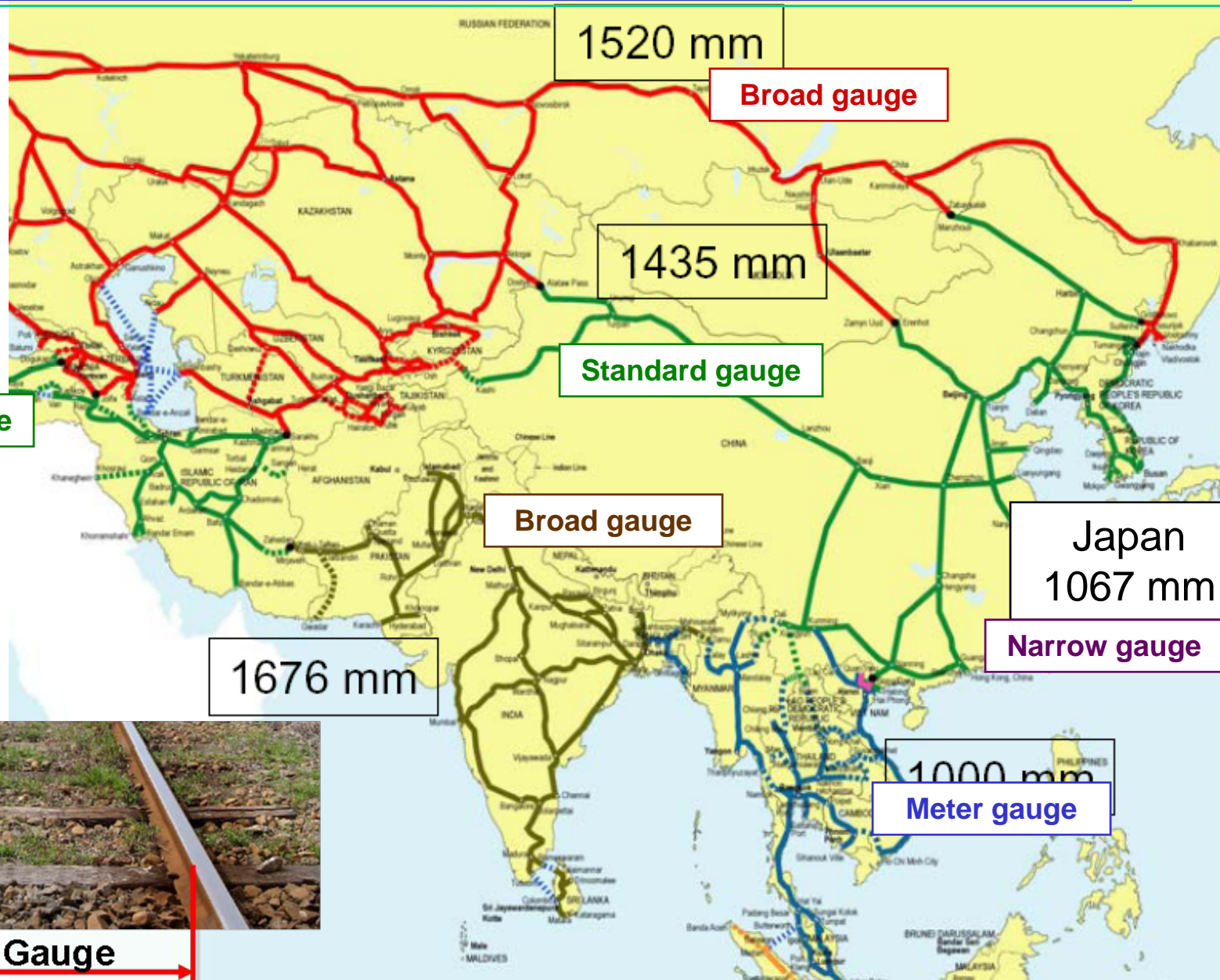


Trains; 336/day in 2013 (11 ~ 13 trains/hour/way), 60 /day in 1964,
Passengers; 0.4 million/day, Income; 330 billion Baht/year,
Number of cars; Approx 3000 (JR-C + JR-W),
Maximum speed; 270 km/h, Travel time (Tokyo~Osaka); 2:25 (Express)
Fare (Tokyo~Osaka); 1,700 Baht,

Gauge and Operation

Dedicated or mixed operation ?

Track Gauge in Asia



Track Gauge




TGV network in France



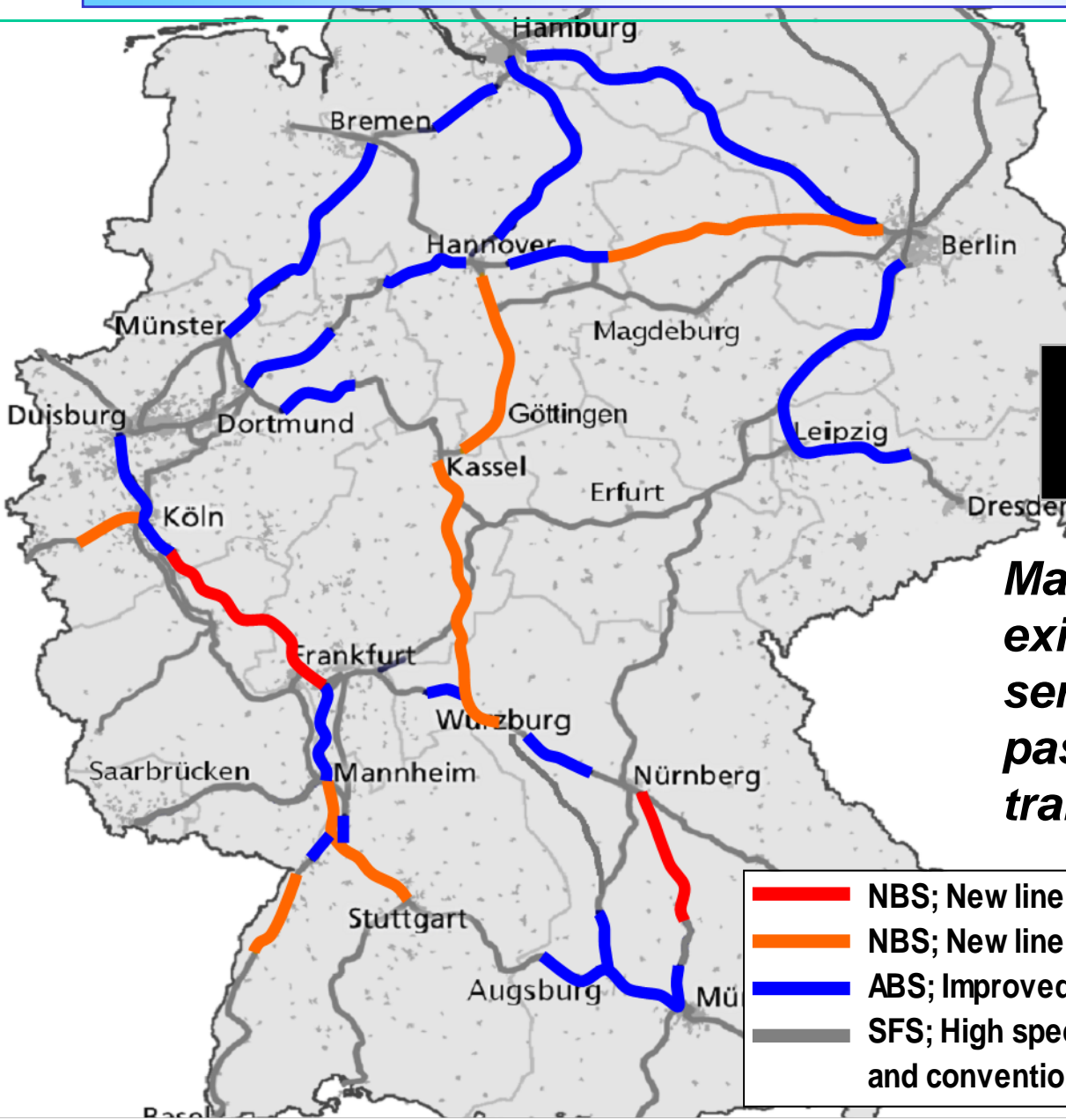
**Conventional rail is
Standard gauge**



***Many TGV trains
operate on existing
lines by mixed
services with
conventional
passengers trains.***

-  LGV; New line for HSR
-  New line for HSR
-  Conventional line with TGV operation






HSR (ICE) Network in Germany



**Conventional rail is
Standard gauge**

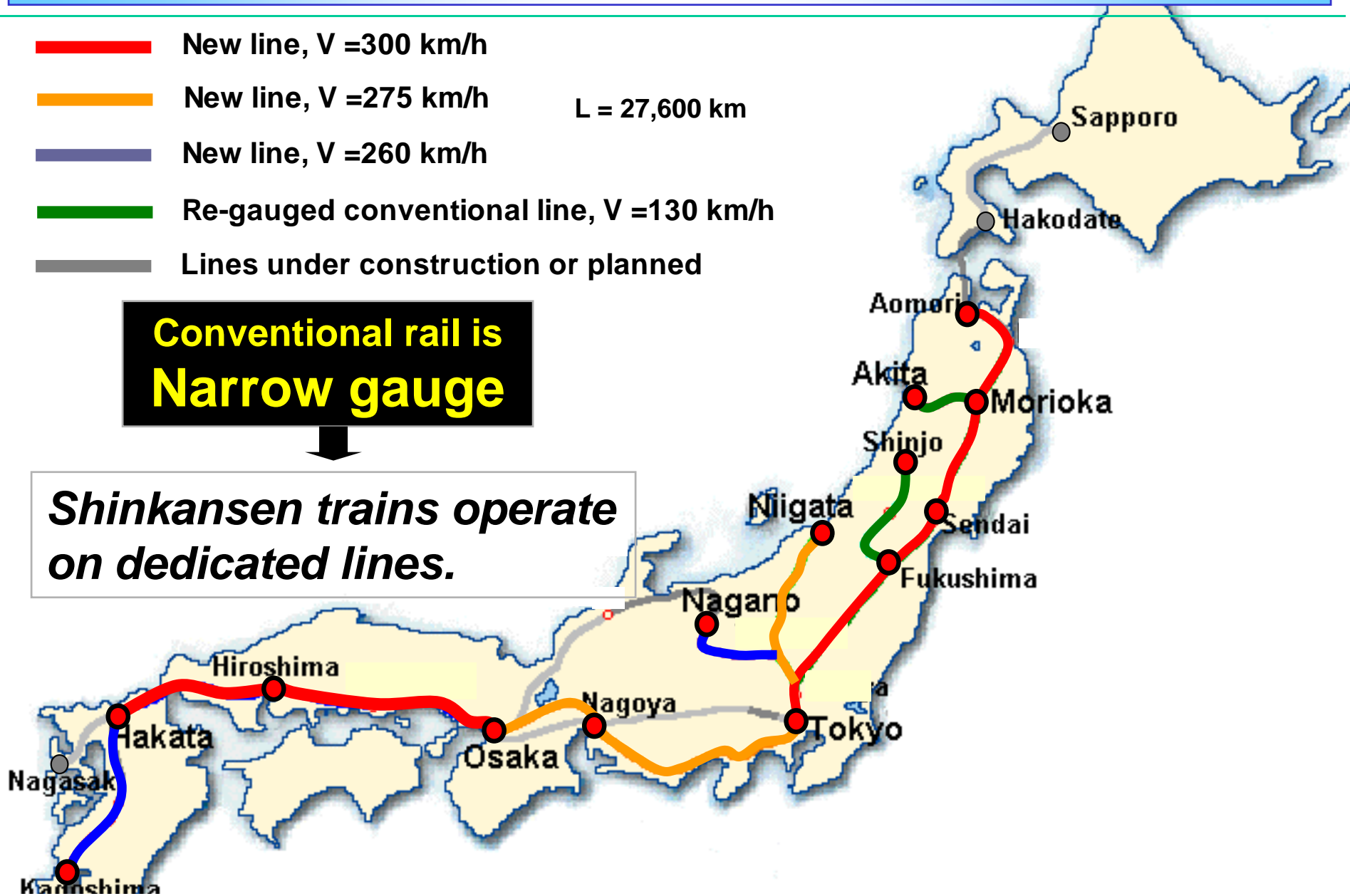
Many ICE trains operate on existing lines by mixed services with conventional passengers and freight trains.

HSR (Shinkansen) network in Japan

-  New line, $V = 300$ km/h
 -  New line, $V = 275$ km/h
 -  New line, $V = 260$ km/h
 -  Re-gauged conventional line, $V = 130$ km/h
 -  Lines under construction or planned
- $L = 27,600$ km

**Conventional rail is
Narrow gauge**

***Shinkansen trains operate
on dedicated lines.***



HSR Plan in Thailand



**Existing SRT rail is
Meter gauge**



Thai HSR shall be dedicated rail.



Existing SRT network will be used for

- ***Commuter services***
- ***Regional transport***
- ***Freight services***

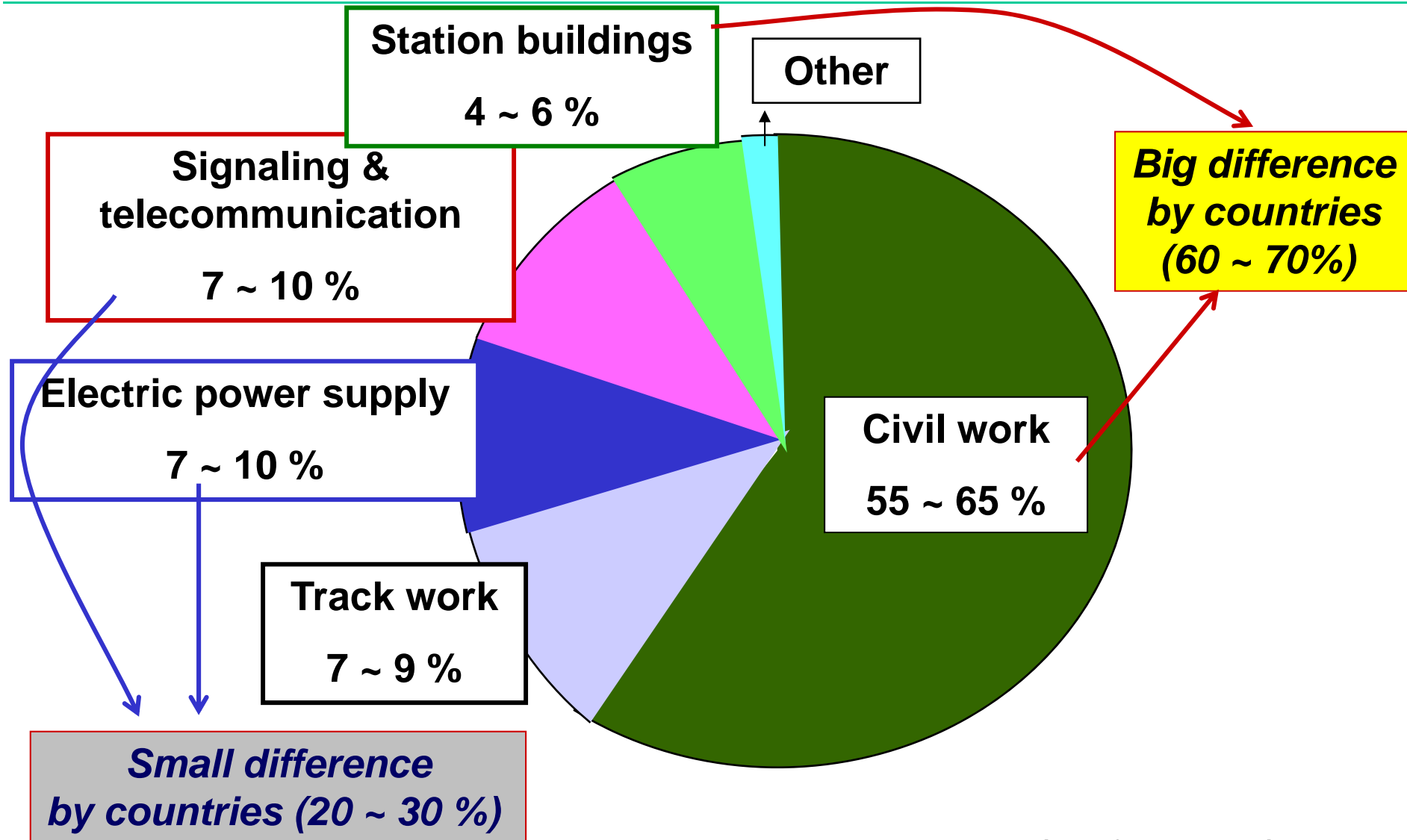
(NE); Bangkok ~ Nong Khai, 610 km
(S); Bangkok ~ Hua Hin ~ Padang Besar, 980 km
(E); Bangkok ~ Rayong, 220 km
(N); Bangkok ~ Phitsanulok ~ Chiang Mai, 680 km

Maximum speed; 250 ~ 300 km/h

Travel time; Bangkok ~ Chiang Mai = about 3 hours

Construction Cost

Typical proportion in Construction Cost

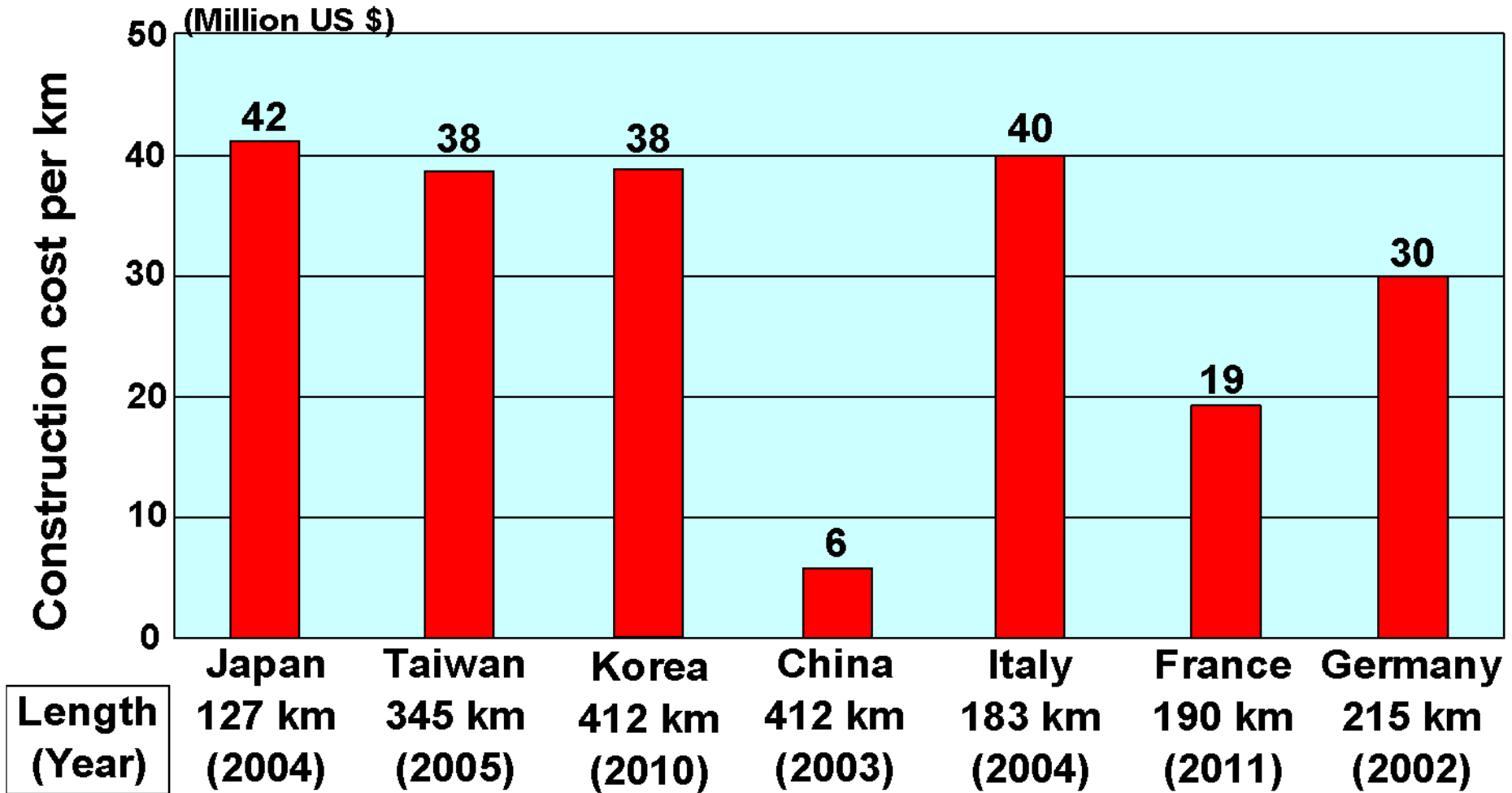


Estimate from records in Japan

Not including Rolling stock, land procurement, design, Management fee etc.

Construction cost of HSR in the world

Recent unit cost of HSR



Note; These figures are rough estimate because construction cost largely depends on many conditions, such as major civil structure (tunnel or bank), station, local labor cost, land price etc.

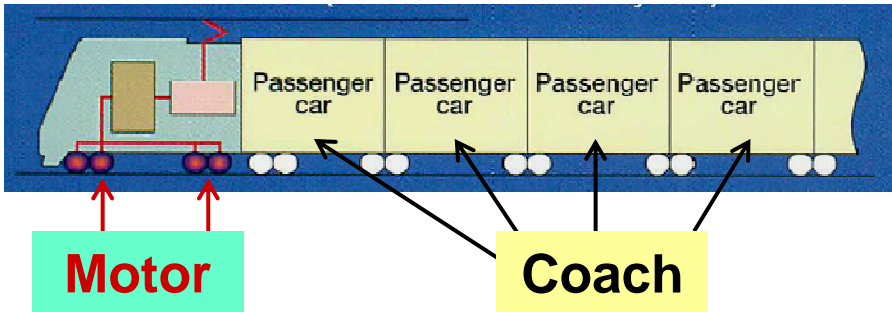
Rolling stock

EMU or Push-pull ?

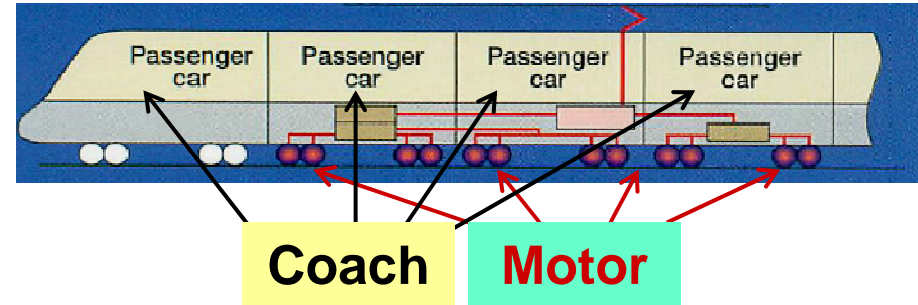
EMU and EL (Locomotive)

Two types of the rolling stock for HSR

Locomotive



EMU (Electric Multiple Unit)



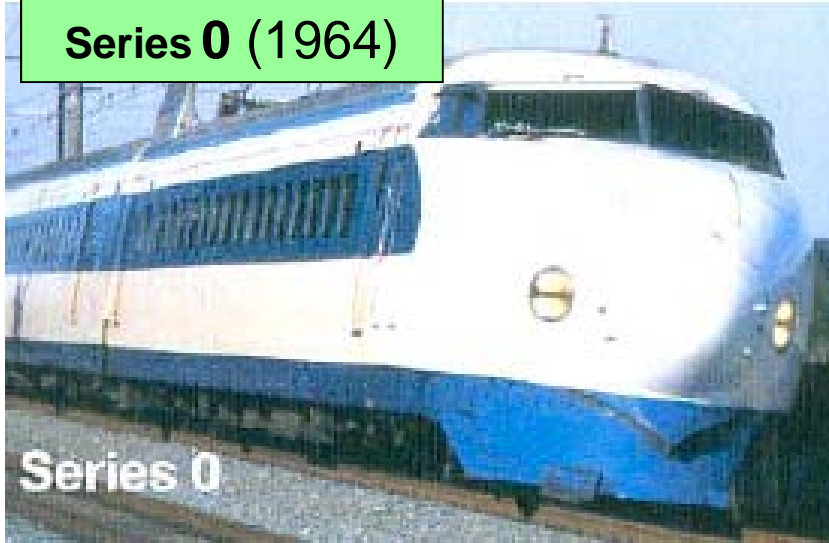
General characteristic of the two types (Cost, operation and maintenance)

Station spacing, Headway Train length	Short	Long
	Long (> 10 ~ 12 cars/train)	EMU Locomotive
Short (< 10 ~ 12 cars/train)	EMU	EMU Locomotive

EMU is becoming the world standard.

History of Shinkansen Train (EMU)

Series 0 (1964)



Series 500 (1997)



E5 (2013)



N700 (2007)



European HSR Train (EMU, EL)

France

TGV (EL)



AGV (EMU)



Germany

ICE 2 (EL)



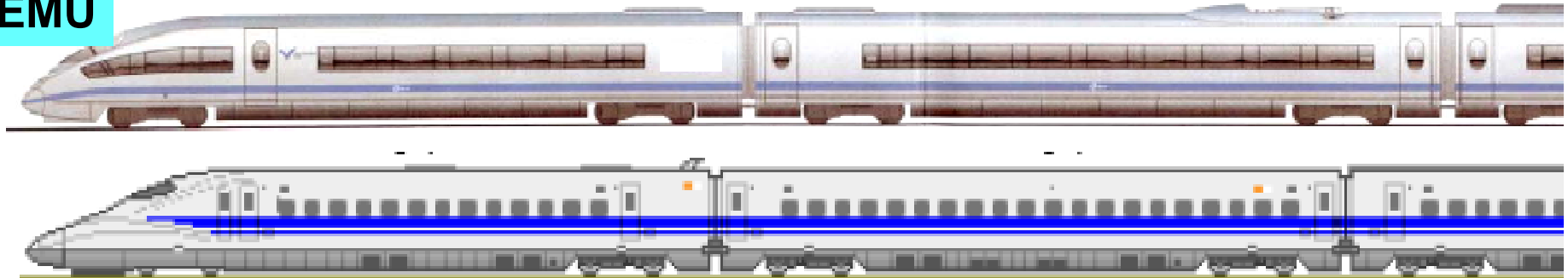
IEC 3 (EMU)



Tendency of train type for HSR

Train type		EMU	EL (Locomotive)
Year	1964~1981	Shinkansen	
	1981~2000	Shinkansen	ICE, TGV
	2000~Now	Shinkansen, ICE-3, AGV	ICE (1,2), TGV

EMU



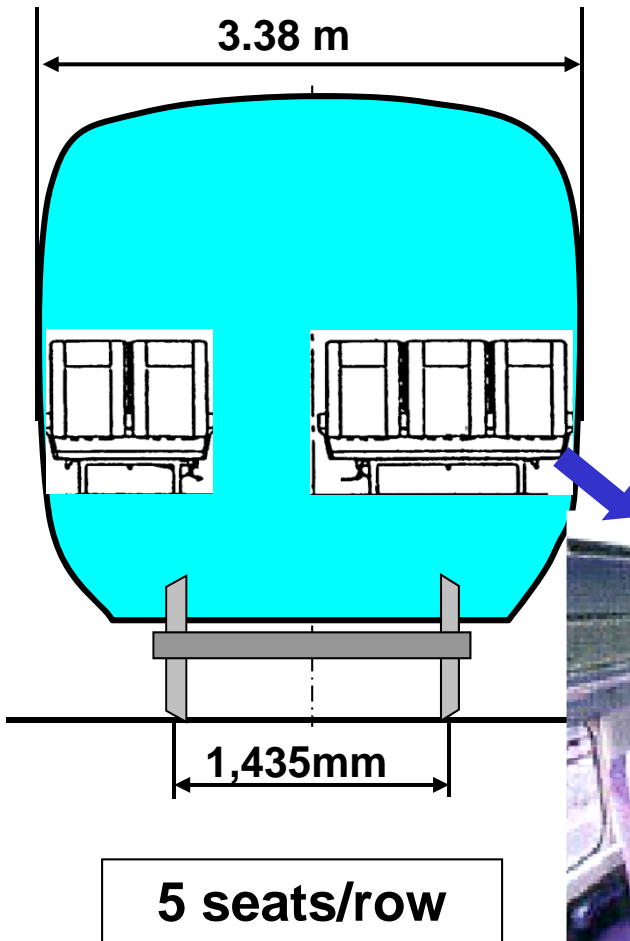
EL (Push-pull locomotive type)



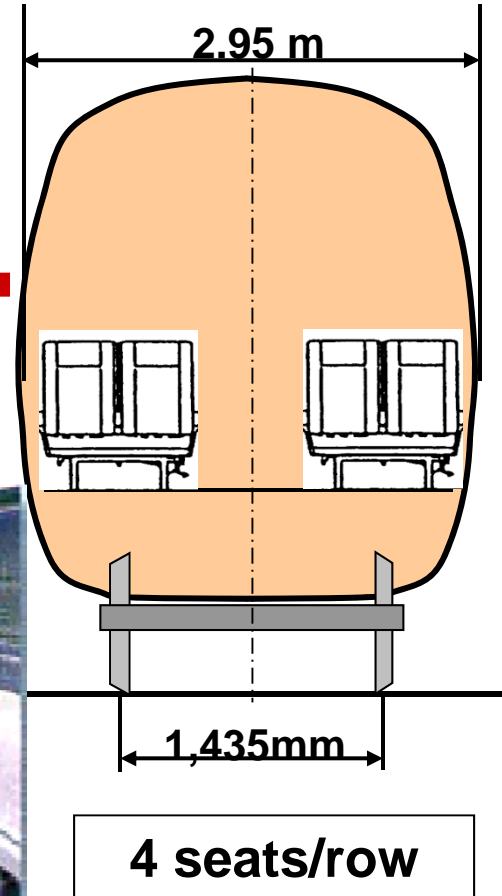
Size of HSR train

(for dedicated track or existing track)

Dedicated track for Shinkansen



UIC Standard for HSR and conventional rail



Thank you