



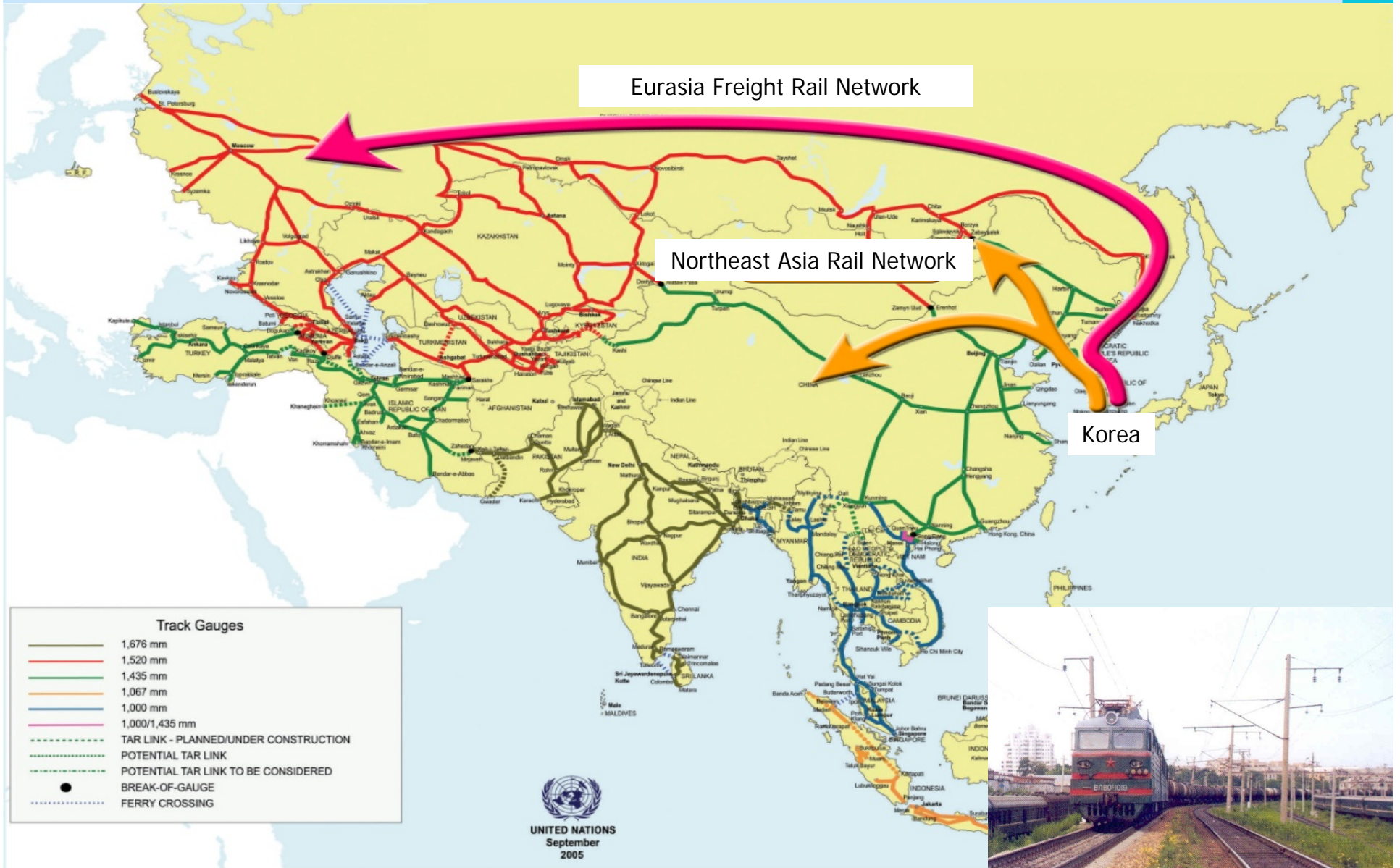
**Strategy of Trans-Korean Railway Transportation
and Development of International Corridors**

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Current status of inter-Korean transportation cooperation

- Reconnecting **Gyeongui-Line** and **Donghae-Line**
 - The most typical example of infrastructure cooperation
 - not only for the Korean Peninsula
 - but also for Northeast Asia in terms of trans-continental railway systems.
- Dream of linking the **Trans-continental Railway**
 - accelerate the building of inter-Korean consensus and the two railway lines can be used as trunk corridors for Korea, China, Russia, Central Asia and Europe. (*Global logistics revolution*)
 - Peace for Korean peninsula (*Mutual Trust*)
 - *new opportunities and challenges* for the 110-year-old Korean railway system

Current status of inter-Korean transportation cooperation



Current status of inter-Korean transportation cooperation

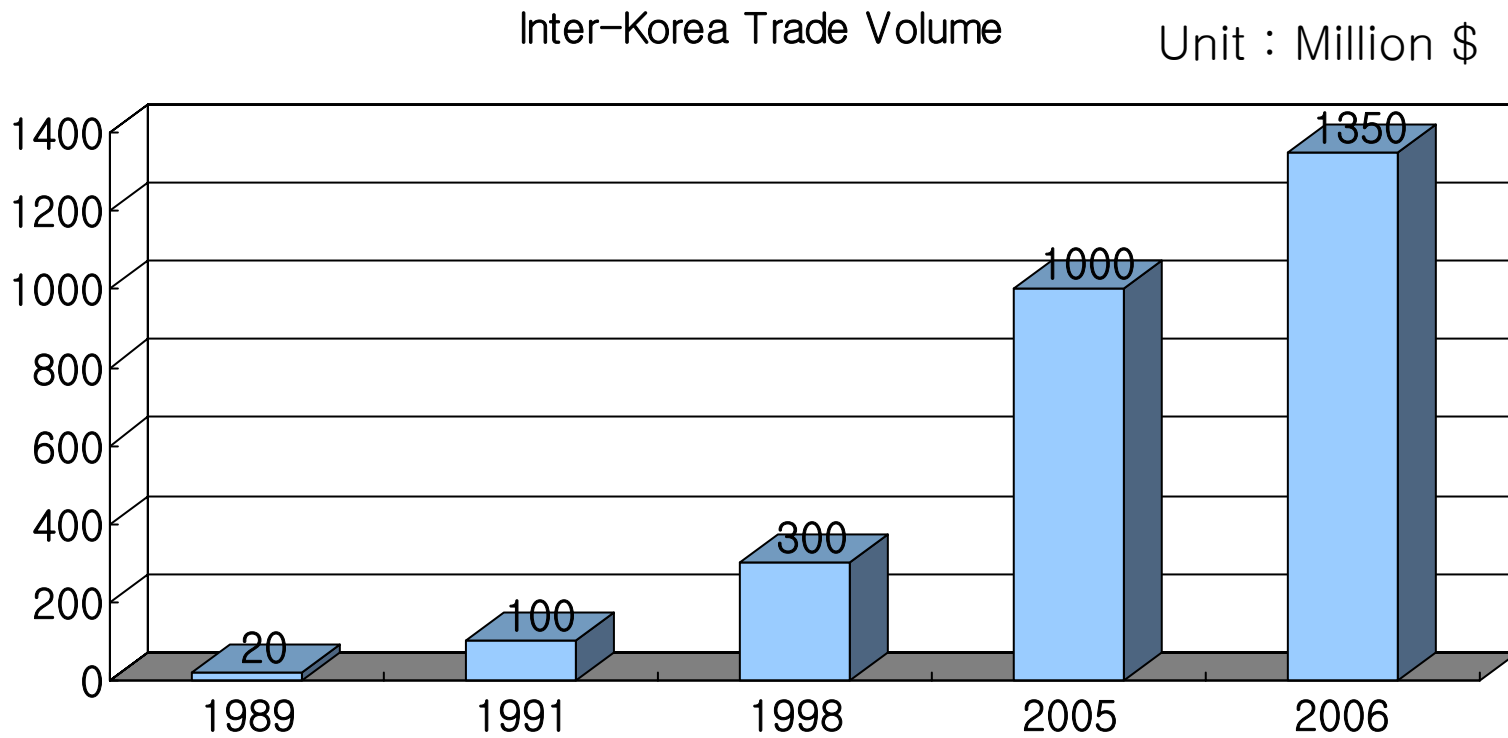
- Regular freight train service across the DMZ
 - **Opened** : Dec. 11. 2007
 - South : completed most of works
 - North : completed everything except part of the station buildings, signal and communication facilities.
 - South Korea supplied materials and equipments for North Korea, adopted the inter-Korean train operation agreement, and is making preparations for logistics after the operation.



Current status of inter-Korean transportation cooperation

- Effects of railway connection
 - transportation time and costs will be reduced
 - greatly contributing to economic cooperation between the two Koreas.
 - symbolizes for the basis of unification of two koreas
 - important policy projects for raising the inter-Korean relationship a notch higher and opening a new age of Northeast Asian cooperation.
- In particular, considering the fact that railroads must be at least 400km long to be economically viable, railroads will play a greater role in the Korean Peninsula and the inter-Korean railway operations will bring great economic benefits.
 - To this end, TKR must be completed as soon as possible

The Prospect of inter-Korean transportation cooperation



- S. Korea was the 2nd most important trade partner of N. Korea in 2005 and 2006.

The Prospect of inter-Korean transportation cooperation

- Most salient characteristic of North Korean land transportation
 - relies more in railroads than roads.
 - **90% of cargo** transportation as of 1998.
 - 62% of passenger transportation as of 1998.
- Operational status of inter-Korean railway
 - Temporary operation agreement for **roads are utilized first**.
 - However, this preponderant reliance on roads is attributed to the revitalization of the special zone projects in the border area and the regional limitations due to the competitive edge of roads due to proximity
 - **North Korea wants to** modernize their transportation infrastructure **with focus on railroads rather than on roads**.

Comparison and Connection of S-N Korean Railways

Comparison of the Present Statuses of the South and North Korean Railways

Classification	S. Korea	N. Korea
Lines	- X-shape - Total 88 lines (24 main lines)	- H-shape - More than 100 lines (17 main lines)
Operating km	3,399km	5,214km
Ratio of Electrification	53.6%	80.4%
Ratio of Double Track	41.3%	3%
Max. Train Speed	- Passenger: 300km/h - Freight: 120km/h	- Passenger: 50km/h - Freight: 40km/h

※ Source: "major Indexes and Statistics of N. Korea" KORAIL (2008) et al.

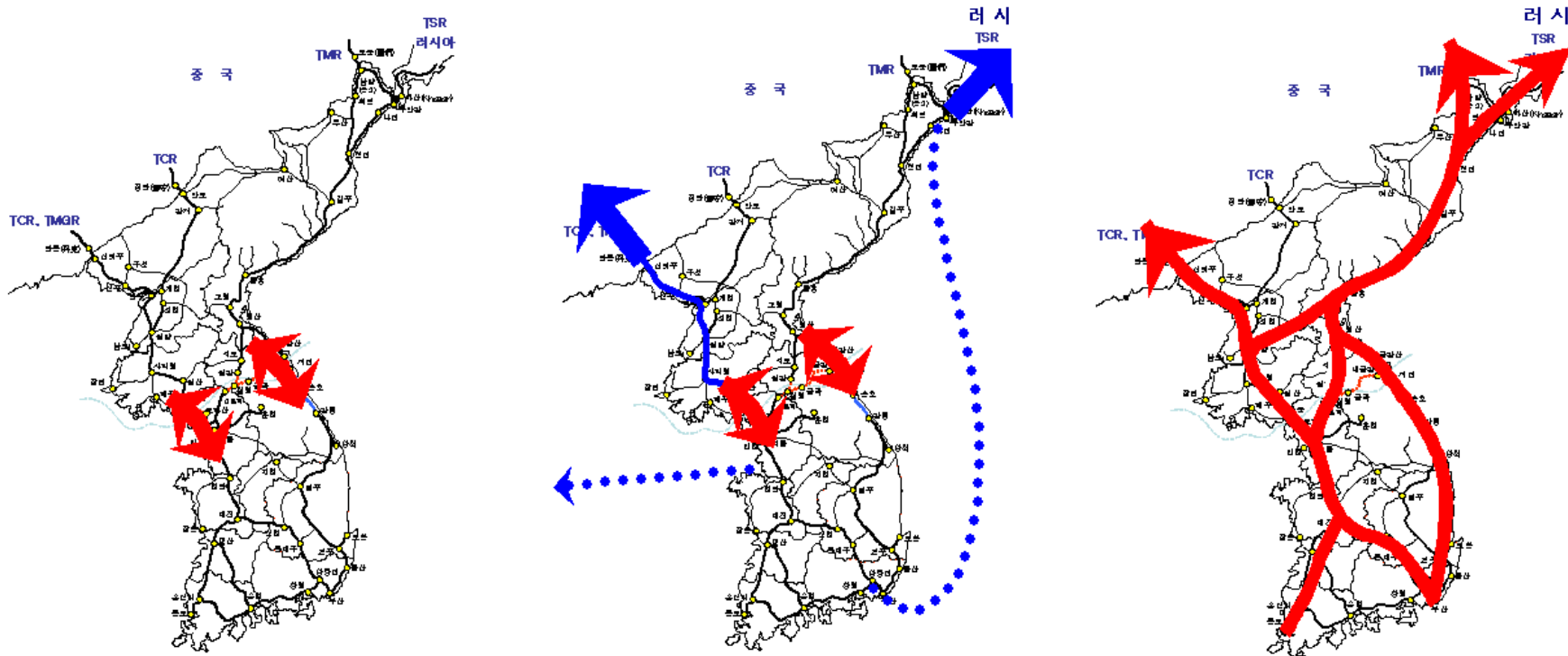
Connection Cases

- Commenced connection works of the Gyeongui Line (2000) and Donghae Line (2002), provided N. Korea with necessary construction materials and equipments. After adopting the Agreement on the Train Operation between S-N Korea, the first freight train had run Munsan-Bongdong, which was suspended Dec. 2008 due to political conflict.

Strategy of Trans-Korean & transcontinental railway connection

- **Objective** : Reviving North-Korean economy, Unification of South-Korean and North-Korean economy, Strengthen the competitiveness of Korean peninsular, SOC of Northeast-Asia.
- **Strategy of Trans-Korean & transcontinental railway connection**
 - Eurasian freight railway
 - Northeast-Asian passenger & freight railway
- **Stepwise development of Trans-Korean & transcontinental railway connection**
 - 1st Phase : North & South Korean Border – Missing link restoration
 - 2nd Phase : Korean-Chinese Border & Korean-Russian Border - Improvement
 - 3rd Phase : Reconstruction of TKR (Double tracking, High speed)
- “(1st Phase) Minimum repairing of TKR → Profit on logistics business / Reinvestment → (2nd Phase) Improvement of TKR → Logistics business expansion / International consortium → (3rd Phase) Modernization of TKR → Eurasian Land Bridge”

Roadmap to S-N Korean Railway



Phase 1	Phase 2	Phase 3
Connection between S-N	Improve N. Korean Railroad	Modernize N. Korean Railroad
Minimum maintenance of N. Korean railroad → create/reinvest profits from transportation business	Improve N. Korean railroad → expand transportation business, organize an international consortium	Modernize N. Korean railroad to a 'new' railroad → complete Eurasia Land Bridge

Methodology of Railway Transportation Demand in N. Korea

Concept and Method

- To estimate the demand for the integrated railway network of the Korean Peninsula, the demand for the following 4 regions are estimated;
 - ① Inside N. Korea
 - ② Between S-N Korea
 - ③ Korea-China (NE) and Korea-Russia
 - ④ Between N. Korea and China and Russia



Conceptual Diagram of Demand Estimation

Railway Transportation Demand of Major Railway Lines in N. Korea

Estimated volume by Status Quo Scenario (2030)

Unit: 10,000 ton

Major Trunk Lines			In N. Korea	S-N Korea	Korea- China/Russia	N. Korea- China/Russia	Total
Gyeongui Line	Pyongan Area	Sineuiju-Suncheon	783.9	-	1,201.7	610.1	2,595.7
		Suncheon-Pyongyang	914.6	685.3	1,201.7	488.08	3,289.7
		Pyongyang-Sariwon	783.9	685.3	1,201.7	122.02	2,792.9
	W. Sea Area	Sariwon.-Gaeseong	522.6	685.3	1,201.7	122.02	2,531.6
		Gaeseong.-Seoul	-	7176.7	1,201.7	-	8,378.4
Donghae Line	Hambuk Area	Najin-Cheongjin.	522.6	-	573.4	152.5	1,248.5
		Cheongjin-Gimchaek	914.6	201.9	573.4	91.5	1,781.4
		Gimchaek-Hamheung	1,110.6	201.9	573.4	91.5	1,977.4
	Hamnam Area	Hamheung.-Gowon	1,437.2	388.3	573.4	76.25	2,475.2
		Gowon-Wonsan	522.6	388.3	573.4	45.75	1,530.1
	Gangwon Area	Wonsan-Goseong	392.0	507.5	573.4	15.25	1,488.2
		Goseong-Sokcho	-	507.5	573.4	-	1,080.9
Pyongwon Line	Pyongyang-Sinyang	1,032.2	-	-	152.52	1,184.7	
	Sinyang-Gowon	940.7	-	-	152.52	1,093.2	

Railway Transportation Demand of Major Railway Lines in N. Korea

Transportation Volume by Optimistic Scenario (2030)

Unit: 10,000 t/year

Major Trunk Lines		In N. Korea	S-N Korea	Korea- China/Russia	N. Korea- China/Russia	Total	
Gyeongui Line	Pyongan Area	Sineuiju-Suncheon	783.9	-	1,201.7	817.8	2,803.4
		Suncheon-Pyongyang	914.6	7,382.7	1,201.7	654.24	10,153.2
		Pyongyang-Sariwon	783.9	7,382.7	1,201.7	163.56	9,531.9
	W. Sea Area	Sariwon.-Gaeseong	522.6	7,382.7	1,201.7	163.56	9,270.6
		Gaeseong.-Seoul	-	13,901.1	1,201.7	-	15,102.8
Donghae Line	Hambuk Area	Najin-Cheongjin.	522.6	-	573.4	204.4	1,300.4
		Cheongjin-Gimchaek	914.6	4,847.0	573.4	122.64	6,457.6
		Gimchaek-Hamheung	1,110.6	4,847.0	573.4	122.64	6,653.6
	Hamnam Area	Hamheung.-Gowon	1,437.2	7,210.1	573.4	102.2	9,322.9
		Gowon-Wonsan	522.6	7,210.1	573.4	61.32	8,367.4
	Gangwon Area	Wonsan-Goseong	392.0	12,057.1	573.4	20.44	13,042.9
		Goseong-Sokcho	-	12,057.1	573.4	-	12,630.5
Pyongwon Line		Pyongyang-Sinyang	1,032.2	-	-	204.44	1,236.6
		Sinyang-Gowon	940.7	-	-	204.44	1,145.1

Problems in South Korean Railway when Integrated

Analysis on the problems of S. Korean railway

- After S-N railway network integration, the final destination of transportation will be the metropolitan area and Busan and Gwangyang ports. The railway capacity should be considered accordingly.
- For the metropolitan area, S-N railways should be connected by the Gyeonggi Line. Presently, the railway network in the area is a radial shape, and all lines lack the capacity to transfer the freight between S-N Korea.

Problems in the Metropolitan Area Railway Network

Section	Expected Problem
Gyeonggi Line, Munsan-Susaek	May conflict with the metropolitan electric railway function
Gyeongbu Line, Seoul-Siheung	Increasing line capacity by signal system improvement, etc., will not be sufficient

Problems in South Korean Railway when Integrated



Direction of Metropolitan Area Railway Improvement

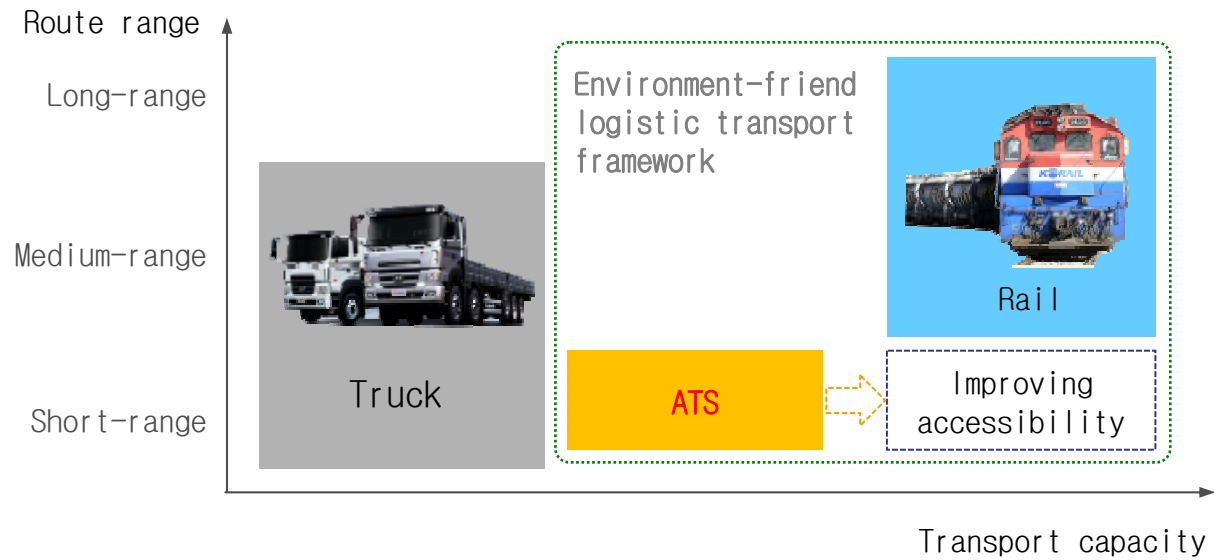
- Western roundabout route: Daegok-Sosa-Wonsi-Hwayang
 - Eastern roundabout route: via Chungbuk Line-Jungang Line to Gyeongseui/Gyeongwon Line
 - Eastern roundabout route is longer, requiring improvement to double track
-
- If the international logistics business of the Eurasia Continent is established in short earlier, use the eastern roundabout route as a replacement, and invest in the western roundabout route on long-term basis.



※ Source: Ministry of Territory and Marine Affairs

Plan of Korean ATS

System Definition

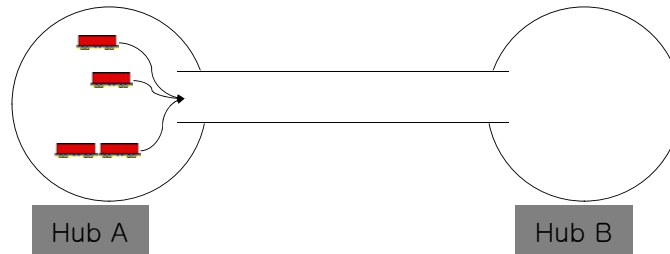


System	Loading capacity (FEU)	Max velocity (Km/h)	Transport capacity	Transport capacity (%)
Truck	1	80	80	2.6%
ATS	4	80	320	10.6%
Rail	30	100	3000	100%

Plan of Korean ATS

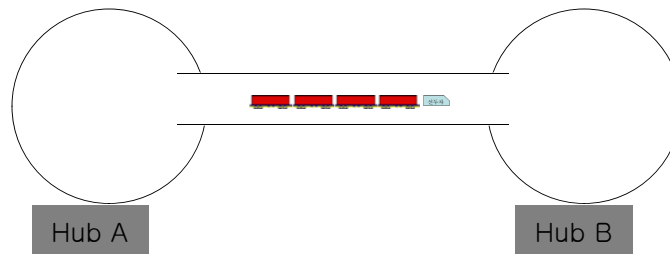
ATS Operations

(1) Gathering operation: load a target container, then move to collecting position by individual unit in origin



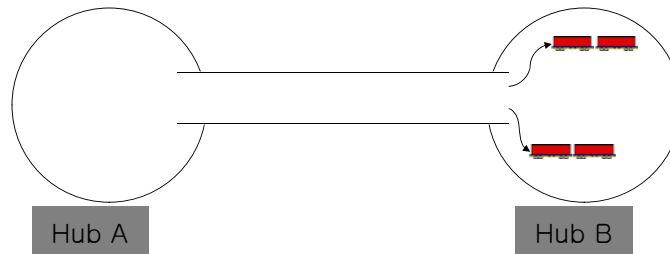
[Animation 1](#)

(2) Hub to Hub operation: couple a fleet composition, then run to destination



[Animation 2](#)

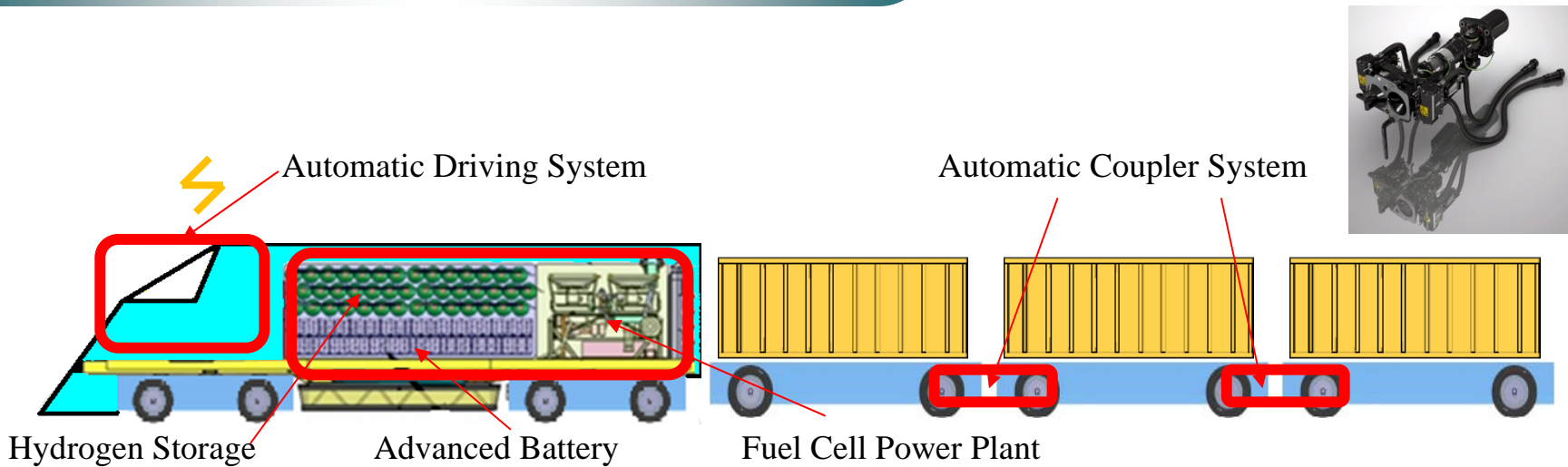
(3) Unloading operation: decouple the fleet composition, then move to unloading position by individual unit.



[Animation 3](#)

Plan of Korean ATS

Technology Elements Locomotive



- Traction power : Fuel cell, battery, and CNG (conditional)
- Automatic coupler system
- Automatic driving system : both for manned and unmanned systems

Conclusion

- The construction of the logistics and transportation system is an important issue in the economic relations between the two countries.
 - **In the short run, break the bottlenecks** in logistics as the trade between the two Koreas is reinvigorated and secure a stable and cost-effective transportation route,
 - **In the long run, the completion of the TKR** will lead to the development of a strategic international multimodal transport route connecting to Northeast Asia and Europe.
- Since it is logistics and transportation that will serve as the backbone of the inter-Korean economic cooperation, their revitalization will lead to the reinvigoration thereof.
- In this sense efforts must be concentrated on establishing policies and systems relating to the inter-Korean logistics and transportation, in particular, land and marine logistics.



Thank you.