Korea National Railway
Building Green Rail Network

Hong Kwon, KIM
Director
Overseas Railway Project Team of Korea National Railway
At a Glance for Korea National Railway

**Korea Railway Structure**
- MOLIT: Railway Policy and Investment Program
- KORAIL, SR: Railway operation

**General Information**
- **State-owned Agency** established in 2004
- **Annual Budget**: USD 8 billion (’23)
- **Credit Rating**: Domestic AAA, Moody’s Aa2

**National Railway Network**
- **’03 Total Length**: 3,374km
- **’23 Total Length**: 4,304km
- **’03 Double Track Rate**: 22%
- **’23 Double Track Rate**: 70.04%
- **’03 Electrified Rate**: 33%
- **’23 Electrified Rate**: 79.9%
KNR Business Area

- KNR’s has 7 key business areas including working with the MOLIT on railway network planning.
- KNR has comprehensive knowledge and experience in railway project management throughout all stages.

Business Area

1. Railway network planning
2. Project management
3. Railway construction
4. Railway facilities management
5. Training & consulting
6. Station area and railway land development
7. Overseas railway projects

PM Capabilities

- Planning stage management
- Design Control
- Construction management (Supervision & Inspection)
- Interface management
- Verification, testing & commissioning

Economical, Safe and Efficient Railway
4th National Rail Network Plan

- Performance goals by 2030 are total length 5,340km(from 4,304km) and modal share 16.5%(from 11.5%)
- Key activities are expansion of eco-friendly railways, speed upgrading and Alleviating traffic congestion by GTX

Performance goals by 2030
Total length: 5,340 km
Modal share: 16.5%
Total investment: USD 90 billion

Key activities
- Expansion of eco-friendly railways
- Carbon neutrality
- HSR linked major hubs
- Speed upgrading of existing lines
- Alleviate traffic congestion in the capital region by GTX
KNR constructed the three HSRs over 300 km/h and total 657 km in length in Korea as of today.

- Suseo HSR line opened in 2016 to provide HSR services to southern districts of Seoul.

**Honam HSR**
- Distance: 183.8km
- Budget: USD 10 billion
- Opened in Apr 2015

**Suseo HSR**
- Distance: 61.1km
- Budget: USD 3.4 billion
- Opened in Dec 2016

**Gyeongbu HSR**
- Distance: 412.5km
- Budget: USD 19 billion
- Phase 1 opened in Apr. 2004
- Phase 2 opened in Nov. 2010
1. Gyeongbu Line (Seoul – Busan)
   - Length: 444.5 km
   - Speed: 120 → 140 km/h

2. Jeolla Line (Iksan – Yeosu)
   - Length: 180.4 km
   - Speed: 150 → 230 km/h

3. Gyeongchun Line (Seoul – Chuncheon)
   - Length: 80.4 km
   - Speed: 150 → 180 km/h

4. Jungang Line (Wonju – Jecheon section)
   - Length: 44.1 km
   - Speed: 120 → 250 km/h

5. Jungang Line (Dodam – Yeongcheon section)
   - Length: 25.5 km
   - Speed: 130 → 250 km/h

6. Jungang Line (Yeongcheon – Singyeongju section)
   - Length: 107.6 km
   - Speed: 120 → 200 km/h

7. Donghae Line (Singyeongju – Bujeon)
   - Length: 46.5 km
   - Speed: 150 → 200 km/h

8. Seohae Line (Hongseong – Daeya section)
   - Length: 86.6 km
   - Speed: 150 → 250 km/h

9. Seohae Line (Daeya – Iksan section)
   - Length: 14.3 km
   - Speed: 90 → 250 km/h

10. Gyeongjeon Line (Gwangyang – Jinju)
    - Length: 180.4 km
    - Speed: 150 → 230 km/h

There are 10 lines covering 1,462 km upgraded to 200-250 km/h. EMU-260 rolling stocks are operating on the Upgraded lines.
Great Train eXpress

✓ GTX is high-speed commuter rail network and public-private partnership Project
✓ GTX enable commuting within the capital region in and around 30 minutes

Current Status
• 21 lines totaling 1,112 km of urban rail in operation in the capital region
  - Avg. distance between stations: 1 to 1.5 km
  - Average speed: 25 km/h
  - Takes up to 2 hours for some commuters

Purpose
• Ease traffic congestion for people in the capital region (over 25 million)
• More convenient commuter transport modes

Concept
• Deep underground tunnel at min. depth of 40 m
• High speed regional (commuter) rail

Speed
• Max. speed: 180 km/h
• Avg. speed: Min. 80km/h

Benefits
• Enable commuting within the capital region in and around 30 minutes
5 major technological Innovations

01 **LTE-R**
- Long-term evolution adapted for railway
- Telecommunication system specialized for railway and capable of ultra-high-speed transmissions of large-data between train-train, train-operation control center, etc.

02 **KTCS**
- Korean train control system
- Uses LTE-R for wireless transmission of train control information for monitoring train locations and movements in real time to prevent collisions

03 **KR LAS**
- Line Allocation System
- Calculates train departure times and headways to produce train operation plan (patented in Korea in 2018)

04 **KR RFD**
- Rail fastening device
- Device that fixes rail to the sleeper for safe running of trains (patented in Korea in 2015, designated new transportation technology in 2016, patented in China and Japan in 2018)

05 **KR ECS**
- High-speed catenary system
- Supplies high voltage electric traction power (100% Korean technology from design to manufacturing, construction and performance verification)
KNR has been participating in railway projects in other countries, beginning with project in China.

Project range from technical consulting, to construction supervision, detail design, feasibility study, and training.
Conclusion

Building the path to a better future and a better world with new railways

- With a history of 120 years, Korea opened its first high-speed rail in 2004 becoming the fifth country in the world to do so.

- Has acquired technological self-reliance since then and today construct HSRs and upgrade speed of existing lines using Korean technologies.

- Through continuous localization efforts, we have developed Korean high-speed rail vehicles, track systems, and LTE-based Korean train control systems.

- Korea's experience could be a good example for the development of national network plan and transport system.