Railways in Asia-Pacific

Rail Sector Snapshots through Railway Profiles

MEL EDEN
Asian Transport Outlook

Expert Group Meeting on Transport Connectivity and Logistics
Emerging opportunities and challenges for enhancing rail connectivity along the Trans-Asian Railway network

Apr 30, 2024
Support the planning and delivery of transport related assistance by the ADB & AIIB

Tracking Global Agreements on Sustainable Development and Climate Change, Regional Aichi 2030 Declaration

Support Transport Policy Making in Asia

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Brainstorming
2019 – 2020

Phase 1
November 2020 – May 2021

Interim Phase
June 2021 – October 2021

Phase 2
November 2021 – November 2022

Phase 3
March 2023 – November 2024

Phase 4 +
ATO National and Urban Database Indicators

51 Economies (ADB Members + Russia and Iran)

460 Urban Centers (412 Asia-Pacific, 48 International)

46 Urban Centers with a detailed review

410 national indicators,
53% have multi-year data,
45% have 2022 data,
10% have more than 2 sources,
30% have more than 1 source,

281 urban indicators,
~80% have multi-year data,
~70% have more than 1 source
Unpacking of policies, uncovering of insights

6,000+ total policy measures
Recorded from 500+ policy documents for a sample of 25 economies.

- National development policies,
- National transport policies,
- Transport sub-sector policies,
- NDC/LTS,
- Transport laws, regulations
- Other transport-related policies
Heavy Rail & HSR Growth and the Infrastructure gap

Asia - Pacific added 39% of the global rail infrastructure increase between 2000-2010 and 57% between 2010-2020

2021, Asia - Pacific has 74km rail infrastructure per million population. Europe and North America - 456, Global - 107

Source: ATO visualization based on UIC, UNStats, World Bank, Country statistics
In 2018, Asian railways carried 6% and 16% of passenger and freight transport demand, but share only 3% of total transport energy consumption and emitted only 2% of fossil transport CO2 emissions.
Rail utilization in Asia-Pacific

Source: ATO visualisation based on UIC
*Transport unit = passenger-kilometer + freight-kilometer

Source: ATO visualisation based on UIC
Expected annual damages to surface transport infrastructure in Asia is disproportionate distributed - as high as 0.1% of GDP in SEA (Myanmar) and 0.08% of GDP in NCA (Georgia).

Source: ATO visualisation based on Koks, et al. (2019), Coalition for Disaster Resilient Infrastructure (CDRI)
### Heavy Railway

**Heavy rail route length (2020)**

- Total: 4,801 km

**Heavy railway route lengths in Asia-Pacific (kilometers)**

<table>
<thead>
<tr>
<th>Country</th>
<th>Double-track</th>
<th>Single-track</th>
</tr>
</thead>
<tbody>
<tr>
<td>People's Republic of China, 2021</td>
<td>190,000 km</td>
<td>50,000 km</td>
</tr>
<tr>
<td>Russian Federation, 2021</td>
<td>190,000 km</td>
<td>50,000 km</td>
</tr>
<tr>
<td>India, 2021</td>
<td>190,000 km</td>
<td>50,000 km</td>
</tr>
<tr>
<td>Thailand, 2020</td>
<td>190,000 km</td>
<td>50,000 km</td>
</tr>
</tbody>
</table>

**Between 2009 to 2020, Thailand added 293.4 kilometers of heavy railway routes, expanding 6.6% annually.**

**Between 2010 to 2017, Thailand added 30 kilometers of electrified routes, expanding 11.0% annually.**

### Availability per capita

- 67 kilometers per million population
- 9.4 kilometers per thousand sqkm

### Availability per capita in Asia-Pacific

- Australia, 2019: 200 km
- Turkmenistan, 2018: 120 km
- Kazakhstan, 2021: 120 km
- Thailand, 2020: 120 km
- Japan, 2021: 60 km
- Republic of Korea, 2021: 60 km
- Armenia, 2021: 60 km

### Density per sqkm

- 3.6 kilometers per square kilometer
There is currently no high-speed rail system in Thailand.

**High Speed Railway**

**Urban Railway**
- Metro length (2021): 96 km
- Light rail transit (LRT) length: n.d.
- Urban rail availability per capita (2021): 2.7 km per million urban population
- Between 2000 and 2021, Thailand added 73.3 kilometers of urban railway, expanding 6.8% annually.
- Number of cities with urban rail systems (2021): 1

**Rolling Stock**
- Locomotives (2017): 89
  - Diesel (2017): 73
- Passenger carriages (2017): 2,477
- Freight wagons (2011): 6,016
- Railcars (self-propelled systems)
  - Diesel (2011): 236
  - Electric (2016): 184

Country statistics:
- Hong Kong, China, 2019
- Singapore, 2021
- Republic of Korea, 2021
- Thailand, 2021
JRC's EDGAR emissions database & EMBER's grid EF database
### Public-private partnership (PPP) investments in rail (Million USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Investment (Million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2015</td>
<td>440</td>
</tr>
<tr>
<td>2016-2022</td>
<td>3,356</td>
</tr>
</tbody>
</table>

### Official development assistance (ODA) in rail (Million USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Assistance (Million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2002-2015</td>
<td>1,838</td>
</tr>
<tr>
<td>2016-2021</td>
<td>1,779</td>
</tr>
</tbody>
</table>

### Share of rail in transport PPP

- **Between 2000-2015**: 47%
- **Between 2016-2022**: 100%

### Share of rail in transport ODA

- **Between 2000-2015**: 54%
- **Between 2016-2021**: 100%

### Import value (Million USD)

<table>
<thead>
<tr>
<th>Year</th>
<th>Import Value (Million USD)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2003-2012</td>
<td>1,108</td>
</tr>
<tr>
<td>2013-2022</td>
<td>1,319</td>
</tr>
</tbody>
</table>

*Includes locomotives, railcars, coaches, freight wagons, rail vehicles, rolling stock parts, and containers.*

### Others

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Share of transport in gross value added (GVA) (2022)</td>
<td>7.5%</td>
</tr>
<tr>
<td>Quality of railway infrastructure (2017)</td>
<td>2.6/7</td>
</tr>
<tr>
<td>Percent of firms identifying transportation as a major constraint - services (2015)</td>
<td>15.3%</td>
</tr>
<tr>
<td>Expected annual damages to road and rail infrastructure due to hazards (2019)</td>
<td>2.61 Min. USD</td>
</tr>
<tr>
<td>Share of rail infrastructure in multihazard average annual loss to transport infrastructure (2023)</td>
<td>19.6%</td>
</tr>
<tr>
<td>Efficiency of train services (2019)</td>
<td>2.8/7</td>
</tr>
</tbody>
</table>
ATO estimates based on UIC, Country statistics

UN Statistics & JRC’s EDGAR
### Policy Measures and Targets

<table>
<thead>
<tr>
<th>Policy Document</th>
<th>Year</th>
<th>Rail-related measures</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oil Plan 2015-2036</td>
<td>2015</td>
<td>Rail infrastructure expansion, Railway electrification</td>
</tr>
<tr>
<td>Strategic Plan of the Ministry of Transport 2017-2021</td>
<td>2017</td>
<td>Rail infrastructure expansion, Urban passenger rail infrastructure improvement, Non-urban passenger rail infrastructure improvement, Railway electrification</td>
</tr>
<tr>
<td>Action Plan on Thailand Logistics Development 2023-2027</td>
<td>2023</td>
<td>Rail infrastructure expansion, Freight transport shifting to rail or inland waterways (IW)</td>
</tr>
<tr>
<td>Strategies for the Development of Thailand’s Transport System for a 20-Year Period (2018-2036)</td>
<td>2019</td>
<td>Non-urban passenger rail infrastructure improvement, General rail improvement, General public transport, Freight transport shifting to rail or inland waterways (IW), Intermodally measures, General transport target - Transport activity, Logistics hub</td>
</tr>
<tr>
<td>Voluntary National Review 2021</td>
<td>2021</td>
<td>Rail infrastructure expansion, Urban passenger rail infrastructure improvement</td>
</tr>
<tr>
<td>Intended Nationally Determined Contribution (INDC)</td>
<td>2015</td>
<td>Rail infrastructure expansion, Urban passenger rail infrastructure improvement, Freight transport shifting to rail or inland waterways (IW)</td>
</tr>
<tr>
<td>Climate change Master Plan 2015-2050</td>
<td>2015</td>
<td>Rail infrastructure expansion, Urban passenger rail infrastructure improvement, General rail improvement, General public transport, Freight transport shifting to rail or inland waterways (IW)</td>
</tr>
<tr>
<td>Thailand Energy Efficiency Development Plan 2015-2036</td>
<td>2015</td>
<td>Rail infrastructure expansion</td>
</tr>
<tr>
<td>National Strategy 2018-2037</td>
<td>2019</td>
<td>General rail improvement</td>
</tr>
<tr>
<td>Updated Nationally Determined Contribution</td>
<td>2021</td>
<td>Freight transport shifting to rail or inland waterways (IW)</td>
</tr>
<tr>
<td>The Thirteenth National Economic and Social Development Plan (2023-2027)</td>
<td>2023</td>
<td>General rail improvement</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Policy document</th>
<th>Target Year</th>
<th>Rail-related targets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Action Plan on Thailand Logistics Development 2023-2027</td>
<td>2027</td>
<td>The proportion of freight moved by rail to total freight volumes = An average of 7 percent (2023-2027)</td>
</tr>
<tr>
<td>Action Plan on Thailand Logistics Development 2023-2027</td>
<td>2027</td>
<td>Customs (LPR) = Rank 25th or a score of not less than 3.20</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Logistics Quality and Competence = Rank 25th or a score of not less than 3.65</td>
</tr>
<tr>
<td></td>
<td></td>
<td>E-commerce value of transport and logistics sectors = An average growth rate of 10 percent (2023-2027)</td>
</tr>
<tr>
<td>Voluntary National Review 2021</td>
<td>2029</td>
<td>According to the Mass Rapid Transit Master Plan in the Bangkok Metropolitan Region (M-MRP), the Government aims to finish 103 metro stations by 2029.</td>
</tr>
<tr>
<td>Strategies for the Development of Thailand’s Transport System for a 20-Year Period (2018-2036)</td>
<td>2036</td>
<td>Proportion of the volume of freight by rail = Present (2015) 1.4% Target (2036) Percent: 10%</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Proportion of volume of water transport = Present (2015) 11.44% Target (2036) 19 percent</td>
</tr>
</tbody>
</table>

Policy measures and targets were extracted from policy documents as listed in the ATO National Transport Policies Database

“ATO translates data into insights, policies, and investments”

www.asiantransportoutlook.com

ATO Team  asiantransportoutlook@gmail.com
Jamie Leather  jleather@adb.org
Andres Pizarro  andres.pizarro@aiib.org
Manuel Benard  manuel.benard@aiib.org
Sudhir Gota  sudhirgota@gmail.com
Alvin Mejia  alvin.mejia.a@gmail.com

Twitter  @transportATO
LinkedIn  bit.ly/ATOlinkedin