Pakistan

Rail Sector Profile

Population (2023)
240.5 Million

Gross domestic product (GDP), PPP (2022)
1.52 Trillion USD (1,2)

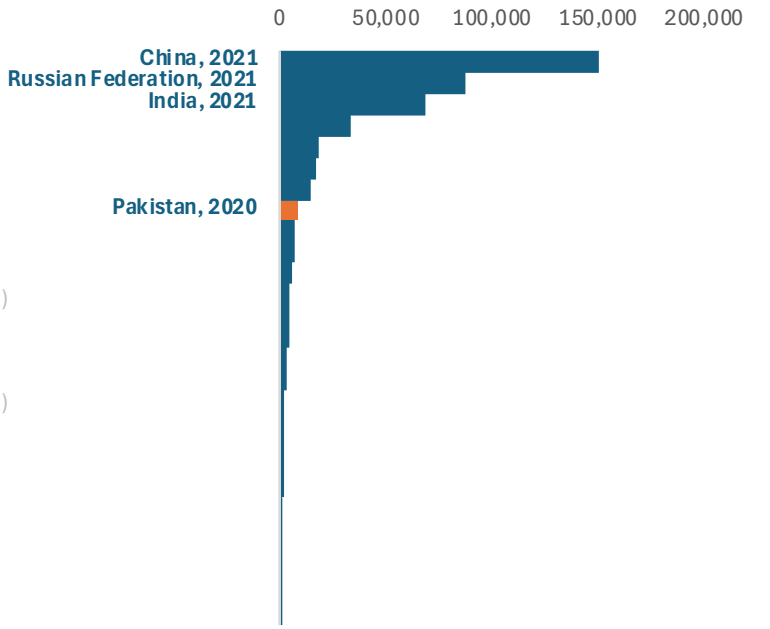
PPP = Purchasing power parity

Heavy Railway

Heavy rail route length (2020)
7,791 km (3,6)

Between 2000 to 2020, Pakistan added 0.0 kilometers of heavy railway routes, expanding 0.0% annually

Heavy railway route lengths in Asia-Pacific (kilometers) (3,6)



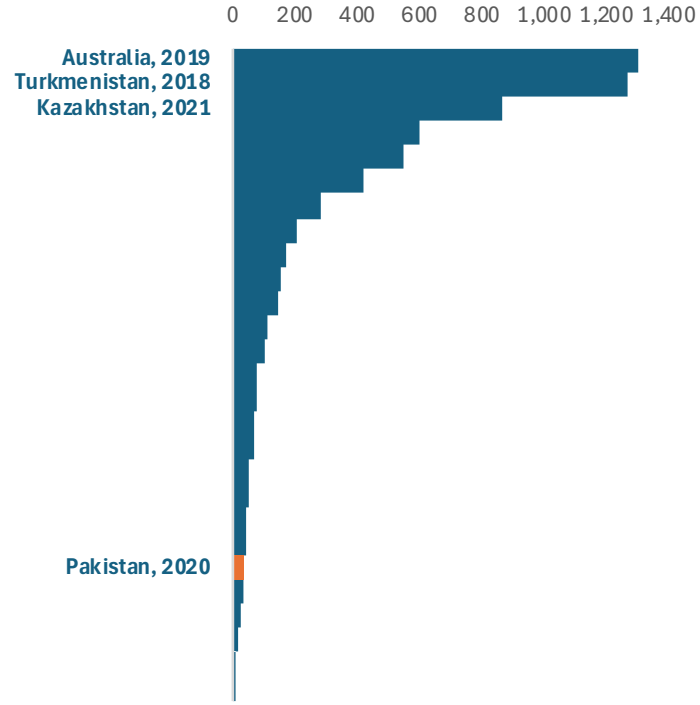
Single-track routes (2019)
81.9%

Double-track routes (2019)
31.3% (4)

Electrified routes
n.d. (3)

Availability per capita
34.3 kilometers per million population (3,6)

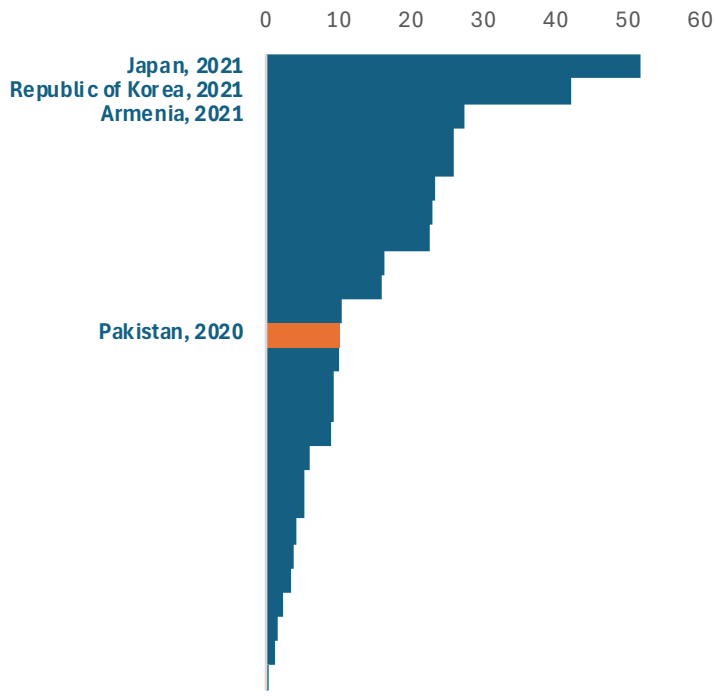
Availability per capita in Asia-Pacific



Density per sqkm
10.1 kilometers per thousand sqkm (3,6)

sqkm = square kilometer

Density per sqkm in Asia-Pacific



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Urban Railway

Metro length (2021)
n.d.

Light rail transit (LRT) length
n.d. (4)

Urban rail availability per capita in Asia-Pacific

Number of cities with urban rail systems (2021)
4 (4)

Urban rail availability per capita (2021)
n.d. (4)

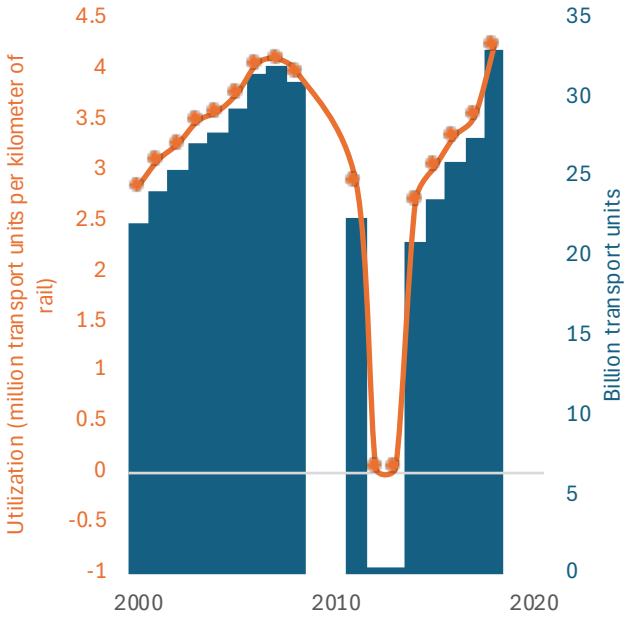
Activity

Passenger-kilometers (PKM) (2018)
24.9 billion (3)

Tonne-kilometers (TKM) (2018)
8.1 billion (3)

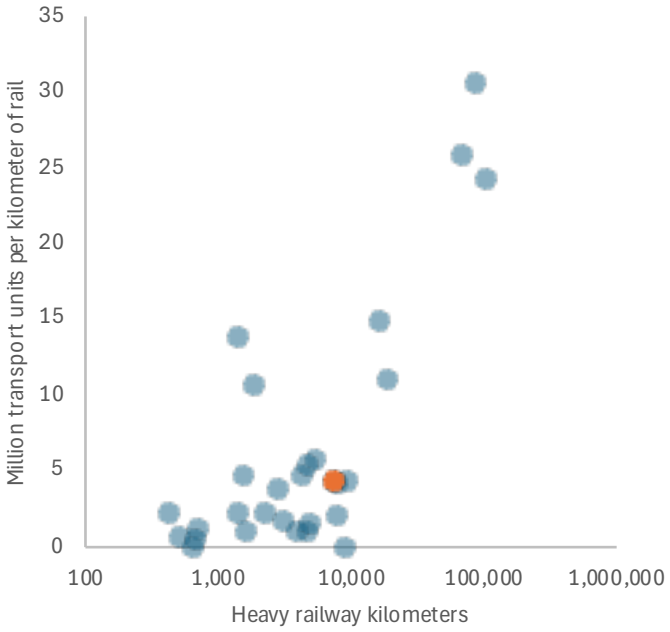
Between 2000 to 2018, PKM increased annually by 1.7%. Between 2000 to 2018, TKM increased annually by 4.6%

Transport units and utilization trend (3)



Transport units = passenger-kilometers + tonne-kilometers

Utilization of railways in Asia-Pacific (3)



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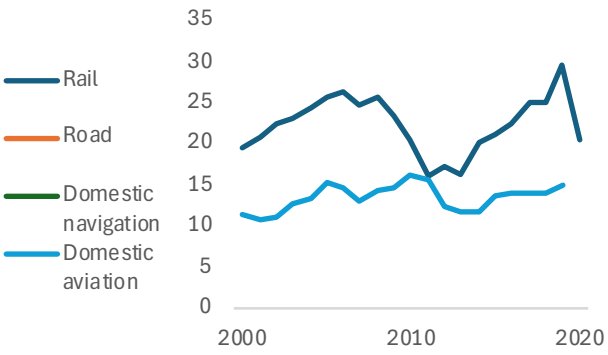
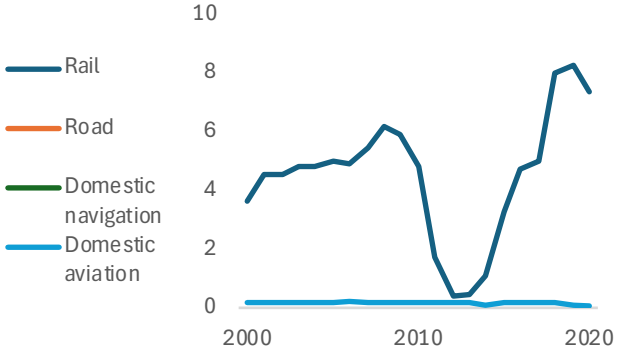
Mode Share

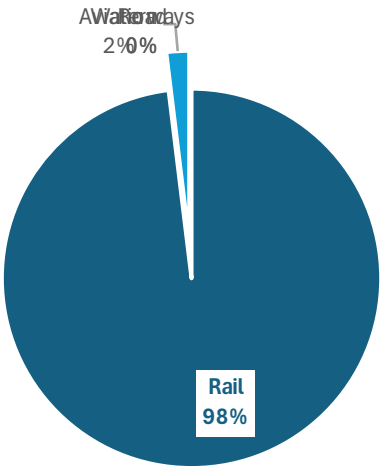
Passenger transport activity (billion passenger-km) (6)



Freight transport activity (billion tonne-km) (6)



Freight transport mode share (2018) (6)



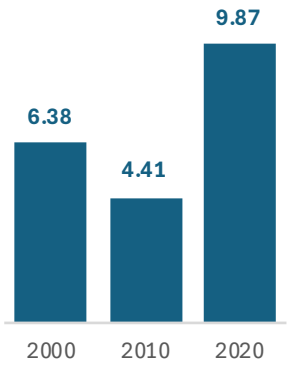
Energy

Rail diesel consumption (2007)
151.901 thousand tonnes

Rail electricity consumption (2011) (5)
1 million kWh

kWh = kiloWatt-hour

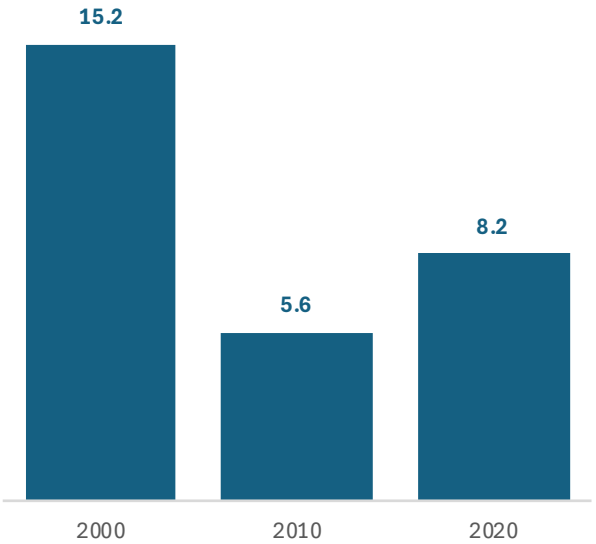
Rail energy consumption (PJ)



Share of electricity in rail energy consumption (5)

PJ = petajoule

Rail energy intensity with GDP (MJ per USD, PPP) (2,5)



MJ = megajoule

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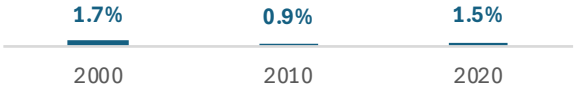
Energy

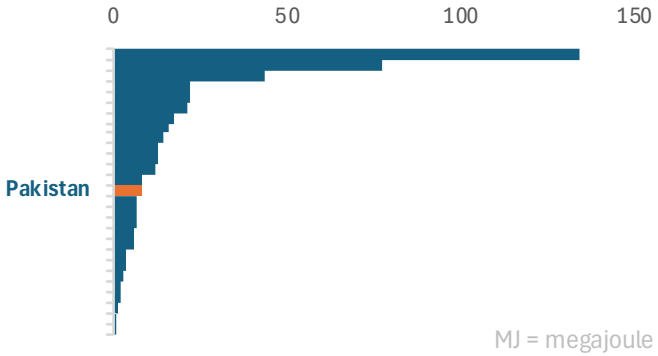
Share of rail in total transport energy consumption

(5)



Rail energy intensity with GDP in Asia-Pacific (MJ per USD, PPP, 2020)

(2,5)



MJ = megajoule

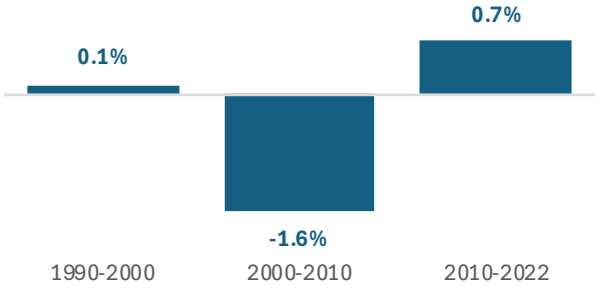
Externalities

Rail CO2 emissions (2022)

843 thousand tonnes

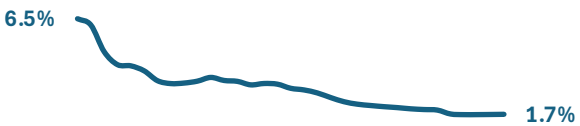
(10)

Rail CO2 emissions annual average growth



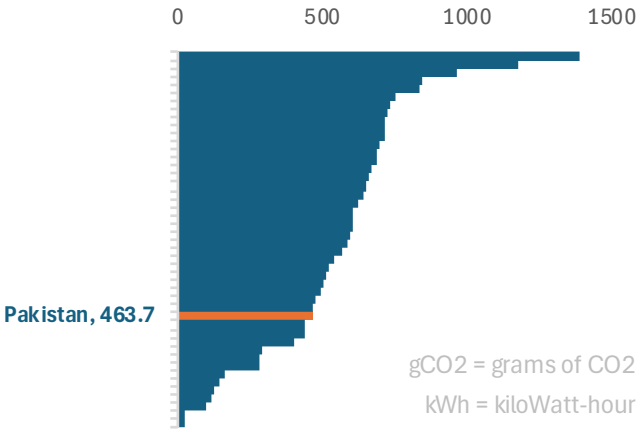
Share of rail in transport CO2 emissions (1990-2022)

(10)



Grid emission factors (gCO2/kWh, 2022)

(11)



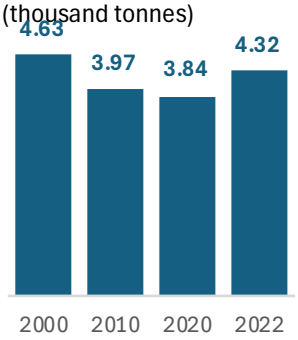
gCO2 = grams of CO2

kWh = kiloWatt-hour

PM 10

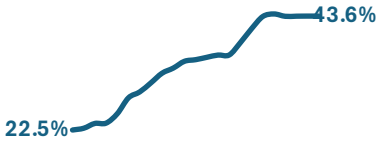
Rail air pollutant emissions (thousand tonnes)

(10)



Share of rail in transport air pollutant emissions (2000-2022)

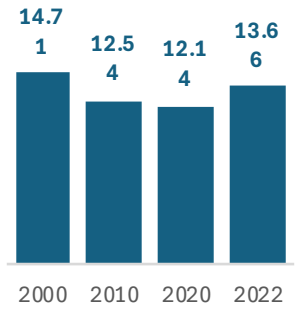
(10)



NOx

Rail air pollutant emissions (thousand tonnes)

(10)



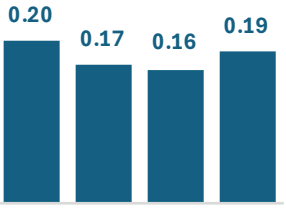
Share of rail in transport air pollutant emissions (2000-2022)

(10)

SOx

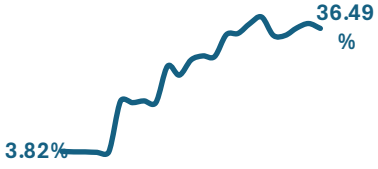
Rail air pollutant emissions (thousand tonnes)

(10)



Share of rail in transport air pollutant emissions (2000-2022)

(10)



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Investment

Public-private partnership (PPP) investments in rail (Million USD) (17)

Official development assistance (ODA) in rail (Million USD) (18)

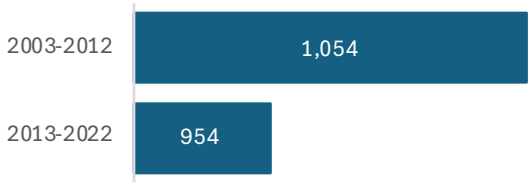
Share of rail in transport PPP (17)

Between 2000-2015	Between 2016-2022
n.d.	**n.d.**

Share of rail in transport ODA (18)

Between 2002-2015	Between 2016-2021
0%	**0%**

Import value (Million USD) (20)



Includes locomotives, railcars, passenger coaches, freight wagons, rail fixtures, rolling stock parts, and containers

National investment in rail - capital expenditure (0) (19)

n.d.

Digitalisation

Internet speed (2022) (8)

Broadband	Mobile
14 Mbps	**20 Mbps**

Mbps = Megabits per second

Digital readiness index (2021) (9)

-1.1/2.5

Others

Share of transport in gross value added (GVA) (2022) (12)

8.8%

Quality of railway infrastructure (2017) (13)

3.3/7

Percent of firms identifying transportation as a major constraint - services (2015) (14)

15.3%

Average annual losses to rail infrastructure due to all potential hazards (2023) (21)

4.86 mln. USD

Share of rail infrastructure in multihazard average annual loss to transport infrastructure (2023) (21)

2.2%

Efficiency of train services (2019) (16)

3.8/7

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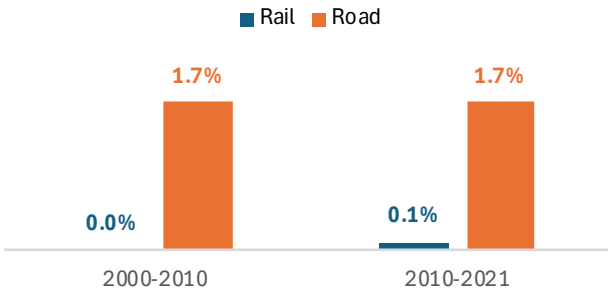
Benchmarking Rail and Road Sectors

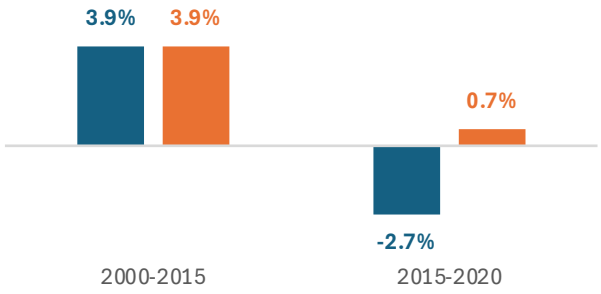
Infrastructure annual average growth of rail (including HSR, LRT, and metro) vs. road

(3,6)



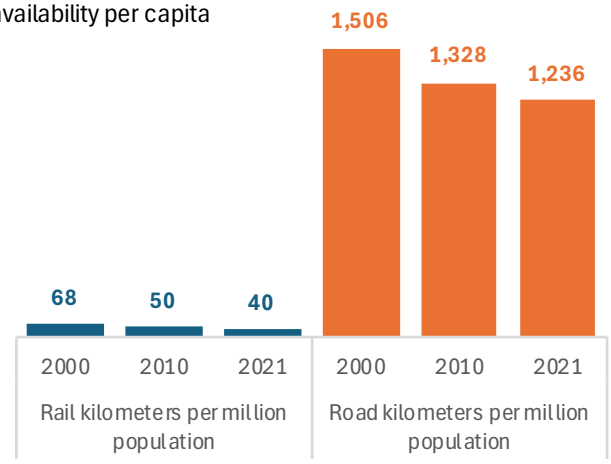
Rail vs. road energy consumption annual average growth rate

(5)



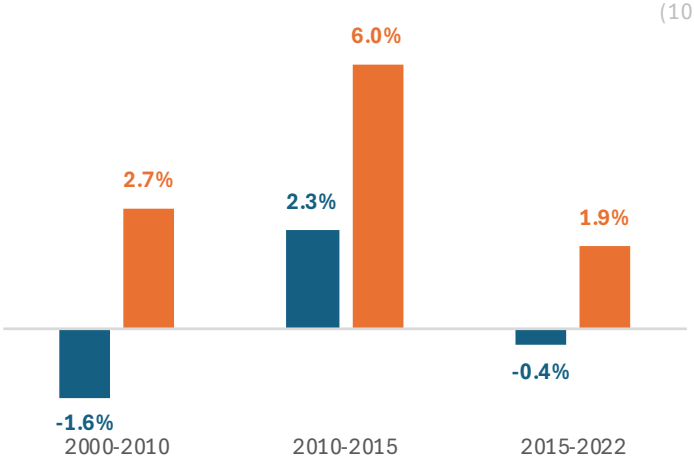
Rail (including HSR, LRT, and metro) vs. road infrastructure availability per capita

(3,6)



Rail vs. road CO2 emissions annual average growth rate

(10)



Sources

(1) UN Population Database (2022), https://population.un.org/wpp/

(2) World Bank (2022), https://data.worldbank.org/indicator/NY.GDP.MKTP.PP.CD

(3) International Union of Railways (2021), https://uic-stats.uic.org/

(4) Rapid Transit Database (ITDP, 2022), https://www.itdp.org/rapid-transit-database/

(5) UN Energy Statistics (2021), https://unstats.un.org/unsd/energystats/dataPortal/

(6) Country Official Statistics

(7) Rail Company

(8) OOKLA (2023), https://worldpopulationreview.com/countries/internet-speeds-by-country/

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(11) Ember (2023), https://ember-climate.org/data-catalogue/yearly-electricity-data/

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(13) World Economic Forum (2019), http://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

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(15) Koks, et al. (2019), https://www.nature.com/articles/s41467-019-10442-3

(16) World Economic Forum (2019), https://www3.weforum.org/docs/WEF_TheGlobalCompetitivenessReport2019.pdf

(17) PPI Database (World Bank, 2023), https://ppi.worldbank.org/en/ppi

(18) Organisation for Economic Co-operation and Development (OECD) (2022), https://stats.oecd.org/Index.aspx?DataSetCode=CRS1#

(19) Country Data

(20) Trademap (ITC, 2024), https://www.trademap.org/

(21) Global Infrastructure Risk Model and Resilience Index (CDRI, 2023), https://giri.unepgrid.ch/

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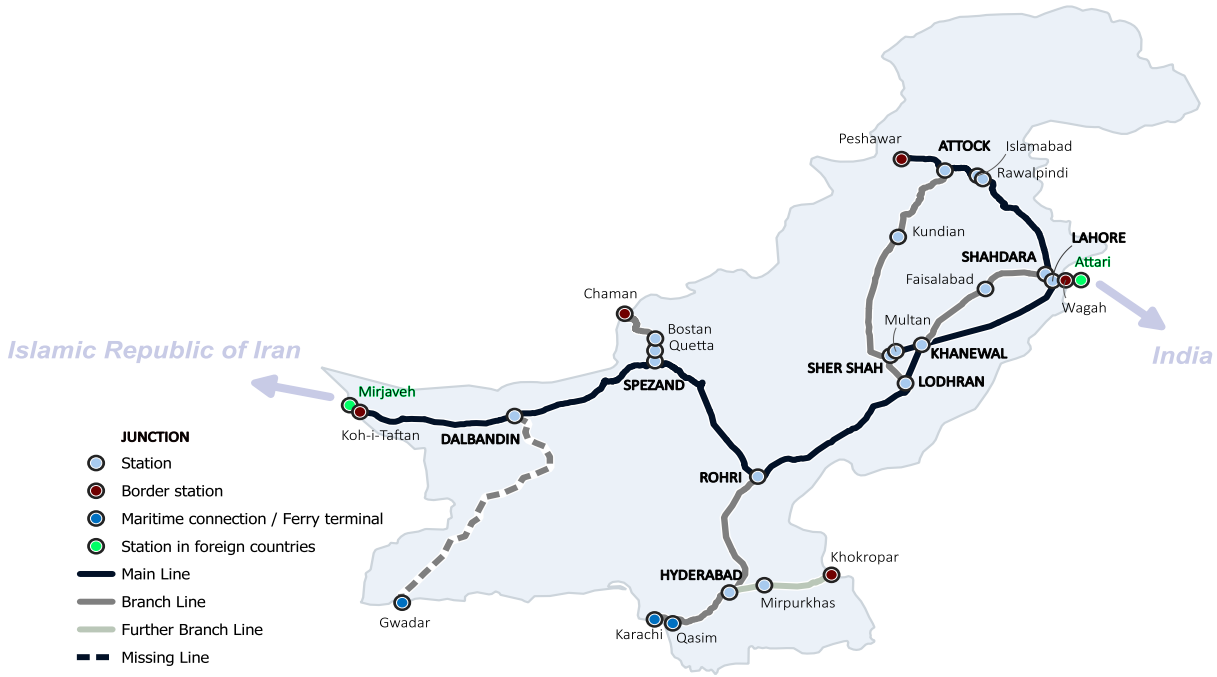
Pakistan Rail Network



Border Crossings to/from Pakistan

Source: UNESCAP

Country	Border Crossing
Pakistan - Iran (Islamic Republic of)	Koh-i-Taftan-Mirjeveh
Pakistan - India	Wagah-Attari

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Trans-Asian Railway Lines in Pakistan

Source: UNESCAP

Line	Length (km)
Koh-i-Taftan – Border of India	1,731
Peshawar – Lahore	462
Spezand – Border of Afghanistan	167
Rohri – Qasim	480
Lodhran – Shahdara	439
Sher Shah – Peshawar	513
Khanewal – Shahdara	n.d.
Attock – Lodhran	73
Shahdara – Lodhran	n.d.
Hyderabad – Khokropar	203
Dalbandin – Gwadar (missing link)	850
Total distance	4,918 km

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Policy Measures and Targets

Policy document	Year	Rail-related measures
Pakistan Updated NDC 2021	2021	Urban passenger rail infrastructure improvement
National Transport Policy of Pakistan 2018	2018	Rail infrastructure expansion, Urban passenger rail infrastructure improvement, General rail improvement, Freight transport shifting to rail or inland waterways (IWT)
Pakistan's First Biennial Update Report	2022	Urban passenger rail infrastructure improvement, General public transport
National Freight and Logistics Policy	2020	Rail infrastructure expansion, General rail improvement, Development of rail plan/ policy
Technology Needs Assessment Report for Climate Change Mitigation	2016	Rail infrastructure expansion, General rail improvement
Pakistan 2025	2014	Rail infrastructure expansion, General rail improvement
National Climate change Policy	2012	Rail infrastructure expansion, General rail improvement
Pakistan in the 21st Century Vision 2030	2007	Rail infrastructure expansion, High-speed rail (HSR), General rail improvement, General transport target - Transport activity
National Clean Air Plan	2022	
Pakistan's Intended Nationally Determined Contribution	2015	Urban passenger rail infrastructure improvement

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Policy Measures and Targets

Policy document	Target year	Rail-related targets
Pakistan in the 21st Century Vision 2030	2030	It is proposed to increase the share of railways in national freight from present 4 percent (6 billion-ton km) to 22 percent (81 billion-ton km) by 2030.

Policy measures and targets were extracted from policy documents as listed in the ATO National Transport Policies Database https://bit.ly/ATOpolicyrepository

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Policy Insights

Key Data Trends

•Heavy Rail Infrastructure: Pakistan's heavy rail network spans 7,791 kilometers, with a density of 34.3 kilometers per million population. However, infrastructure development has stagnated, with no new routes added between 2000 and 2020.
•Urban Rail Infrastructure: Urban rail development lags significantly, with only four cities having rapid transit systems and a low per capita urban rail infrastructure.
•Activity: Passenger and freight transport have seen moderate growth, with annual increases of 1.7% and 4.6%, respectively, between 2000 and 2018. Rail utilization remains relatively low.
•Energy Consumption: The rail sector's energy consumption has increased, but its share of total transport energy use remains marginal at 1.5%. Energy efficiency has improved, with a decrease in energy consumption per unit of GDP.
•Emissions: Rail emissions contribute a small portion (1.7%) to total transport emissions. However, emissions growth has been observed between 2010 and 2022. The rail sector contributes significantly to air pollutants like PM10, NOx, and SOx.
•Investments: Public-private partnerships and official development assistance in the rail sector have been limited, hindering infrastructure development and modernization.
•Digitalization and Quality: Pakistan's digital readiness and rail infrastructure and services quality are relatively low.
•Adaptation and Resilience: Climate hazards pose a significant risk to Pakistan's rail infrastructure, with estimated annual losses of $4.9 million.

Policy Landscape

•Key Documents: Pakistan has several policy documents addressing the rail sector, including the National Transport Policy, National Freight and Logistics Policy, Pakistan in the 21st Century Vision 2030, and Nationally Determined Contributions (NDCs).
•Policy Priorities: These documents emphasize infrastructure expansion, urban rail improvement, high-speed rail development, general rail improvement, freight transport shifting to rail, and the development of a comprehensive rail plan.
•NDC Gaps and Alignment: While Pakistan's NDCs include targets for reducing emissions and improving resilience in the transport sector, there is a misalignment between these targets and the policies outlined in other documents. The ambitious target of increasing rail's share of freight transport to 22% by 2030 faces challenges due to limited investments and infrastructure development.

Opportunities

Pakistan's railway sector holds significant potential for growth and development, with several key opportunities identified. Electrification of the rail network stands out as a major step toward reducing environmental impact and improving energy efficiency. Modernization and expansion of existing infrastructure are crucial to enhance capacity and service quality, attracting more passengers and freight. Digitalization can streamline operations and improve the overall passenger experience, while climate resilience measures ensure the network's longevity. Policy coherence across various sectors is vital for achieving sustainable development.
In light of these opportunities, the following priorities emerge: Prioritizing investments in infrastructure development, modernization, and electrification lays the foundation for a robust rail system. Strengthening policy coherence and alignment across different sectors ensures coordinated progress. Integrating climate resilience into planning protects the network from the impacts of climate change. Leveraging digital technologies further enhances operational efficiency and service quality. Finally, promoting public-private partnerships can mobilize additional investments, accelerating the sector's growth. By focusing on these key priorities, Pakistan can unlock the full potential of its rail network and contribute to sustainable development.By implementing these suggestions, Pakistan can unlock the potential of its rail sector to contribute to a sustainable and climate-resilient future.

Conclusion

Pakistan's rail sector faces significant challenges in addressing climate change and achieving sustainable development goals. Policy documents outline ambitious targets, but limited investments, infrastructure constraints, and policy misalignments hinder progress. However, opportunities exist to leverage electrification, modernization, digitalization, and climate resilience to transform the rail sector into a critical driver of low-carbon and climate-resilient transport.

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