



10th Railway Working Group Meeting

3-5 June 2026 | Ulaanbaatar, Mongolia

10-е заседание Рабочей группы по железнодорожному транспорту

3-5 июня 2026 года | Улан-Батор, Монголия



Session 2: Strategic Railway Planning in Mongolia

Prefeasibility Study of Nomgon–Khushig Valley Railway Project

Tyrrell Duncan

TA Team Leader/Railway Specialist
Department / Office
Consultant



Outline

- Purpose of the study
- Context for a 2nd North–South Corridor
- Traffic model and forecasting
- Scope and cost of investment
- Operational requirements
- Financial and economic feasibility
- Recommendations and next steps

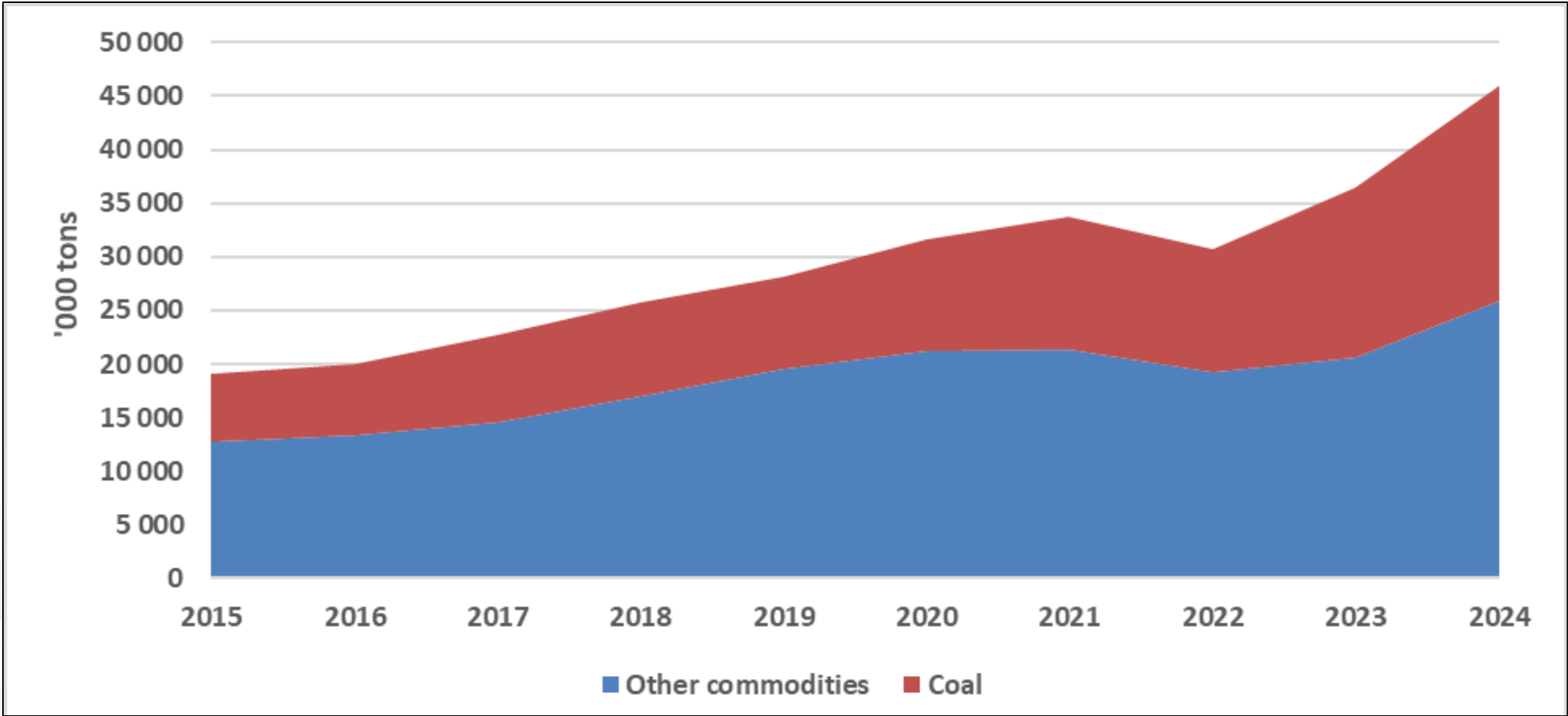


Mongolia's national railway policy

- Adopted in 2010, updated periodically
- Focuses on developing a comprehensive national railway network to support mineral exports and economic diversification
- Seeks to expand the rail network to over 5,600 km in three phases
- Priorities include
 - creating new export routes to the PRC
 - supporting increased transit traffic between PRC and Russia
 - developing east-west connectivity,
 - adopting models of ownership and operation, including private sector participation
 - promoting "open access" for private operators

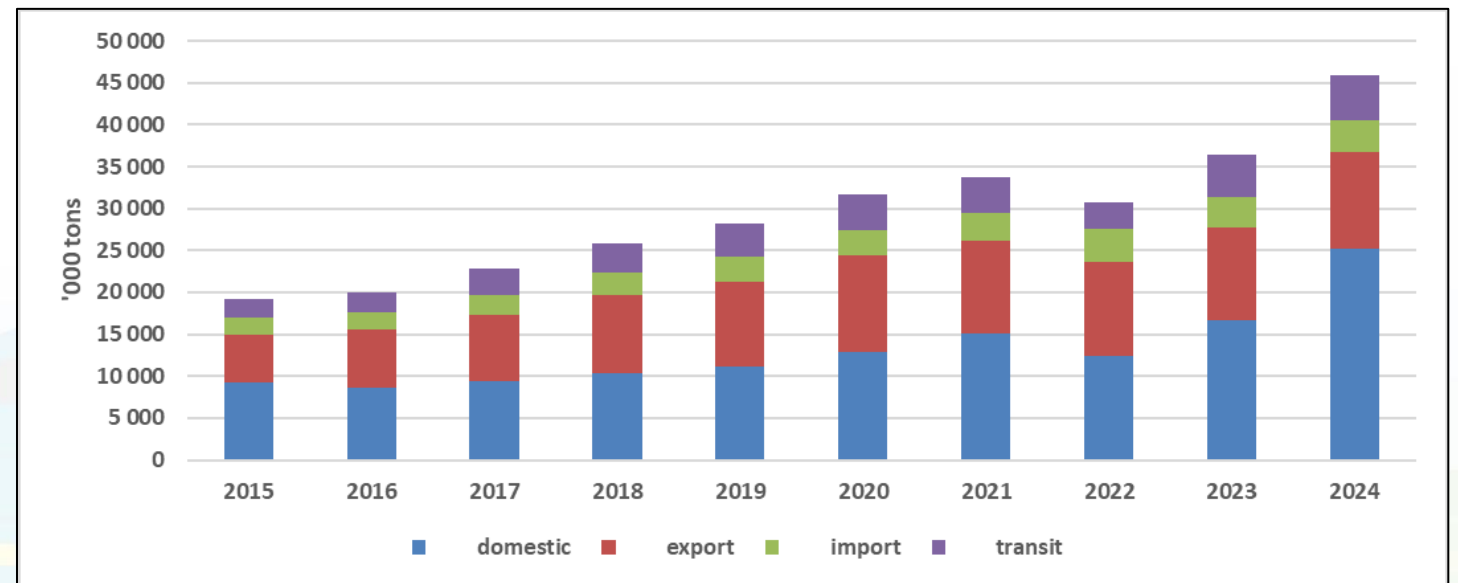
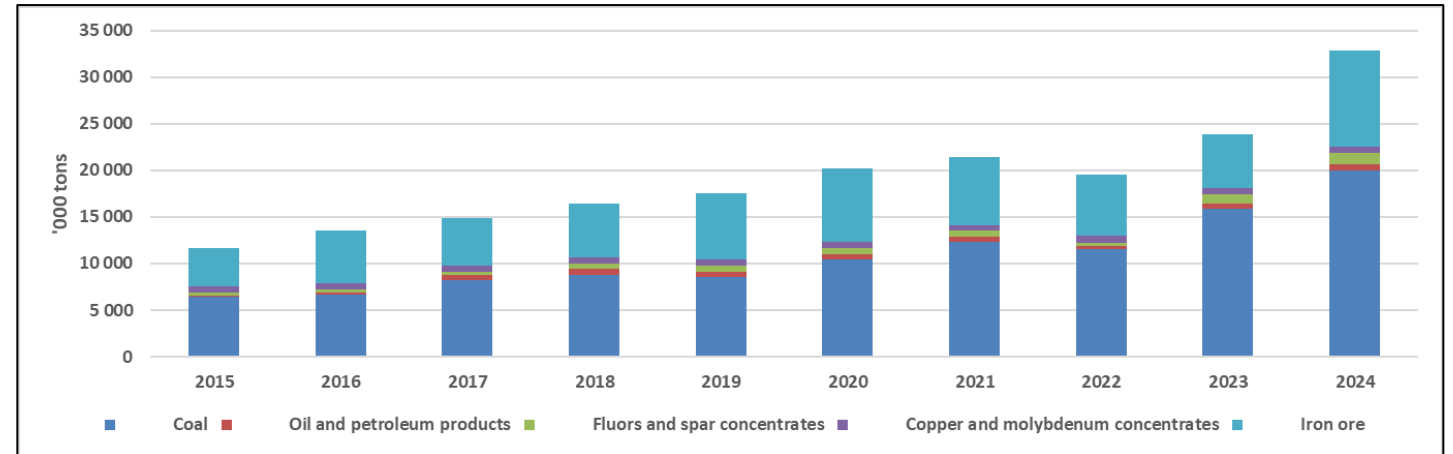


Railway freight traffic has doubled in 10 years



Coal and minerals exports to PRC were the main source of growth

- Most traffic growth due to mining exports to the PRC, mainly coal, also iron ore and other minerals
- Domestic traffic rose rapidly due to coal exports being taken by rail to border terminals at Zamuyn Uud, Khangai and Gashuunshukhait, and then transported across the border by road
- Although only a fairly small share of total traffic, transit freight has been growing fast

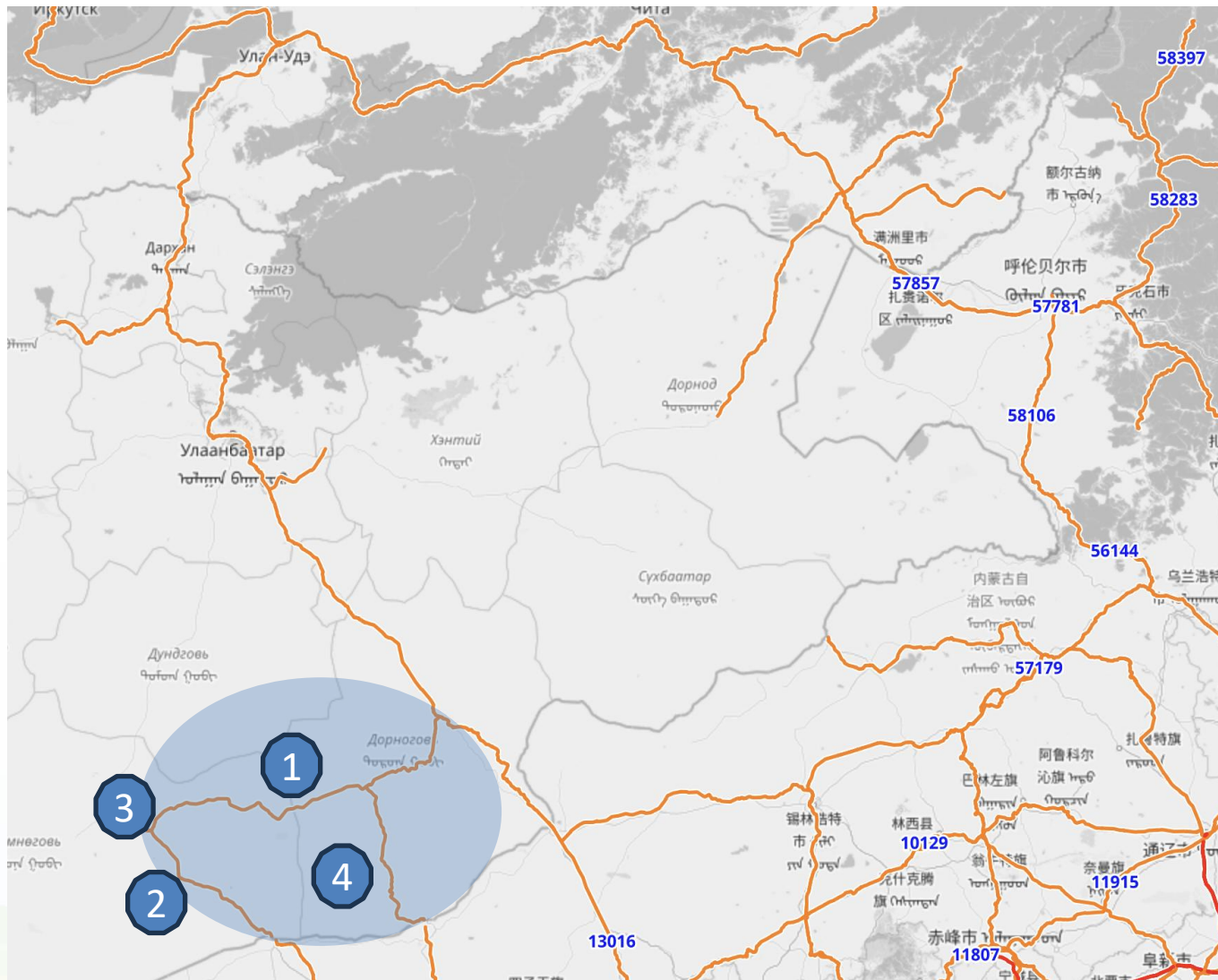


Limitations of the existing North–South Railway (UBTZ)

- Lack of investment
- Many railway assets are aged and need renewal
- Congestion on southern sections



Expansion of the railway network over the past decade



The new lines

1. Tavan Tolgoi–Zuunbayan railway (416 km)
2. Tavan Tolgoi–Gashuunsukhait railway (233.6 km)
3. Link between these two routes (21.1 km)
4. Zuunbayan–Khangai railway (226.9 km), within which the Nomgon–Khangai section also represents the southernmost section of the 2nd North-South railway

Source: OpenRailwayMap

New lines built to serve mining exports from south Mongolia

1. Tavan Tolgoi–Zuunbayan (416 km)



2. Tavan Tolgoi–Gashuunsukhait (233.6 km)



3. Link between new lines 1 and 2 (21.1 km)



4. Zuunbayan–Khangai (226.9 km)*



* Includes Nomgon–Khangai, southernmost section of proposed 2nd North-South railway

Modern designs, effectively implemented

MTZ railway track near Zumbayan



Railway bridge near Zumbayan



Wagons loaded with containerized coal



Diesel locomotive at Nomgon Station



Owners and operators of the new lines

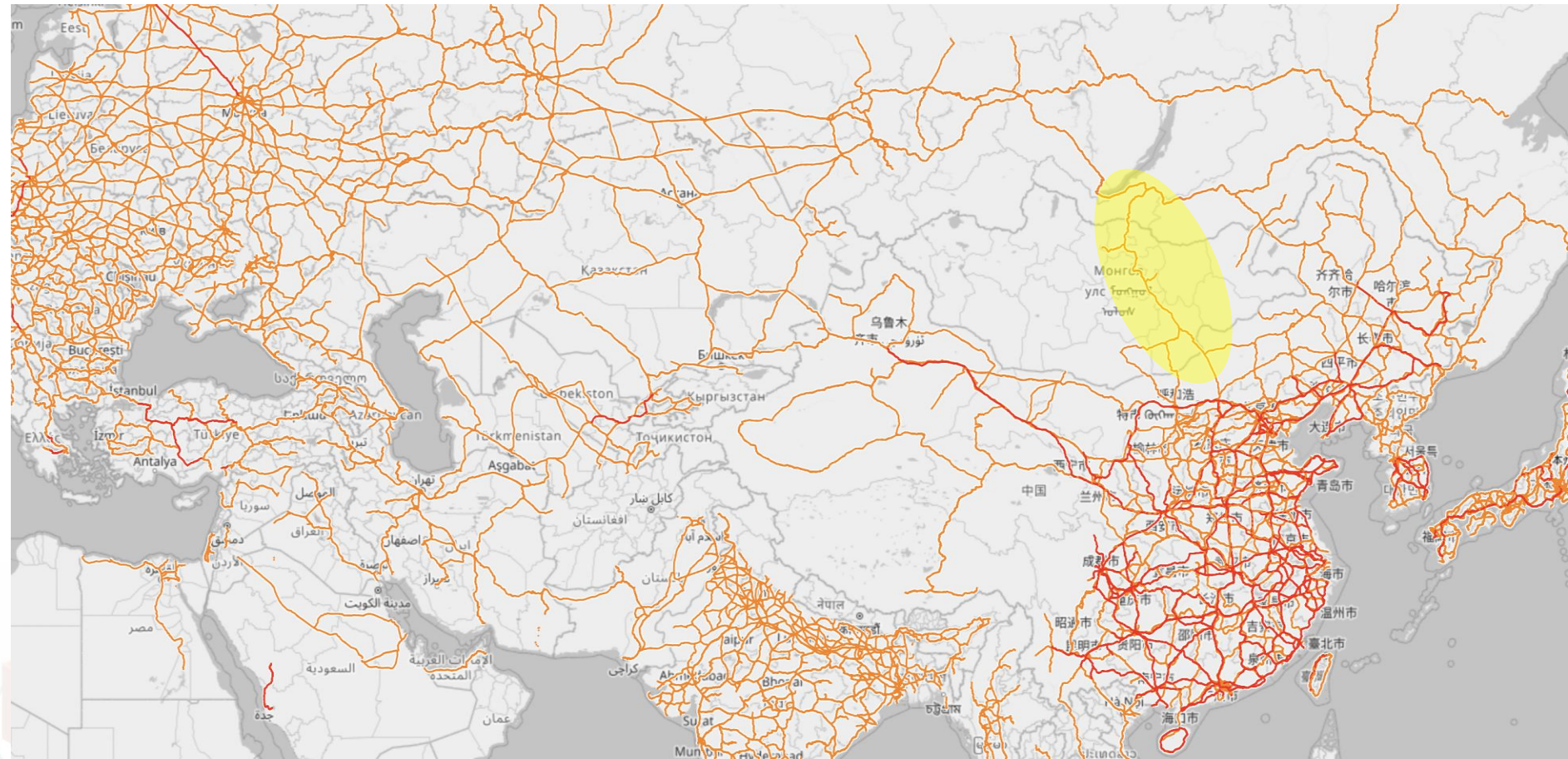
New railway line	Operator	Ownership
Tavan Tolgoi–Zuunbayan railway	<u>Zuunbayan Railway LLC</u>	Joint venture between Erdenes Tavan Tolgoy JSC and Mongolian Railway (MTZ)
Tavan Tolgoi–Gashuunsukhait railway	<u>Tavantolgoi Railway LLC</u>	Joint venture between Erdenes Tavan Tolgoy JSC and MTZ
Rail link between Tavan Tolgoi–Zuunbayan and Tavan Tolgoi–Gashuunsukhait	<u>Tavantolgoi Railway LLC</u>	Joint venture between Erdenes Tavan Tolgoy JSC and MTZ
Nomgon–Khangai railway	Joint venture of <u>Mongolian Trans Line LLC</u> and <u>Mongolian Trans Logistics LLC</u>	20-year design-build-operate transfer-transfer concession

Mongolia–PRC–Russia initiative on Mongolian Railway Corridor

- **Mongolia, Russia and the PRC established “a working group on the new development of the central line of the economic corridor between Mongolia–Russia–China”**
- Protocol of 3rd meeting of **working group adopted relatively high traffic projections for a 2nd North–South line** over the period 2025–2050
- **The projections were “high level”**, not supported by detailed examination of traffic by commodity and origin/destination
- MRT requested TA support for preparation of a **PFS to update the traffic forecasts and provide preliminary confirmation of likely feasibility**
- **PFS to examine option of providing a 2nd North–South line by building a new link from Nomgon to Khushig Valley** which, together with the existing Nomgon–Khangai railway, would form a new North–South corridor between the PRC border and the Ulaanbaatar area, with onward rail connectivity to Russia

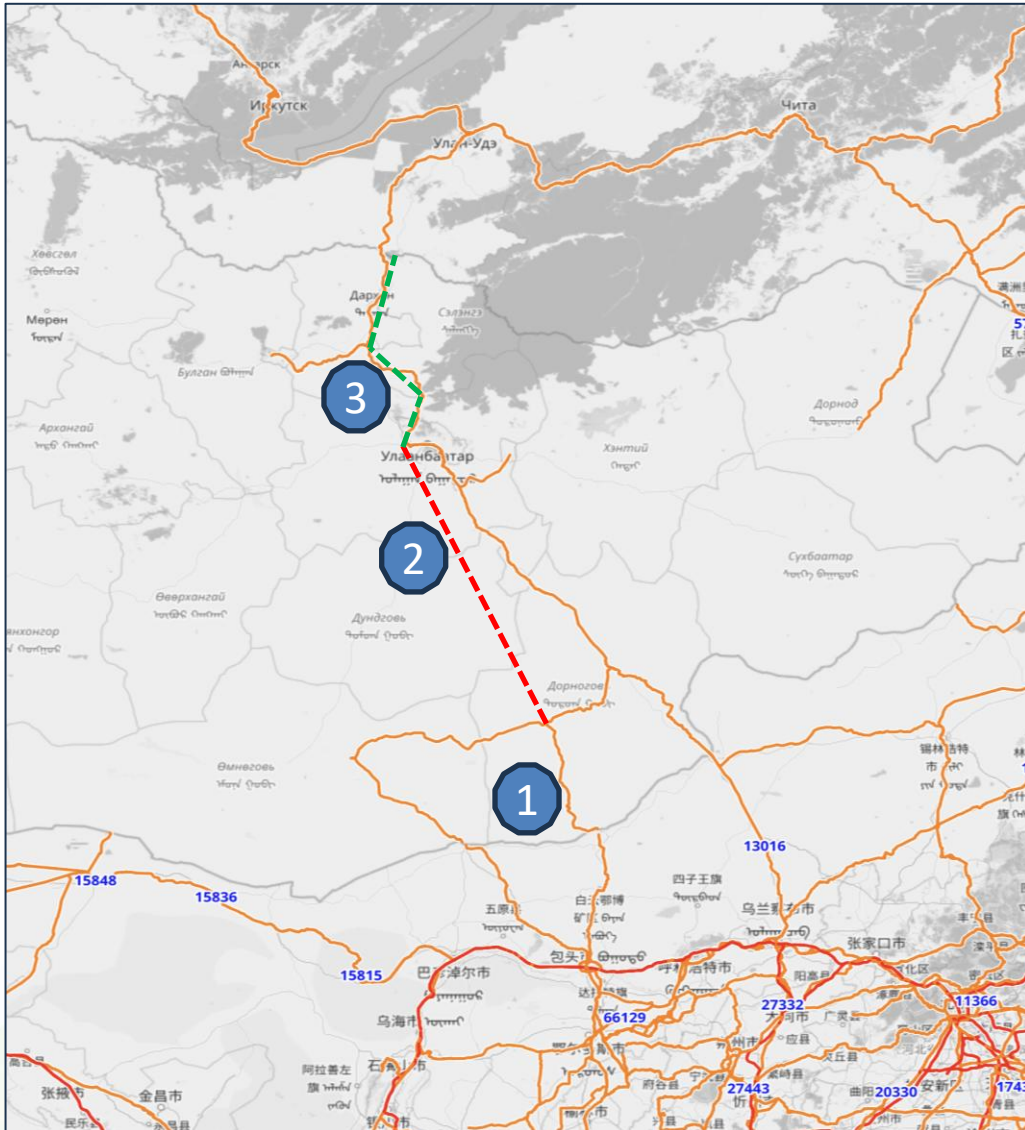
Proposed 2nd North-South Railway Corridor, Mongolia

- To supplement the limited capacity of the existing UBTZ corridor
- To offer fast, reliable freight services, mainly to transport mineral exports to PRC, and PRC–Russia and PRC–Europe transit traffic



Source: OpenRailwayMap

Main sections of the proposed 2nd North-South Railway



Source: OpenRailwayMap

Section	Km	Status
1. Nomgon— Khangai (at PRC border)	220	Recently completed, now operating
2. Nomgon— Khushig Valley	525	Main subject of this PFS
3. Khushig Valley— Sukhbaatar (at Russia border)	447	Added to PFS scope (rough assessment only)

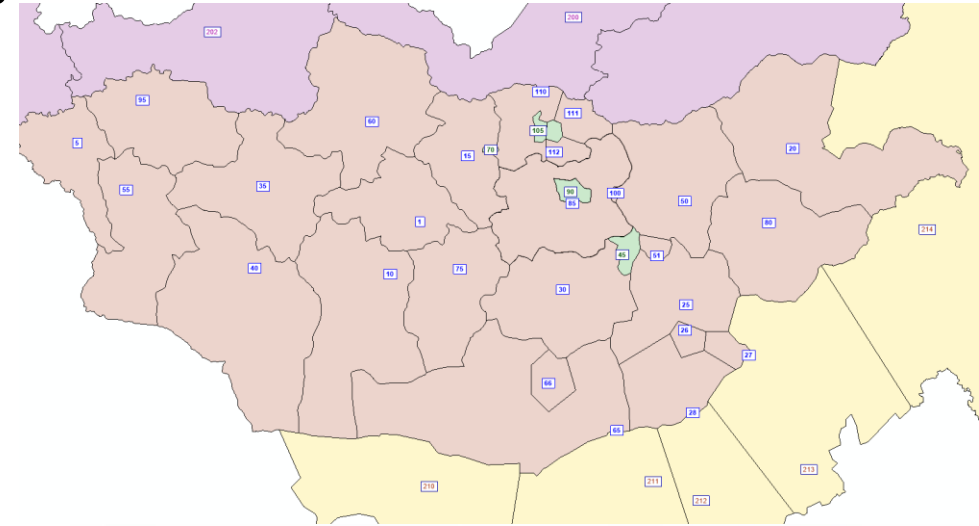
Study terms of reference

- Review existing traffic projections
- Rapid market assessment
- Prepare updated railway freight traffic projections
- Rapid review of operational conditions and technical bottlenecks
- Estimate scope and cost of railway and other investments needed
- Identify relevant best practices in railway planning and operation
- Financial and economic assessment
- Recommendations and next steps

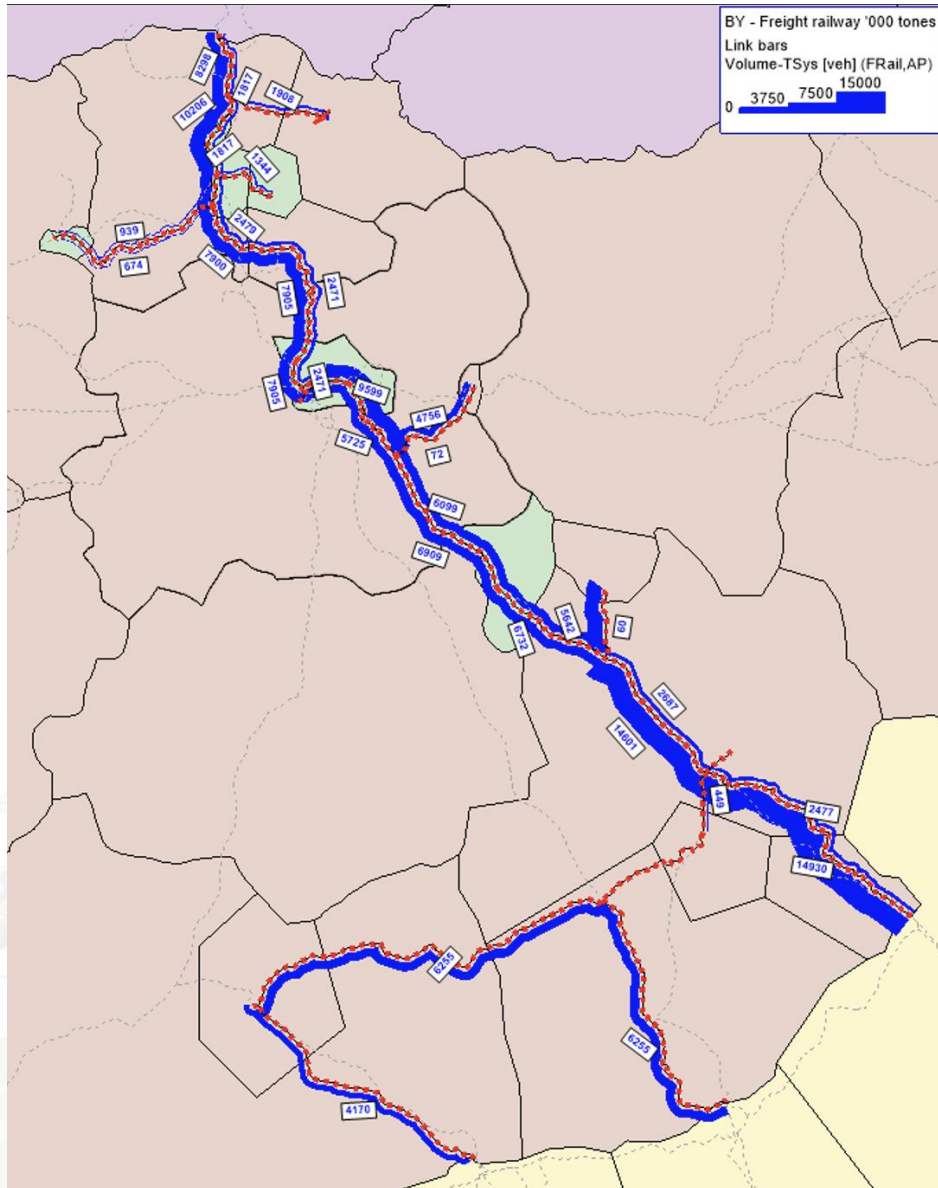
At the 9th RWG meeting, ADB agreed to GOM's request to include a rough assessment of extending the 2nd North–South Railway from Khushig Valley to the Russian border at Sukhbaatar

Traffic modelling

- Drew upon knowledge of Mongolia transport market and location of mineral export producers, and insights from interviews with transport industry stakeholders
- PTV VISUM traffic simulation software used for modelling
- Developed rail traffic demand model based on a 40-zone origin-destination matrix (31 zones in Mongolia, 5 in PRC and 4 in Russia)
- Separately forecasts export, import, domestic and transit traffic, each disaggregated across 10 commodity groups
- Used model to simulate each main commodity flow from origin to destination in 2024, and identify the traffic carried by each section of the railway
- Forecasts then prepared for export, import, domestic and transit traffic disaggregated by commodity grouping



Railway traffic simulation by origin and destination, 2024

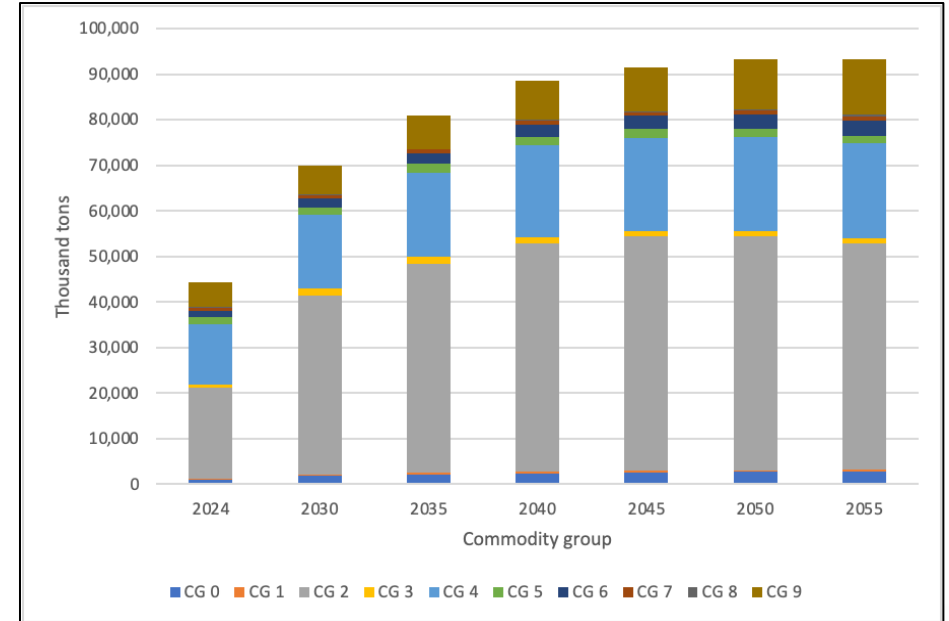


- Model calibrated with reported traffic in 2024
- UBTZ traffic density is highest on the southern sections from Airag to Zamyn Uud, and in the Ulaanbaatar area
- Lower traffic density on other central and northern sections
- Initial buildup of mineral export traffic on the new rail links, ahead of Mongolia and the PRC agreeing to open planned new railway border crossings at Gashuunsukhait and Khangai

Total railway traffic demand forecast, 2023–2055

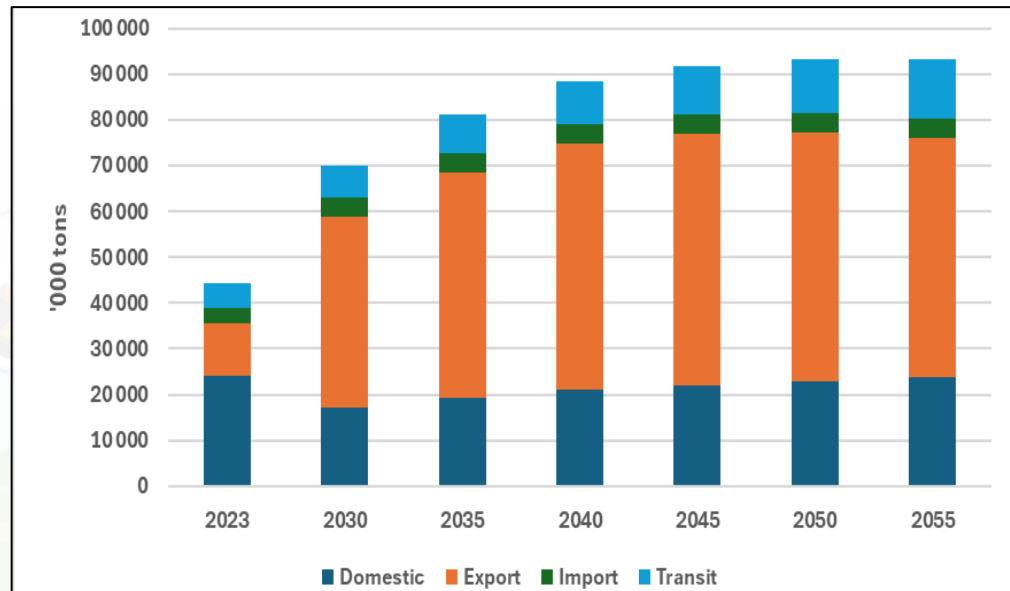
- Rapid growth forecast in coal and other mining exports during first half of the reference period
- Transit traffic forecast to double
- Modest growth in imports and domestic traffic
- Recategorization of some mining exports from domestic to export traffic after Gashuunsukhait and Khangai border crossings are opened

Traffic demand by commodity group



- CG 2 Solid mineral fuels (coal, coke, etc)
- CG 4 Ores and metal waste (iron ore, copper, molybdenum and zinc concentrates, phosphate and fluorspar)
- CG 5 Metal products (black iron, scrap, rails)
- CG 6 Crude and manufactured minerals, building materials
- CG 9 Machinery, transport equipment, manufactured articles, and miscellaneous

Traffic demand by domestic, export, import and transit



Comparison with Working Group railway demand forecast

- Modelled railway demand forecast of 93.2mt in 2050 is comparable with forecast of 90.7mt by the Mongolia-Russia-PRC working group
- Working group assumed sustained high growth in coal and other mineral exports, leading to earlier saturation of the UBTZ line and diversion to the Project line
- Modelled forecast assumes such growth will eventually moderate (e.g. linked to implementation of decarbonization policies in the PRC and other countries).
- Commodity structure of working group forecast was relatively static over time, with the main mining export commodities retaining a fairly constant share in total railway demand. Given planned industrial diversification initiatives, domestic processing capacity expansion, and policy-driven energy transition goals, such structural rigidity is unlikely to fully reflect future realities

Traffic assignment

- **All non-Russia-related flows** (i.e. exports to PRC, imports from PRC, and domestic transport). Assignment was based on the principle of least generalized cost, taking into account transport distances and transportation time. This ensured the model allocates flows to the most efficient available path in the new network configuration
- **All flows to and from Russia.** These were explicitly assigned to the UBTZ line, with a view to avoiding unrealistic traffic diversion assumptions while ensuring consistency with the actual network structure
- Based on the traffic assignment, modelled railway freight in the With Project case is projected to rise from 21.97 million tons in 2024 to 48.58 million tons in 2050.

With Project case: traffic using UBTZ and new links (ton '000)

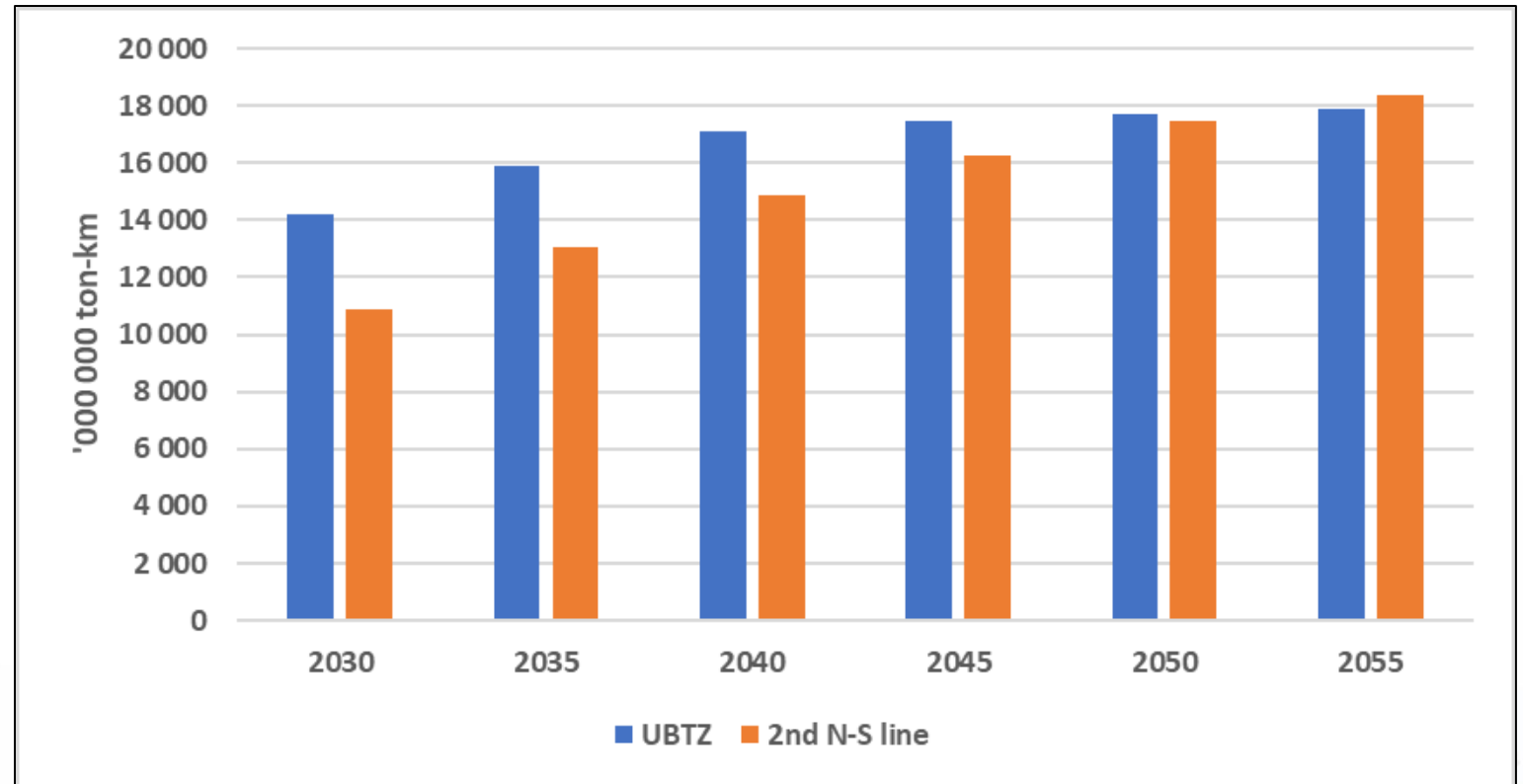
Railway section		2024	2030	2035	2040	2045	2050	2055
UBTZ								
Naushki	Sukhbaatar	8,810	8,025	8,676	9,029	9,321	9,564	9,903
Sukhbaatar	Eree	10,835	8,013	8,665	9,021	9,314	9,557	9,897
Eree	Darkhan	12,743	8,013	8,665	9,021	9,314	9,557	9,897
Darkhan	Salkhit	11,009	7,582	8,198	8,557	8,858	9,105	9,437
Salkhit	Ulanbaatar	11,134	7,364	7,967	8,342	8,660	8,921	9,262
Ulanbaatar	Bagakhangai	16,080	14,426	15,891	16,990	17,556	18,012	18,472
Bagakhangai	Choir	13,765	13,377	15,087	16,380	17,091	17,554	17,841
Choir	Ayrag	13,130	12,627	14,211	15,407	16,038	16,427	16,656
Ayrag	Sainshand	18,045	18,645	21,163	22,959	23,059	22,924	22,796
Sainshand	Zamyn-Uud	18,164	17,739	20,142	21,850	21,963	21,849	21,748
Zuunbayan–Khangī–Tavan Tolgoi–Gashuunsuhait								
Zuunbayan	Nomgom	449	533	588	620	600	580	568
Nomgom	Khangī	6,255	21 775	26 053	29,062	30,721	31,666	31,703
Nomgom	Tavan Tolgoi	6,255	15,262	18,265	20,079	20 767	20,767	19,891
Tavan Tolgoi	Gashuunsukhait	4,170	10,175	12,176	13,386	13,844	13,844	13,261

With Project case: traffic using Project railway (ton '000)

Railway section		2024	2030	2035	2040	2045	2050	2055
2nd North–South Railway								
Naushki N	Sukhbaatar N	-	2,387	2,973	3,655	4,383	5,174	6,014
Sukhbaatar N	Eree N	-	4,968	5 982	7 073	8,161	9,271	10,369
Eree N	Dirhan N	-	7,353	8,768	10,240	11,672	13,087	14,433
Dirhan N	Salkhit N	-	6,685	8,001	9,220	10,245	11,214	12,086
Salkhit N	Zuunkharaa N	-	7,142	8,556	9,873	10,939	11,942	12,850
Zuunkharaa N	Arshaant N	-	7,153	8,568	9,887	10,953	11,957	12,865
Arshaant N	Khilem nuur	-	7,161	8,575	9,887	10,942	11,930	12,818
Khilem nuur	Doityn Bulag	-	5,980	7,200	8,363	9,354	10,319	11,244
Doityn Bulag	Bayantsagaan	-	5 980	7,200	8,363	9,354	10,319	11,244
Bayantsagaan	Tsagaandelger	-	5 980	7,200	8,363	9,354	10,319	11,244
Tsagaandelger	Bayanjargalan	-	5,980	7,200	8,363	9,354	10,319	11,244
Bayanjargalan	Ondorshil	-	5,980	7,200	8,363	9,354	10,319	11,244
Ondorshil	Nomgom Ertee	-	5,980	7,200	8,363	9,354	10,319	11,244

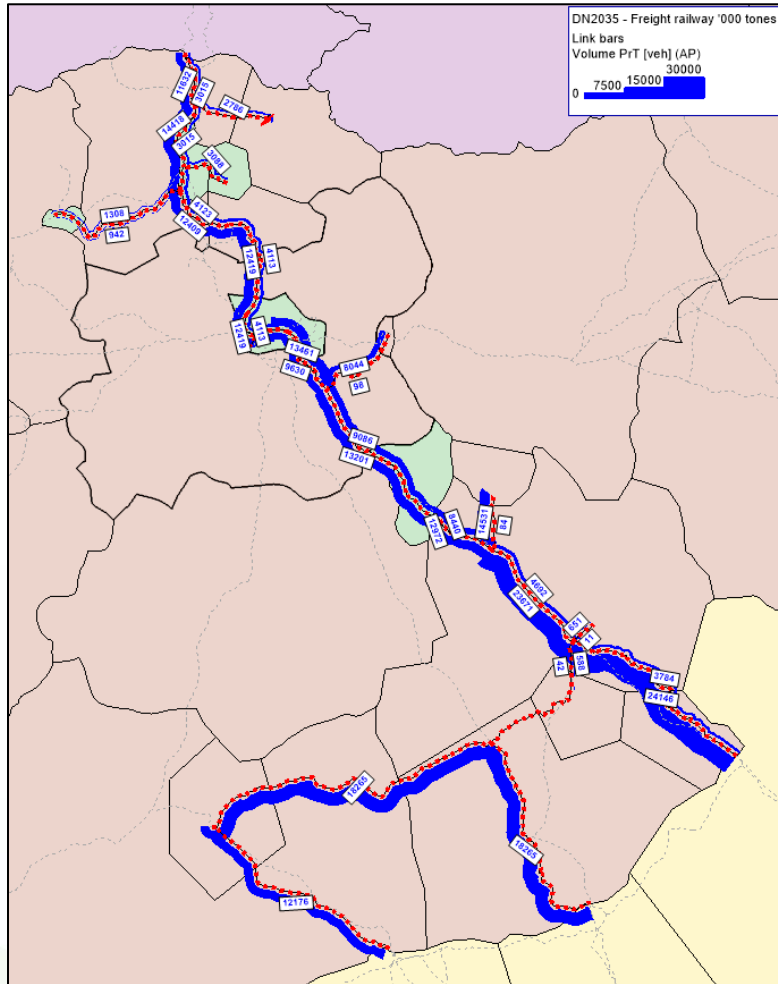
Traffic turnover of UBTZ and Project railway in With Project case

- Project line would become a strategic backbone of Mongolia's rail network, helping to balance freight volumes between the two north-south routes and enhancing overall system capacity
- This role would be more significant after 2040

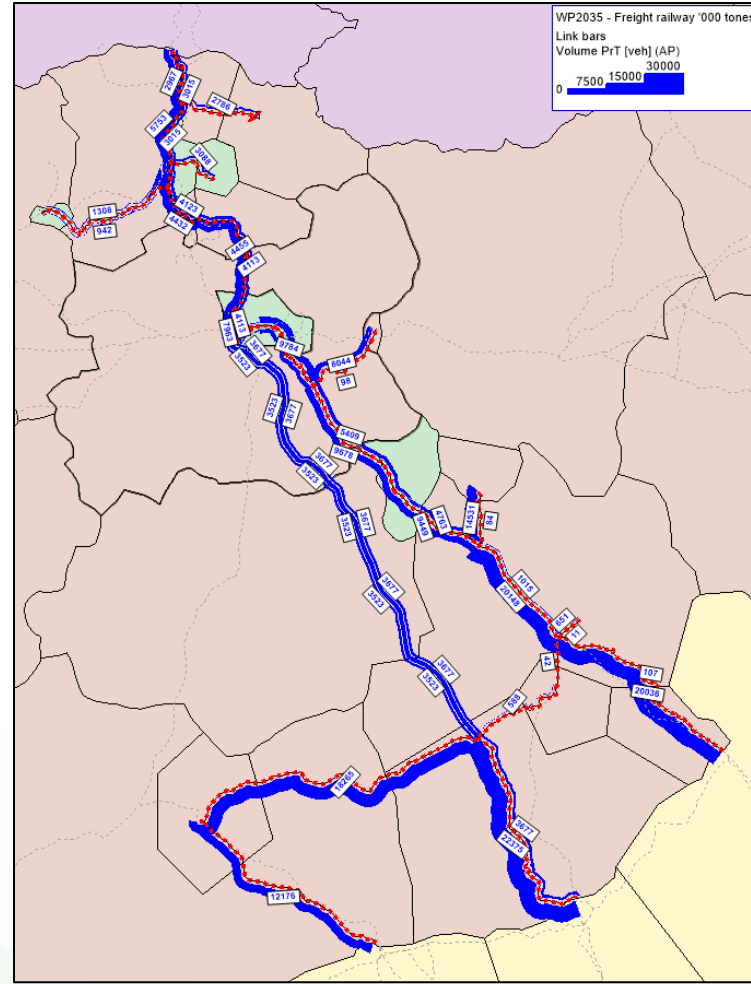


Traffic modelling results: With and Without Cases in 2035

Without Project case, 2035



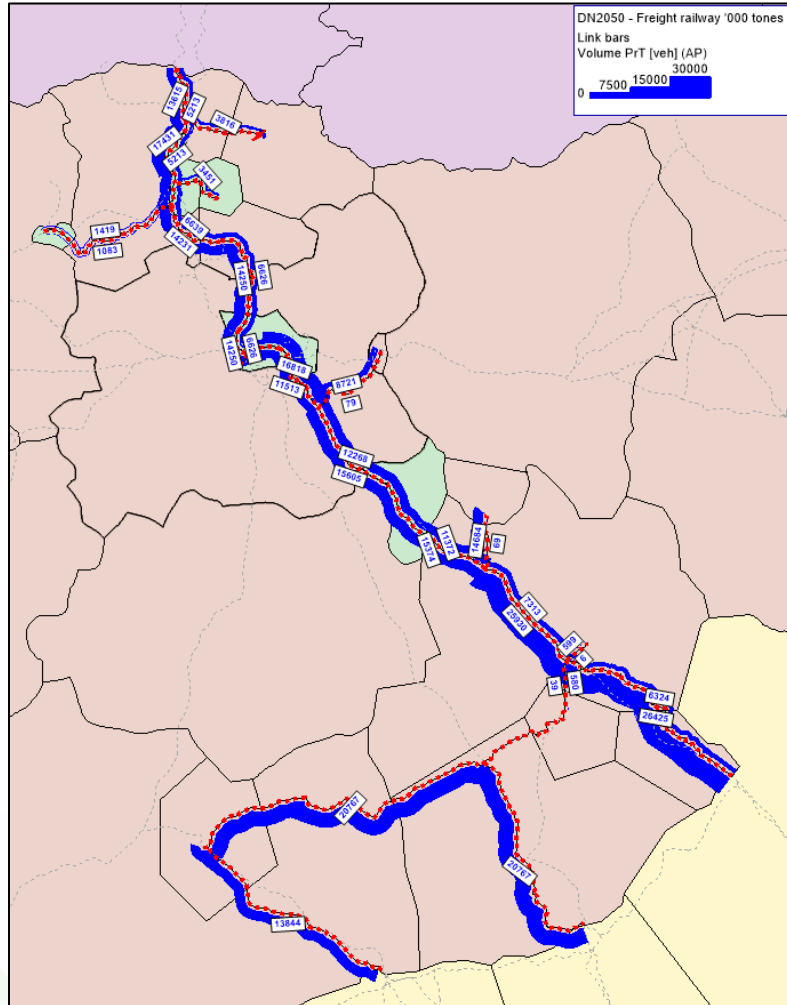
With Project case, 2035



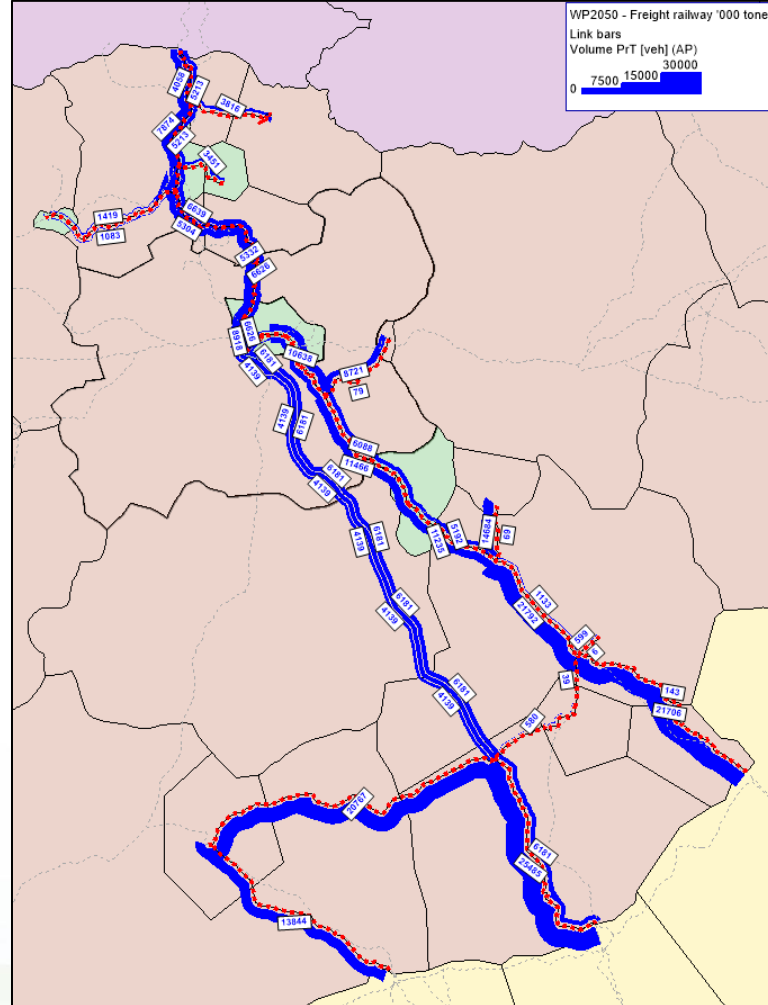
- Rapid initial buildup of coal and mineral export traffic on recently completed new links reduces UBTZ congestion south of Airag, and even the busy Sainshand–Zamyn Uud section may not saturate until around 2040
- UBTZ will continue to carry part of the future growth in rail freight demand, so reduced UBTZ congestion will result in the Project initially attracting only modest levels of traffic, with slower traffic buildup

Traffic modelling results: With and Without Cases, 2025

Without Project case, 2050



With Project case, 2050



- Forecast traffic to/from the PRC much higher than to/from Russia
- Most traffic growth will be coal/minerals exports from southern Mongolia to PRC, carried by UBTZ and the new lines (Project is too far north for this traffic)
- No large mine projects confirmed in the catchment
- Due to higher speeds, greater reliability and distance savings to some PRC O/Ds, Project will be attractive for transit and imports

Other possible sources of traffic

Some other plausible sources of additional traffic growth might include

- Agreements with PRC and Russia to route additional transit traffic
- Further diversion of transit traffic from other long-distance corridors
- Dangerous goods traffic
- New connecting routes being developed in the PRC
- Major new mining projects in the project catchment area

While these may offer opportunities in future, no reliable data was available to support their inclusion in the base case demand forecast



Engineering studies and cost estimation

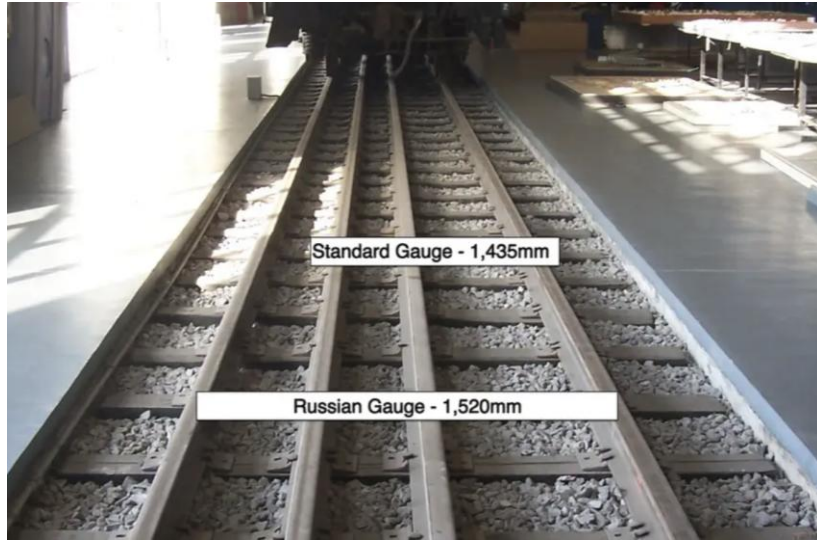
- Field review of the recently-completed Nomgon–Khangai line confirmed the appropriateness of the design, technical standards, and high standard of execution of construction works
- The proposed alignment has mostly flat and even terrain with low gradients
- The main components of the proposed Khushig Valley–Nomgon project are:
 - a 745 km of single-track railway infrastructure
 - 20 locomotives
 - 1,000 wagons
 - An inland container terminal and a crossborder train facility
 - Provision in layouts and handling equipment to support continuing trend toward containerization, including of bulks such as coal and iron ore
 - Total estimated investment cost of \$1.38 billion
- The additional cost to build the Khushig Valley–Russian border section was assumed to be in the region of \$944 million

Railway operations 1/2

- **New lines have already adopted modern, efficient approaches to railway freight and logistics services**, including use of scheduled block trains and provision of modern multimodal terminals and transshipment facilities.
- Tavan Tolgoy line has shown that **coal and bulks can be efficiently transported in containers**. The Project should adopt similar approaches
- **Private sector partnerships** should be incentivized, as private sector actors can often provide services in more efficiently which helps grow the business
- **Railway operating concept to focus on use of block trains**, particularly for import and export traffic. This avoids the need to build expensive shunting yards, reduces shunting costs, and enables more efficient use of rolling stock by reducing yard dwell times and wagon turnaround times



Railway operations 2/2



Need for high-quality transshipment facilities

- Most traffic will be to/from the PRC, so efficient transshipment between 1435mm and 1520mm is essential for competitiveness
- Ulaanbaatar area needs modern terminals that offer smooth rail to road transshipment
- Terminal designs should minimize shunting, ideally providing for full train lengths on the transshipment tracks. Use of modular design will support scaling of transshipment equipment and track capacity as demand grows

Offer freight rates competitive with UBTZ line. This can be achieved as the Project railway will have higher operational efficiency, better rolling stock utilization and lower staff requirements, and will focus on block train transport.

Financial analysis



- Estimated project cost includes costs of investment, replacement, residual values, and O&M costs
- Revenues based on average blended tariff level of approx. \$0.034/ton-km
- Estimated FIRR is well below financial discount rate of 9%, so Project is not financially viable and would lead to financial loss for railway company

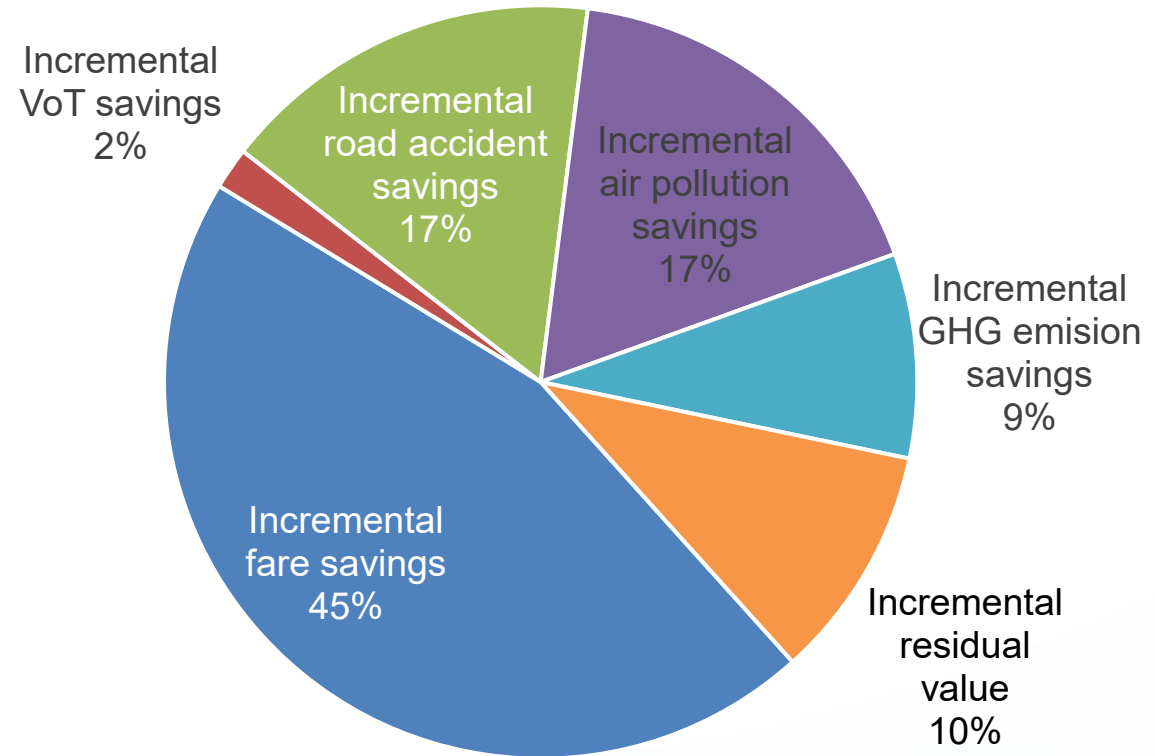
Findings of financial analysis

Section	FNPV (\$ million)	FIRR
Khushig Valley–Nomgon	-225.4	6.2%
Khushig Valley–Nomgon + existing lines	-698.8	-1.1%
2 nd North–South line	-228.8	7.2%
2 nd North–South line + existing lines	-1,093.7	-2.5%

- Main reason is that traffic buildup will be fairly slow, partly because the corresponding UBTZ sections will not reach saturation for many years

Economic analysis: economic benefits

- Financial investment and operating **costs converted to economic prices**
- Main quantified economic benefit is **fare savings** for excess traffic that would divert to road transport when capacity of some UBTZ sections is exceeded in the Without Project case after 2032.
- Other main benefits categories are **road accident savings, air pollution savings and GHG emission savings**
- **Time savings** are often a leading economic benefit of railway projects but are not significant in this case. Small time savings benefits would be realized for traffic diverted from the slower UBTZ (35 kph) to the Project railway (50 kph), There would be little scope for time savings for traffic diverted from road because average truck speeds (70 kph) exceed those assumed for the Project railway.



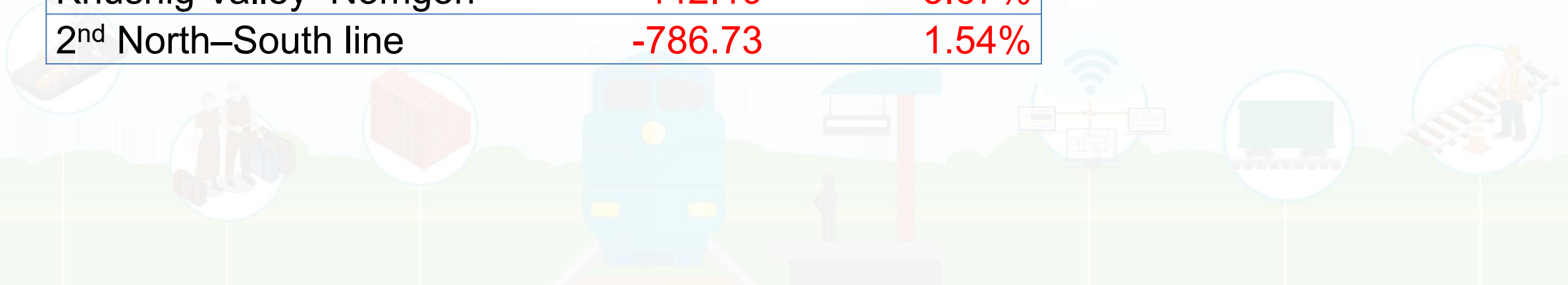
Economic analysis: economic viability assessment

The estimated EIRRs for Khushig Valley–Nomgon and the full 2nd North–South railway are well below the 9% economic discount rate, indicating that they are not expected to be economically viable and would result in a net economic loss for Mongolia



Findings of economic analysis

Section	ENPV (\$ million)	EIRR
Khushig Valley–Nomgon	-442.19	3.67%
2 nd North–South line	-786.73	1.54%



Sensitivity testing

- Sensitivity tests examined Project performance if Project traffic is 10%, 20% and 30% higher than forecast. While estimated FIRR's approach viability at 30% higher traffic, the estimated EIRR's remain well below the 9% threshold even if traffic is 30% higher

Findings of sensitivity testing

Project	Base case	Assumed increase in traffic		
		10%	20%	30%
Estimated FIRR				
Nomgon–Khushig Valley	6.23%	7.08%	7.89%	8.67%
2nd North–South Corridor	7.15%	7.61%	8.06%	8.50%
Estimated EIRR				
Nomgon–Khushig valley	3.67%	4.56%	5.38%	6.14%
2nd North–South Corridor	1.54%	2.32%	3.05%	3.74%

- Further calculations indicate that the Nomgon–Khushig Valley Project would only become financially viable if traffic is 35% higher and economically viable if traffic is 75% higher
- For the full 2nd North-South Corridor project, financial viability would only be reached if traffic is 41% higher and economic viability would require traffic to be 129% higher

Conclusions and next steps

- There are no major issues concerning technical and operational feasibility
- Rapid traffic growth has been concentrated in the UBTZ sections south of Ayrag and the new lines, while the Project railway is located too far north to serve such traffic
- Traffic is significantly lower on most UBTZ sections north of Ayrag, and most will not reach capacity saturation for many years. So UBTZ will continue to carry part of future growth in rail demand. As a result, UBTZ will continue to serve a share of this traffic, which will slow the buildup of traffic on the Project railway
- The project is strategically important to the PRC and Russia, and could potentially be made feasible for Mongolia if it can negotiate suitable traffic guarantees and/or financing contributions
- Next steps
 - Drawing on the PFS, review the case for further project preparation
 - Explore options for seeking assurances from the PRC and Russia
 - Depending on progress in exploring options, consider preparing full feasibility study

Thank you!

tyrrell.duncan@gmail.com

