



Enhancing Northeast Asia and Mongolia Economic Cooperation through Transport Network Development

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1. Introduction:

NEA cooperation. As is well known, Northeast Asia is a home to the 4 of the world's major powers, 2 of the 5 permanent members of the UN Security Council and 2 of the largest economies of the world. It is also a home to one of the world's hottest flash points. The situation in the sub-region remains fragile, although it is relatively stable, on the whole thanks to the determination and efforts of the countries of the sub-region.

This area of the world includes countries with very diverse political and economic conditions. The basis of an international economic cooperation framework could be a combination of rich mineral resources of Mongolia and investment capital and advanced technology from Japan and South Korea, as well as a considerable pool of workforce from China (PRC) and North Korea. Priority should be given to the development of those economic relations which involve the countries concerned directly into international cooperation.

Cooperation between the countries in the region should be based on the principles of reciprocity, sovereignty, territorial integrity, non-interference into internal affairs and removal of restrictions in trade and economic cooperation.

Table 1.1 Mongolia's foreign trade

	Export			Import		
	2009	2010	2011	2009	2010	2011
Total	1888 385.1	2 908 502.2	4 780 350.5	2 137 673.5	3 200 053.3	6 526 882.4
NEA	1 414 023	2 499 662.6	4 449 328.7	794 553.8	1 355 282.5	2 851 436.7
DPRK	-	25.5	-	47.1	798.5	740.0
ROK	15 458.1	30 519.9	1 896.1	155 102.2	181 781.9	350 648.5
PRC	1 393 906.7	2 466 265.5	4 400 735.7	538 582.6	970 976.0	2 007 572.2
Taiwan	94.0	182.0	10.0	3 768.4	5 238.1	8 966.5
Japan	4 564.2	2 669.7	10 694.6	97 053.5	196 488.0	483 509.5

Source: National Statistical Office, Mongolia

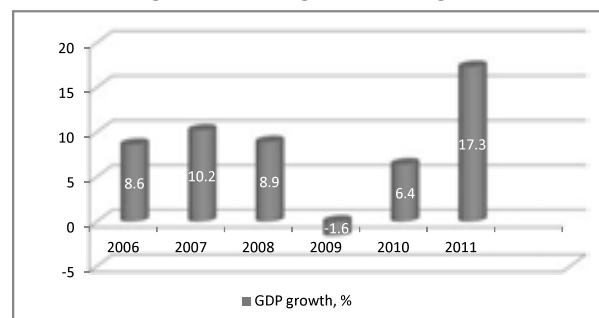
Mongolia's foreign trade is mainly carried with NEA countries (see table 1.1). Mongolia believes that the development of multilateral cooperation in NEA is of special significance for the economic development, strengthening cooperation and mutual confidence among the countries of the sub-region.

1.1 Mongolia's Macroeconomic Review

The economy of Mongolia did return to solid growth in 2011. Growth for 2011 has reached 17.3%, up from 6.4

% in 2010, and is being spurred by the development of large copper, coal and gold mining projects. High GDP forecasts are based on (i) continued strong flows of foreign direct investment, which has more than doubled between 2010 and 2011; (ii) continued rapid expansion of the mining sector, especially coal; (iii) public investment being raised by a factor three; and (iv) strong consumer demand due to the disbursements of cash to the citizens ahead of the 2012 elections.

Figure 1.1 GDP growth, Mongolia



Source: Mongolian Statistical Yearbook, 2011

The coal sector has become the fastest growing sector, surpassing copper exports in becoming the top export earner for the country. The PRC, the largest thermal coal consumer in the world, remains the only destination for coal from Mongolia. It is expected to grow even faster in the near future when large coal mining projects start production. At US\$ 11.3 billion, Mongolia's external trade grew 3.8 times in last 5 years (see table 1.2). Amount of import is 39% higher than the amount of export.

Figure 1.2 Share of GDP, Mongolia

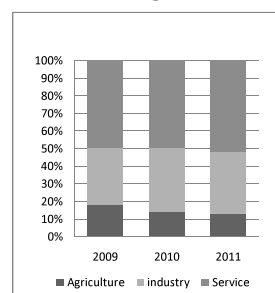
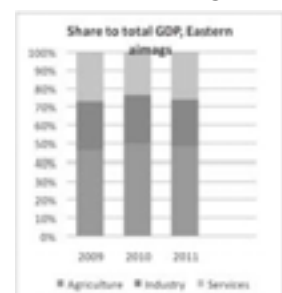


Figure 1.3 Share of GDP, Eastern aimags



Source: Mongolian Statistical Yearbooks

Equipment, machineries and electrical appliances are the most imported products as the accelerating economy requires fuels for growth. On other hand, led by coal, mineral products account for most of the export. As of 2011, 92% of Mongolia's total export went to PRC and 32% of the total import came from the same country.

2. Infrastructure capacity review

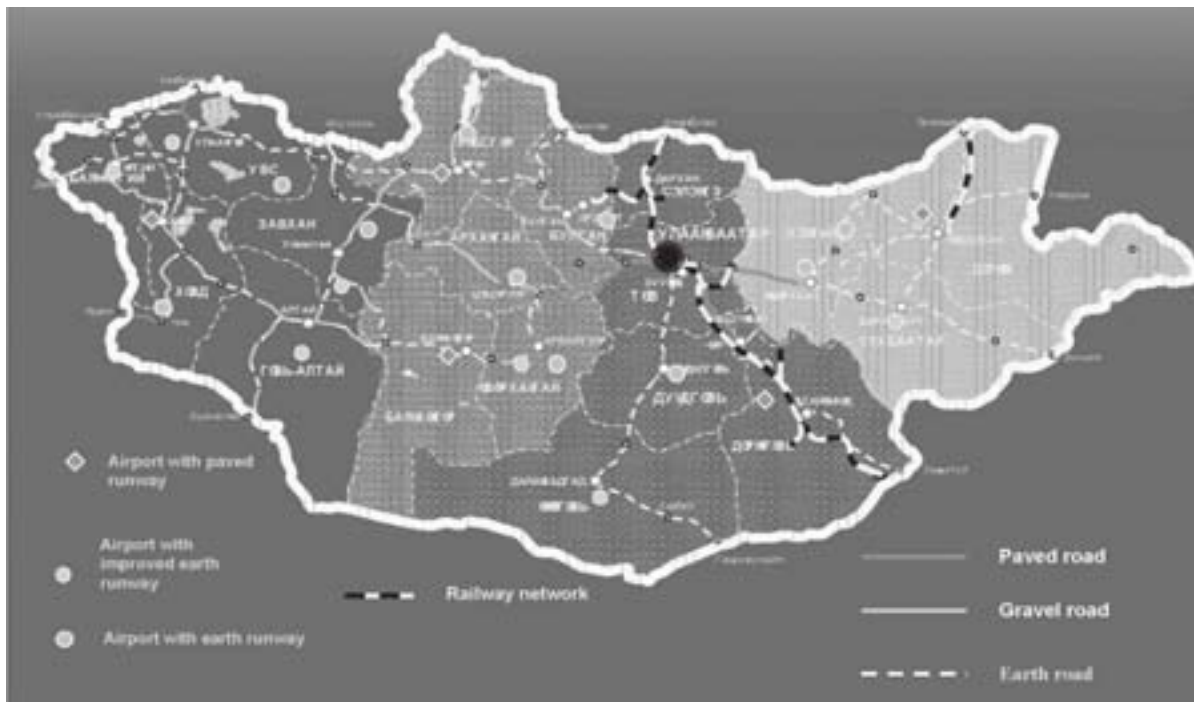
2.1. Transport sector of Mongolia

The transport sector in Mongolia is divided over four modes - railway, roads, air, and inland waterway. As can be seen in Table 2.1 in freight transport, the railway is the

Table 1.2 Foreign Trade of Mongolia over the last 10 years, Million US\$

Year	Exports				Imports				Trade balance
	Russia	PRC	Others	Total	Russia	PRC	Others	Total	
2002	48.09	220.5	255.57	524	237.63	167.7	313.64	690.74	-166.78
2003	41.2	287	287.7	615.9	265.4	196.3	339.3	801	-185.1
2004	20.6	413.9	435.2	869.7	341.9	257.2	422	1,021.1	-151.4
2005	27.9	514.2	523.5	1,064.9	417.9	307.3	459.3	1,184.3	-119.4
2006	45.1	1,050.2	447.5	1,542.8	547.8	365	422.2	1,435.0	107.8
2007	58.5	1,411.4	477.3	1,947.2	745	568.9	753.9	2,061.8	-114.6
2008	86.3	1,635.9	812.3	2,534.5	1,242.3	898.7	1,103.5	3,244.5	-101
2009	68.2	1,393.9	423.3	1,885.4	772.8	538.6	826.3	2,137.7	-252.3
2010	82.7	2,466.3	359.5	2,908.5	1,096.7	970.9	1,132.4	3,200.0	-291.5
2011	95.9	4,400.7	283.9	4,780.5	1,595.9	2,007.6	2,923.1	6,526.9	-1,746

Figure 2.1 Transport Networks of Mongolia



Source: Ministry of Roads, Transport, Construction and Urban Development, Mongolia

Table 2.1 Summary Transportation Statistics for Mongolia

	2007	2008	2009	2010	2011
Freight (Thousand tones)	23,281.6	23,904.4	24,729.7	29,415.9	43,956.6
By Rail	14,072.6	14,646.9	14,164.5	16,753.2	18,327.4
By Road	9,207.1	9,255.7	10,563.8	12,610.2	25,635.3
By Air	1,887.2	1,847.0	1,369.3	1,641.6	2,930.9
Freight (Million TKM)	9,030.2	9,051.4	8,981.3	12,106.4	16,300.2
By Rail	8,360.7	8,261.4	7,817.0	10,286.7	11,382.2
By Road	661.9	782.1	1,160.7	1,834.0	4,910.3
By Air	7,720.6	7,926.5	3,666.7	4,169.5	7,708.6
Passengers (Million)	209.9	231.6	232.4	250.7	296.2
By Rail	4.5	4.4	3.1	3.5	3.8
By Road	205.0	226.9	229.0	246.7	291.8
By Air	0.4	0.4	0.3	0.4	0.6
Passengers (Million PKM)	3,263.1	3,607.3	3,173.1	3,607.4	4,696.1
By Rail	1,406.4	1,400.5	1,003.1	1,220.0	1,400.1
By Road	869.7	1,215.0	1,535.9	1,480.2	2,321.8
By Air	987.1	991.9	634.1	907.2	974.1

Source: *Mongolia Statistical Yearbook 2011*, National Statistical Office, Ulaanbaatar 2011

dominant mode both in terms of tones and tone-kilometers. With the historic significance of mining industries in Mongolia, the railway has been the primary mode of transport for the heavy and bulk freight. Given the poor condition of the roads, the high cost of air transport, and the limited range of the waterways, the railway has had little competition in freight transport from other modes. As shown in Table 2.1, the majority of freight traffic in Mongolia is handled by the railway (approximately 86%).

The rail share is very high compared to other developing countries, where highways carry the majority of the freight traffic in terms of tones (e.g. in PRC highways carry 76.5% of freight traffic whereas railways only carry 13.1%). This can mainly be attributed to the bad conditions of the highways in Mongolia.

Road network. Mongolia's road network overall (including both state and local roads) totals approximately 49,000 kilometers, connecting 21 major cities and towns and 160 smaller villages (soums and bags) (Figure 2.1). Roads in Mongolia are administratively classified into two: (i) State Roads, which are intended to connect Ulaanbaatar with aimag (province) centers, important towns, and important border crossings; and (ii) Local Roads, which are intended to connect aimag centers with other aimag and soum centers.

There are approximately 11,063 km of state roads and 38,187 km of local roads in Mongolia. Most of the roads in Mongolia are poorly maintained gravel or earth roads and as much as 75.6% of state roads and 97.7% of local roads are earth roads. Only about 1,670 kilometers of state and local roads are classified "paved", while an additional 3,820 km of state and local roads are classified as "gravel" and "improved earth road".

It is recognized that development of key infrastructure such as roads will contribute to Mongolia's global integration and improve the living conditions of the poor by improving access to goods and services. One measure of the growing importance of roads is reflected in the strong

growth in vehicle ownership in Mongolia since 1990. The largest growth was observed in private car ownership, which grew at an annual average rate of 23.43%. This is followed by publicly-owned cars, which grew at an average annual rate of 18.85% during the same period.

Rail network. One of the primary weaknesses of railway transport in Mongolia is its limited coverage. The railway network extends only 1,815 km, principally in the north-south direction connecting to the Russian and Chinese Railways, respectively. The Mongolian main railway line passes through Ulaanbaatar, and connects the Chinese rail system in the south with the Russian Trans-Siberian line in the north, a distance of about 1,400 km. The transport network in eastern Mongolia, which also shows the Choibalsan-Ereentsav rail line, is presented in Figure 2.1. The second rail line in Mongolia is in eastern Mongolia. This line is 237.6 kilometers long, is broad gauge, and runs from Choibalsan to the border with the Russian Federation at Ereentsav. From there the rail line continues on for another 90 kilometers to Borzya, where it links with the Trans-Manchurian Railway. From here a connection can be made to the Trans-Siberian Main Line, which is 247 kilometers away. The distance from Borzya to the Russian terminal station at Zabaikalsk at the Russian Federation-PRC border is 117 kilometers. The Choibalsan-Ereentsav line was constructed in 1939. Rail type R-50 and wooden sleepers are used for this line. The maximum gradient is 9% and the minimum curve radius is 300 m. There are only six stations along this line and the capacity of the railway is seven train pairs a day. Due to limited freight being generated along the line and the decrease in trade between the Russian Federation and Mongolia, this line is currently operating below capacity.

In 2010 The State Great Khural (Parliament) of Mongolia has endorsed the State policy on Railway Transportation (Figure 2.2). According to the Policy approximately 5,683.5 km of main railway composition shall be newly built in Mongolia in 3 stages.

Figure 2.2 Railway network development plan of Mongolia



The first stage (approximately 1,100 km in total) is:

- Dalanzadgad -Tavantolgoi-Tsagaan suvarga-Zuunbayan 400 km;
- Sainshand-Baruun Urt -350 km;
- Baruun Urt-Khuut - 140 km;
- Khuut-Choibalsan - 150 km.

The rail lines will have broader gauge of 1,520 mm with axle load of 25 tons per axle.

2.2. Border Crossing Points (BCPs)

Zamyn Uud is the largest border crossing in Mongolia, both in terms of general cargo and overall tonnage. Besides petroleum products, 90% of the total import, and 75% of the total export pass through Zamyn-Uud. Transit traffic is also significant. The BCP is located on the Trans-Mongolian Railways, which links up with the Trans-Siberian Railways in the north and the rail line to Beijing and Tianjin in the south. Mongolia has transit arrangements with the PRC through the port of Tianjin. As a result, much of their third-country trade is routed along this corridor. In addition, the PRC is Mongolia's main trading partner and most bilateral general cargo traffic goes through this BCP.

In general, there are relatively low numbers of passengers using the borders, other than the drivers of the coal and general cargo trucks. The exception is Zamyn Uud, which has significant numbers of people engaging in cross-border trade, many returning the same day by road or rail. There is also some tourist traffic, mainly southbound, but the amount is small and seasonal.

In 2010 ADB approved the Regional Logistics Development Project at this location that is designed to handle much of the rail traffic, especially containers. This is a major project for a multimodal terminal costing \$71.59 million, of which \$40 million would be funded by an ADB loan. Given ADB's heavy investment in the rail border sector, it was considered the primary focus of the assessment should be on the residual road BCP activities, covering both passenger and freight traffic, which would not be enhanced by this development.

3. Future Development Potential

3.1 Review of on-going/planned economic development projects likely to impact future traffic

State Policy on Railway Transportation endorsed by the State Great Hural (Parliament) of Mongolia says that the issues of broadening the main railway composition, direction to build new railway and processing and exporting of mining products shall be resolved in close relation.

Nowadays, there are 3 on-going mega-projects that have great impact on future traffic:

1) Tavan Tolgoi (TT) coal mine project

In 2020, volume of the unprocessed products of the mine would be 67.7 million tons. This mine has 6 operational sites:

- West Tsanhi (owned by Erdenes Tavantolgoi): 15.0 million tons per year;
- East Tsankhi (Erdenes Tavantolgoi): 15.0 million tons per year;
- Ukhua khudag (Energy resources): 15.2 million tons per year;

- "Small" Tavantolgoi (Tavantolgoi LC): 8.0 million tons per year;
- West Naran (Energy Resources): 10.0 million tons per year;
- Tsant Uul (Hunnu): 4.5 million tons per year.

2) Nariin Sukhait (NS) coal mine project

In 2020, volume of the unprocessed products of the mine would be 30.5 million tons. This mine has 3 operational sites:

- Ovoot tolgoi, Sumber (South Gobi): 14.0 million tons per year;
- Nariin Sukhait (MAK): 15.0 million tons per year;
- Nariin Sukhait (MAK joint venture): 1.5 million tons per year;

3) Oyu Tolgoi (OT) copper mine project

Expected production volume is 2.1 million tons of copper concentrate.

On the basis of the washing and crashing outcomes of each mine, it is expected that in 2020 total coal exploration would reach up to 98.2 million tons 66.8 million tons of which will be transported by rail.

Exploration of Tavantolgoi mine will reach 46.5 million tons per year, of which:

- 29.7 million tons - coking coal;
- 16.8 million tons - steam coal.

Exploration of Nariin Sukhait would be 20.3 million tons per year, of which:

- 14.1 million tons -coking coal;
- 6.2 million tons - steam coal

3.2 . Traffic and Transport demand forecasting

3.2.1. Road traffic forecast

For planning and designing roads, traffic along the corridor can be classified as normal traffic, diverted traffic and generated traffic. **Normal traffic** is traffic that currently uses the road on both directions between the origin and destination. **Diverted traffic** means traffic transferred from other routes after the construction of the road not changing its origin and destination. **Generated traffic** is newly created traffic due to economic growth and demand increase after construction of the road. In general, traffic forecast can be undertaken on the basis of the various factors such as population growth, GDP growth, increase of vehicles, volume of the industrial and agricultural products, and consumption of the fuel and so on.

Simple forecasting technique suggested to use the following variables: income growth measured by GDP/capita growth rate, population growth rate and income elasticity, price and cross price elasticity. The equation which is often used is:

For passenger transportation:

$$\text{GRPT} = \left[\left\{ \left(\frac{\text{GDPpc}}{100} \times \text{IEp} \right) / 100 + 1 \right\} \times (\text{PGR}/100 + 1) - 1 \right] \times 100 \quad (1)$$

Where: GRPT = growth rate of passenger traffic per year;

GDPpc = Growth rate of GDP/capita;

IEp = GDP/capita traffic elasticity;

PGR = population growth rate.

Where: IEp = GDPa/Q (GDPa: GDP/capita and Q is traffic volume.)

For freight transportation:

$$\text{GRFT} = \text{GDP} \times \text{IEf} \quad (2)$$

Where:

GRFT = annual average growth rate of freight traffic;

GDP = Annual growth rate of GDP;

IEf = GDP/capita freight traffic elasticity.

GDP/capita traffic elasticity is fluctuated between 1.2 - 2.0 for most developing countries. As for Mongolia, it is higher than this fluctuation depending on long distance traffic and poor road conditions. It is determined by the Feasibility studies on road construction, conducted by the ADB, WB and Kuwait foundation. For example, in the Transport Rehabilitation project funded by WB and Road development project funded by ADB the GDP/capita traffic elasticity was used as for passenger transportation 1.4-1.8, and for freight transportation: 1.0-1.5. However, in the prefeasibility study of the Millennium Road project it was taken: for passenger transportation -1.4-2.0 and for freight transportation- 1.1-1.5.

On the basis of the above mentioned methodology and gathered data growth rates of the passenger and freight

traffic between the sections of the road corridor 1a would be as follows (Table 3.1):

Accordingly, traffic would increase per year by 19.9-25.2% for passenger transportation, for freight 8.0-10.7%-freight transportation until 2025. However in the project area, especially between Choibalsan (possibly Khuut) and Sumber BCP (Nomrog bridge) a new railway line is planned to be built. Considering this situation, the following growth rates (Table 3.2) have been used for traffic estimates through Sumber BCP (Nomrog bridge).

On the basis of the above future growth rates, daily average normal traffic between 2012 and 2025 has been estimated (Table 3.3). In addition, diverted and generated traffic have been shown as well.

If construction of the road section is completed in 2015, current daily traffic will be doubled reaching 899 vehicles. In 2025, average daily traffic will be increased 10.9 times reaching up to 3,632 compared with 2015 (Table 3.3).

During the field trip along the Road Corridor 1a, the revision traffic count between the cities has been conducted in order to verify the above traffic survey (Table 3.4).

Table 3.1 Annual growth rates of the passenger and freight traffic

Years	Growth rate			GDP/capita traffic elasticity		Growth percentage	
	GDP	Population	GDP/capita	Passenger traffic (IEp)	Freight traffic (IEf)	Passenger traffic	Freight traffic
2015	7.7	2.0	5.7	1.75	1.39	25.2	10.70
2020	7.0	2.0	5.0	1.62	1.35	23.5	9.45
2025	7.0	2.0	5.0	1.35	1.15	19.9	8.05

Table 3.2 Future growth rates of passenger and freight traffic

Type of Vehicles	2012-2015	2016-2020	2021-2025
Car Small/Medium	5.0	23.0	15.0
Jeep 4WD	5.0	23.0	10.0
Truck Light	3.0	9.0	8.0
Truck Medium	3.0	9.0	8.0
Truck Heavy	3.0	9.0	8.0
Truck Articulated	3.0	9.0	8.0
Bus Light	5.0	23.0	15.0
Bus Medium	5.0	23.0	15.0
Bus Heavy Duty	5.0	23.0	15.0
Weighted average	4.1	19.7	13.3

Table 3.3 Traffic forecast between Choibalsan and Sumber BCP (Nomrog bridge)

Years	Cars Small/ Medium	Jeep 4WD	Truck Light	Truck Medium	Truck Heavy	Truck Articulated	Bus Light	Bus Medium	Bus Heavy	Total of the Normal Traffic	Diverted traffic	Generated traffic	Total traffic
2012	245	61	65	24	24	8	33	2	2	464	0	0	464
2013	257	64	68	25	25	9	34	2	2	487	0	0	487
2014	270	67	72	27	27	9	36	2	2	512	0	0	512
2015	332	83	78	29	29	10	44	3	3	610	191	98	899
2016	408	102	85	32	32	11	54	3	3	729	210	119	1,058
2017	502	125	93	34	34	12	67	3	3	874	230	145	1,248
2018	617	154	101	38	38	13	82	3	3	1,050	235	176	1,460
2019	759	189	110	41	41	14	101	4	4	1,263	245	214	1,722
2020	934	233	120	45	45	16	124	4	4	1,524	249	261	2,034
2021	1,074	267	130	48	48	17	143	5	5	1,737	260	213	2,210
2022	1,235	307	140	52	52	18	164	5	5	1,981	275	244	2,499
2023	1,421	354	152	56	56	20	189	6	6	2,259	290	279	2,828
2024	1,634	407	164	61	61	21	217	7	7	2,578	310	319	3,207
2025	1,879	468	177	66	66	23	250	8	8	2,944	323	365	3,632

Source: Preliminary study on Road Section between Choibalsan and Sumber-Degee River, funded by the National Development and Innovation Committee, Mongolia and Modified by the Consultant on the basis of the traffic count revision during the field survey in April, 2012

Table 3.4 Summary of Traffic Counts by O/D survey Site- Two Directions- April 22-26, 2012

Road section O/D	Car	Jeep	Light truck	Medium truck	Heavy truck/ articulated truck	Minibus	Medium bus	Heavy bus	Motorcycle	Total	Daily traffic along the Road corridor
Ulaanbaatar toll gate-Nalaikh/ Nalaikh-UB toll gate	71/51	12/11	14/18	5/3	7/5	7/4	3/5	1/0	0/0	120/97 (an hour)	2604
Nalaikh-Baganuur/ Baganuur- Nalaikh	53/46	16/12	17/16	3/5	4/6	6/7	2/0	0/0	3/1	104/93 (an hour)	2364
Baganuur-Undurkhaan / Undurkhaan-Baganuur	22/29	10/15	25/29	12/17	4/6	14/19	3/3	0/0	4/4	94/122 (3hour)	864
Undurkhaan- Choibalsan/ Choibalsan-Undurkhaan	26/14	8/10	7/5	4/2	3/5	2/4	1/3	1/1	2/4	54/48 (4 hour)	306
Choibalsan-Sumber (Nomrog)/ Sumber Nomrog)-Choibalsan	17/12	8/7	7/6	3/4	3/4	2/3	3/2	0/0	3/3	46/41 (5 hour)	208
Total											6138

3.2.2 Rail traffic forecasts

Rail traffic is connected mainly with minerals transportation in Mongolia. Therefore, potential mining projects should be considered in order to forecast transportation demand for the Corridor.

The Mines of principal interest are indicated in the map in the Figure 3.1 and Table 3.5. Significant copper deposits are found at Oyu Tolgoi and Tsagaan Suvarga. The coal deposits at Tavantolgoi and Nariin Sukhait are known to be particular significant. Tavan Tolgoi strategic coal deposit covering totally 80 thousand hectares area is located

in the Ulaan nuur area of Tsogttsetsii soum, Omnogobi province, with approving reserves of 1.5 billion ton coking and energy coal, and possible exploitation reserves of 4.9 billion ton. Totally 13 companies and consortiums had expressed their interest to invest in Tavan Tolgoi coal deposit after the invitation, based on the principals and guidelines of the State Great Khural, had been sent to the companies with financial ability and experience in mining sector. They are South Korean consortium of 11 companies, Russian consortium of 3 companies, USA, China, Japanese consortium, India, Brazil, Australia and Switzerland. The

Figure 3.1 Important Mines in Mongolia



Table 3.5 Potential Major Mines in Southern Mongolia

Mine	Minerals	Life, years	Production (thousand tons/year)	Employment Estimate	Start date Estimate
Tavan tolgoi	Coal	200+	15,000	1500	2012
Ukhaakhudag	Coal	40	10,000	1000	2009
Baruunnaran	Coal	20	6,000	500	2012
Tsagaan tolgoi	Coal	20	2,000	150	2015
Nariin Sukhait	Coal	40	12,000	150	2015
Ovoot tolgoi	Coal	50	5,000	400	2008
Sumber	Coal	50	5,000	400	2015
Shivee Ovoo	Coal	200+	14,000	600	2015
Oyu Tolgoi*	Copper	50	2,000	4000	2012
Tsagaan Suvrraga*	Copper	20	250	1000	2012
Total				7800	

Note: *- Production figure is for copper concentrate (30% copper)

initial introduction is made for the representatives of them and the Working group with consultants is reviewing and comparing the proposals received from them. The second negotiation will start after the infrastructure issue will be resolved.

Demand of NEA for coal. Northeast Asia demand for coking coal would be 168 million tons in 2020. This is 5 times bigger than amount of processed coal in Tavantolgoi (Figure 3.2).

Coal deposits are scattered all over the country and coal in the past was mostly used in thermal power facilities

before becoming a major export commodity. However, it is in the south that the major developments are taking place. The Government-controlled Tavan Tolgoi mine is situated in South Gobi desert 98 km east of Dalanzadgad. It has been in operation since 1967 and has estimated reserves of 1.9 billion tons of coking coal from a total of 4.5 billion tons of reserves and could produce as much as 20 million tons per year. The mine is situated 400 km from the nearest railway, which poses a logistical problem. Plans for the development of a new rail link, either directly south or eastwards to connect with the existing trans-Mongolian

Figure 3.2 Demand for coal in Northeast Asia, million tons per year, 2020

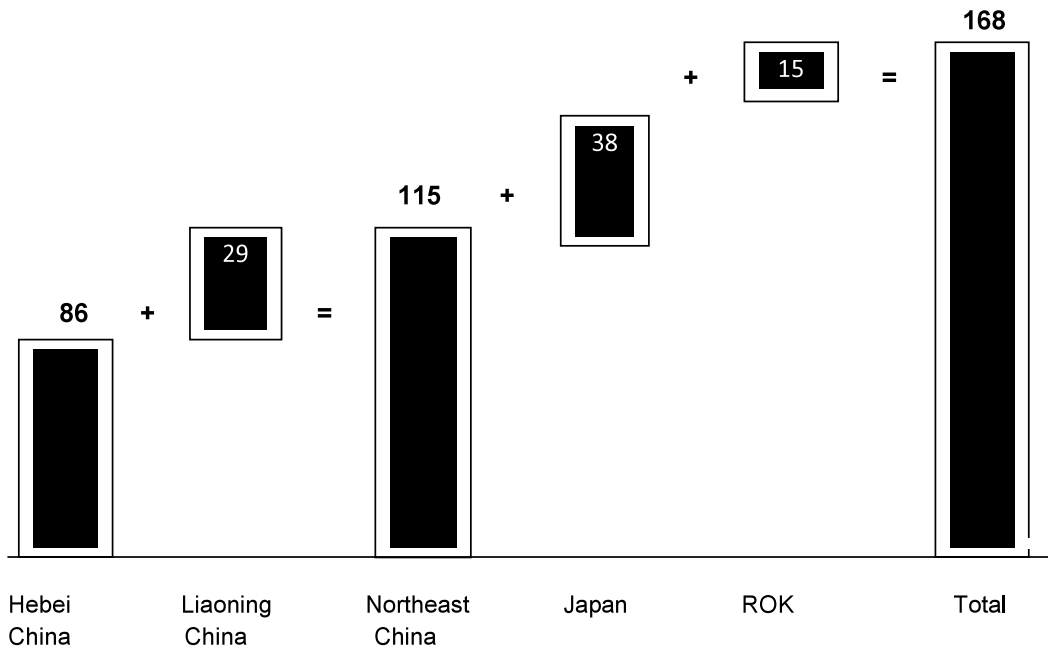


Figure 3.3 Mineral transportation flow, million tons

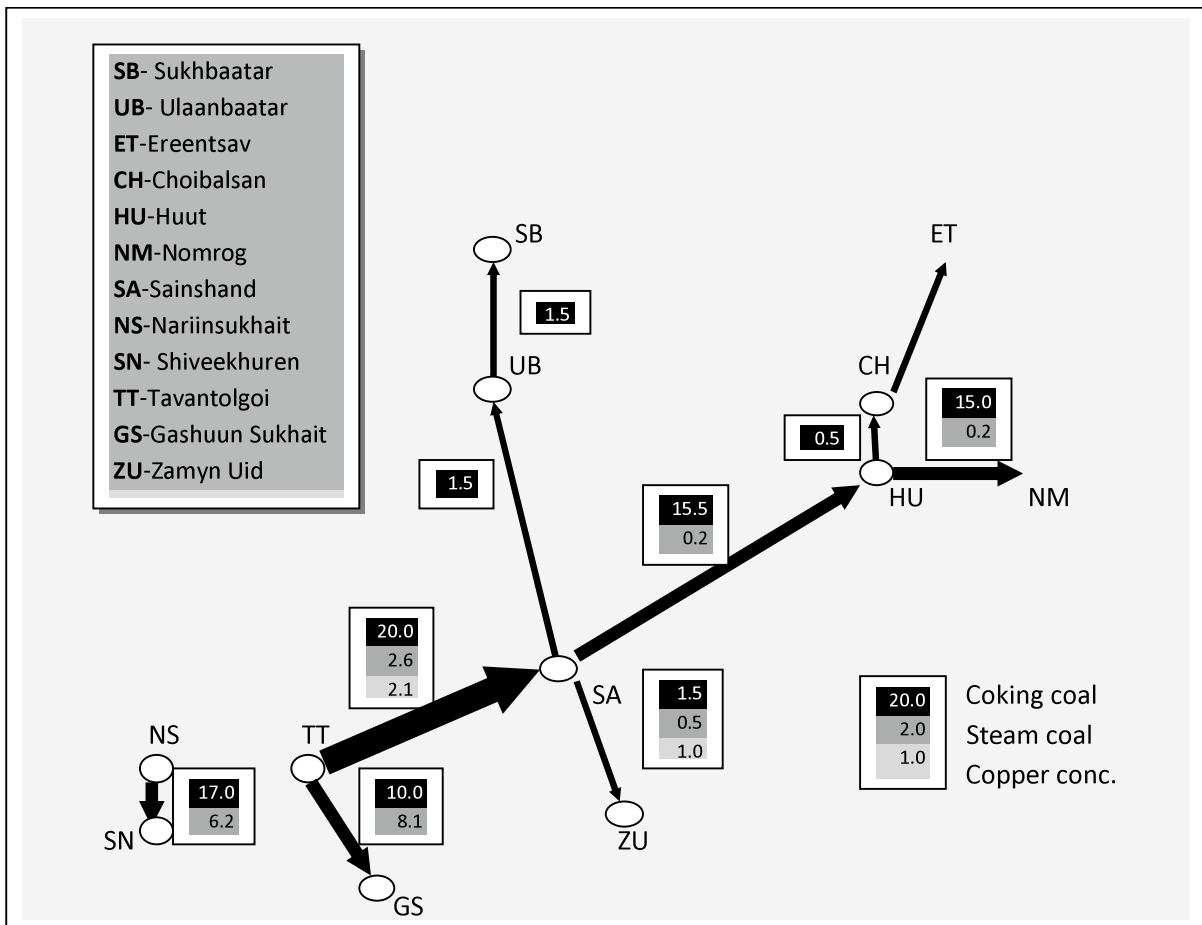


Figure 3.4 Margin from Mongolian coking coal export to China

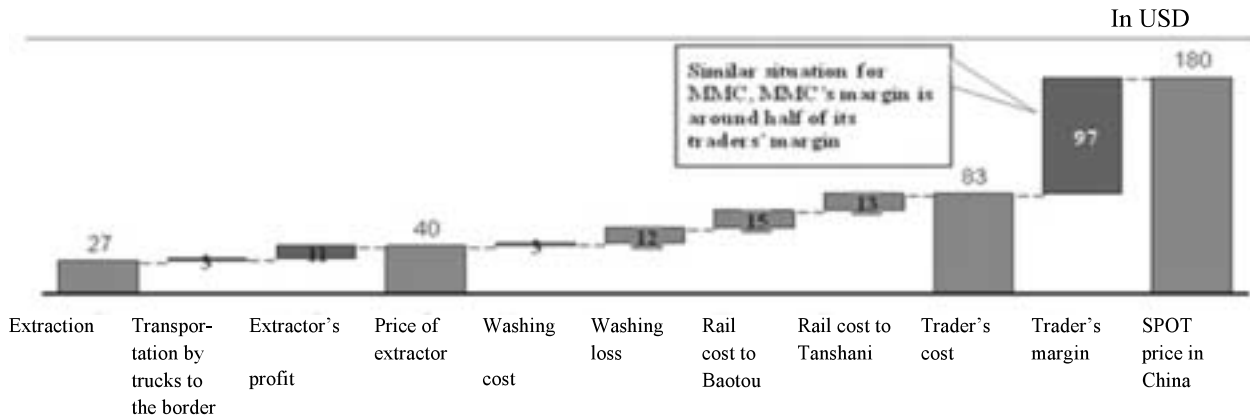
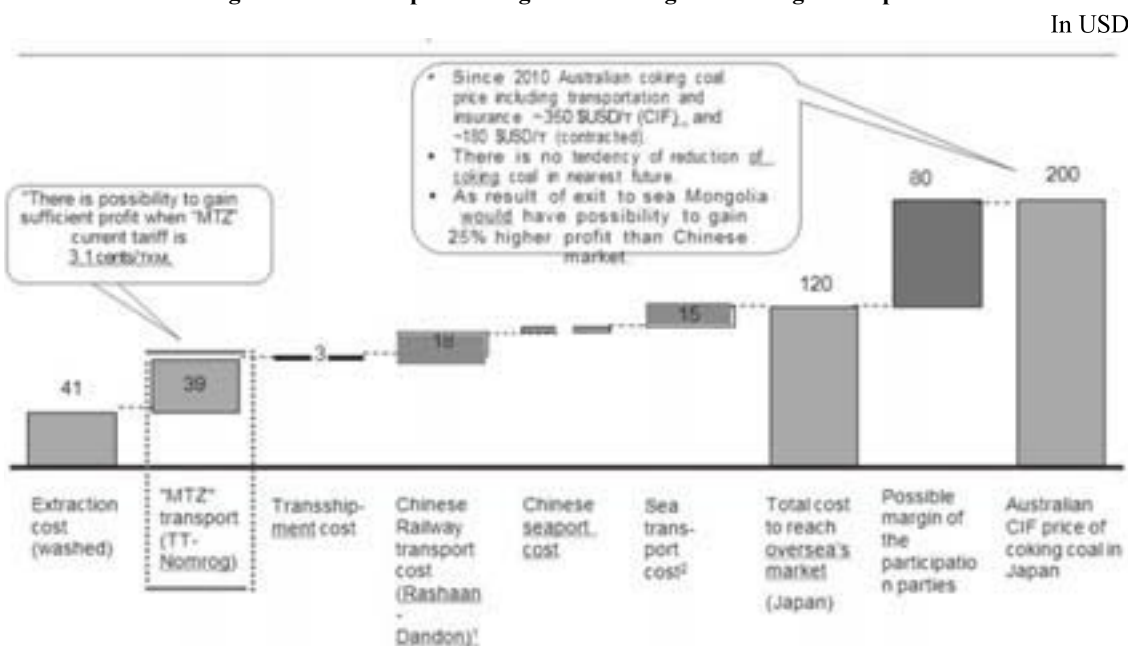


Figure 3.5 Possible profit margin from Mongolian coking coal export



Source: Consulting company-Boston group

line, have yet to be firmed up.

Approximately 100 km south of Tavan Tolgoi are the Tsagan Tolgoi mines and about 200 km to the east are the Nariin Sukhait coal deposit and the Ovoot Tolgoi coal development. The Ovoot Tolgoi coal development has estimated surface coal reserves of 114 million tons. The project is situated next to the existing MAK/Qinhua coal mine, approximately 45 km north of the Mongolian/Chinese border and the Chinese town of Ceke. A major coal basin runs 120 km east and west of Nariin Sukhait and many other coal mines in the basin have significant reserves that would eventually be exploited.

As mentioned earlier that approximate volume of coal to be transported by rail in 2020 would be 66 million tons. This volume of coal will be distributed to following routes (see Figure 3.3):

Per year- 23.2 million tons from Nariin Sukhait to Shivee Khuren;

Per year- 18.1 million tons from Tavantolgoi to Gashuun Sukhait;

Per year- 24.7 million from Tolgoi to Sainshand;
 Per year- 15.7 million from Sainshand to Khuut;
 Per year- 15.2 million tons from Khuut to Sumber BCP (Nomrog);
 Per year- 0.5 million tons from Khuut to Choibalsan.

According to our estimates, 15.2 million tons coal would be delivered mainly to Chinese market. However, some shares of the coal would be exported to Republic of Korea (ROK) and Japan as well.

On the basis of the interviews' of officers from the freight forwarders, transport operators and railway specialists, we assume that very rough shares would be as follows:

Eastern China: 10.6 million tons (70%) per year
 ROK: 2.3 million tons (15%) per year
 Japan: 2.3 million tons (15%) per year.

Above share is very rough and it will depend on transportation costs, market prices and so on.

Figure 3.4 and 3.5 show margin from Mongolian

Table 3.6 Tourism Products for Eastern Mongolia

Tourism Resources	Existing and Potential Products	Potential Market Segments By Activity
Unique steppe flora and fauna, especially Mongolian gazelle	Steppe and Flora Tours	Ecotourism, education, photography, and research
Unique landscapes and lakes of Sukhbaatar and Dornod Aimags	Adventure 4WD Safari Tours	Hard and Soft adventure travel based on walking, climbing, riding, swimming, fishing, photogrpahy, and visits to herdsman's ger camps
Historic and archeological sites of the Mongols and other groups in Hentii, Dornod, and Sukhbaatar	Archeological Discovery Tours	Culture, research, education, and ecotourism
Culture of nomadic herdsman and unique steppe landscape	Soft Adventure, Sightseeing Tours	Sightseeing and photography based on visits to herdsman; optional horseback riding tours and hiking tours
Buir, Ganga, and Sumiin Steppe lakes	Lake Resort Facilities; Fishing Tours	Rest, relaxation, entertainment, and medical treatments; special interest in freshwater fishing
Hunting Areas at Khenti-Batashreet, Dornod-Bayan Uul, Dornod-Matad-Sumber, and Sukhbaatar	Hunting Expeditions	Hunting Segments
Unique Landscapes, flora and fauna, lakes	Incentive Tours	Team building exercises in unique environment: horseback riding, paragliding, survival games
Unique Landscapes, flora and fauna, lakes, and nomadic lifestyle	Caravan Tours	Hard and Soft adventure travel based on camping, visiting herdsman's gers, photography

Source: *Marketing and Product Development*; UNDP; WTO Project RAS/00/088; Madrid 2002

coking coal to China (current situation) and possible profit margin from its export to Japan respectively. Margin for coking coal shipments to markets other than China is positive and enables diversification.

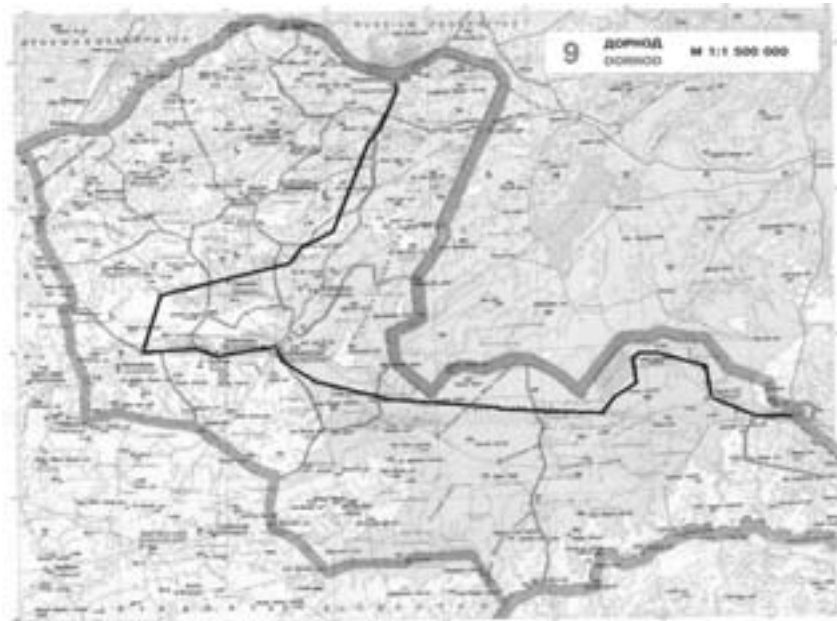
3.2.3 Tourism demand in the project area

The tourism sector, including especially ecotourism, is projected to be a key driver of sustainable economic development in the Project Area. The minerals and petroleum sector development and resulting cross-border trade will take 7 to 10 years to materialize based on the need for further exploration and development of institutional and transport infrastructure to support a viable export-oriented industry. Therefore, in the short-term cross-border tourism appears as the only viable option, particularly in light of the environmental assets and both governments' interest in their preservation on both sides of the river.

Natural and Cultural Assets. As shown in Table 3.6, the eastern region of Mongolia has an abundance of natural and cultural resources. Each aimag (province) has its own mix of natural and cultural sites. For example in Hentii, a small town called Dadal, located near the Mongolian-Russian border, has become popular in recent years, as it is said to be the birthplace of Chinggis Khan. There is a monument in the town built in 1962 commemorating the 800th anniversary of Chinggis Khan's birth. Near the monument, in a picturesque setting near a lake is the Oronno Resort. This facility is a sanatorium where the local waters and medicines are used to help people recovering from skin ailments. Along the Onon and Baiji rivers, which flow near the town of Dadal, are the Ugtam uul wildlife refuge and Mongol Daguur reserves. The latter is well-known for being the home of large variety of water birds.

The Mongolian Plateau Zone (MPZ), which encompasses a significant portion of the Project Area, is a globally important region for biodiversity and attracts scientists, environmentalists, and various kinds of nature enthusiasts such as bird watchers. There are over 600 species of birds, including a large number of migratory species such as the black stork, marsh duck, and rock thrush. The lakes in the area - Lake Buir (Mongolia and PRC) and Lake Dalai (PRC) - are sites for nesting birds such as Daurian, Japanese and Black cranes, Mandarin duck, and numerous types of geese, such as the Swan Goose. The area contains nearly 70 species of mammals including endangered animals such as the Manchurian Moose (*Alces alces cameloides*), Mongolian Gazelle, or White-Tailed Gazelle (*Procapra gutturosa*), and Eurasian Otter (*Lutra lutra*). There are over 40 varieties of freshwater fish including the Amur sturgeon, Siberian Gudgeon, and Taimen. The MPZ also has diverse topography, climate, and vegetation, which supports a wide variety of animals inhabiting the area. There are 23 species of higher plants and a range of grassland species such as *Aneurolepidum Chinese*, *Stipa baicalensis*, *Stipa capillata*, *Stipa grandis*, *Filifolium sibiricum*, *Cleistogenes squarrosa*, and *Festuca ovina*. The high grass steppes of the MPZ are the world's last un-fragmented grasslands, and are recognized as an important resource for preservation.

Tourism Route to the Dornod aimag would be Sumber (Nomrog)-Arxan (PRC) BCP-Nomrog Preserve-Khalkh Gol soum-Ikh Burkhan Complex-Buir Lake-Menen Steppe-Choibalsan City-Tug Mountain-Kherlen Bars-Utaat Minchuur Hot Spa-Khukh Lake-Mongol Daguur Preserve-Ereentsav-Solovievsk (Russia) BCP with total length over 1,000 km (Figure 3.6).

Figure 3.6 Possible tourism route on Dornod aimag

Source: Purevsuren Gombosuren, the Mongolian National Tourist Center

4. Road and Rail Transport corridors

According to the Policies of the Government of Mongolia on Millennium Road project and Railway Network Development, approved by the Mongolian Parliament, following transportation corridors shall be considered as critical important for the country's economic development. Most of export and import goods of Mongolia are/will be carried out to the markets, especially to the main potential markets (Northeast Asia- PRC, ROK and Japan).

Mongolia is facing to facilitate and enhance mining infrastructure development in the Mongolian railway System and the Government of Mongolia has approved a "State Policy on Rail Transportation" in June, 2010. Purpose of the policy is to increase the railway capacity to carry, broaden an unified national network of efficient state railway directed at satisfying the ever growing future transport demand both effectively and reliably, and further, to improve the national transit capability, advance the legal environment, structure and organization of the sector, utilize the large mineral deposit, expedite the national economic and social development through exporting and exporting after processing, and ensure sustainable development for the future. Within the framework of the policy, new railway network routes that are capable of delivering surging coal outputs to foreign markets are being outlined by the Government of Mongolia.

Conclusions and recommendations:

Based on observations during the desk and field surveys, and interviews, the following conclusions and recommendations can be made for Road and Railway corridors' development strategy in the Project Area (Figures 4.1-4.3):

- The Khalkgol (Sumer) - Rashaan BCPs connection through the Nomrog Bridge seems to be the most cost-effective and feasible connection

between Mongolia and NEA especially between Mongolia and PRC, at this time for further development of the tourism sector in both countries. This bridge has been constructed. Due to environmental considerations on both sides of the border, however, it is recommended that this bridge is only used for ecotourism and environmental protection related activities and all the other freight traffic should be carried through another route to be developed further north, away from the Nomrog SPA.

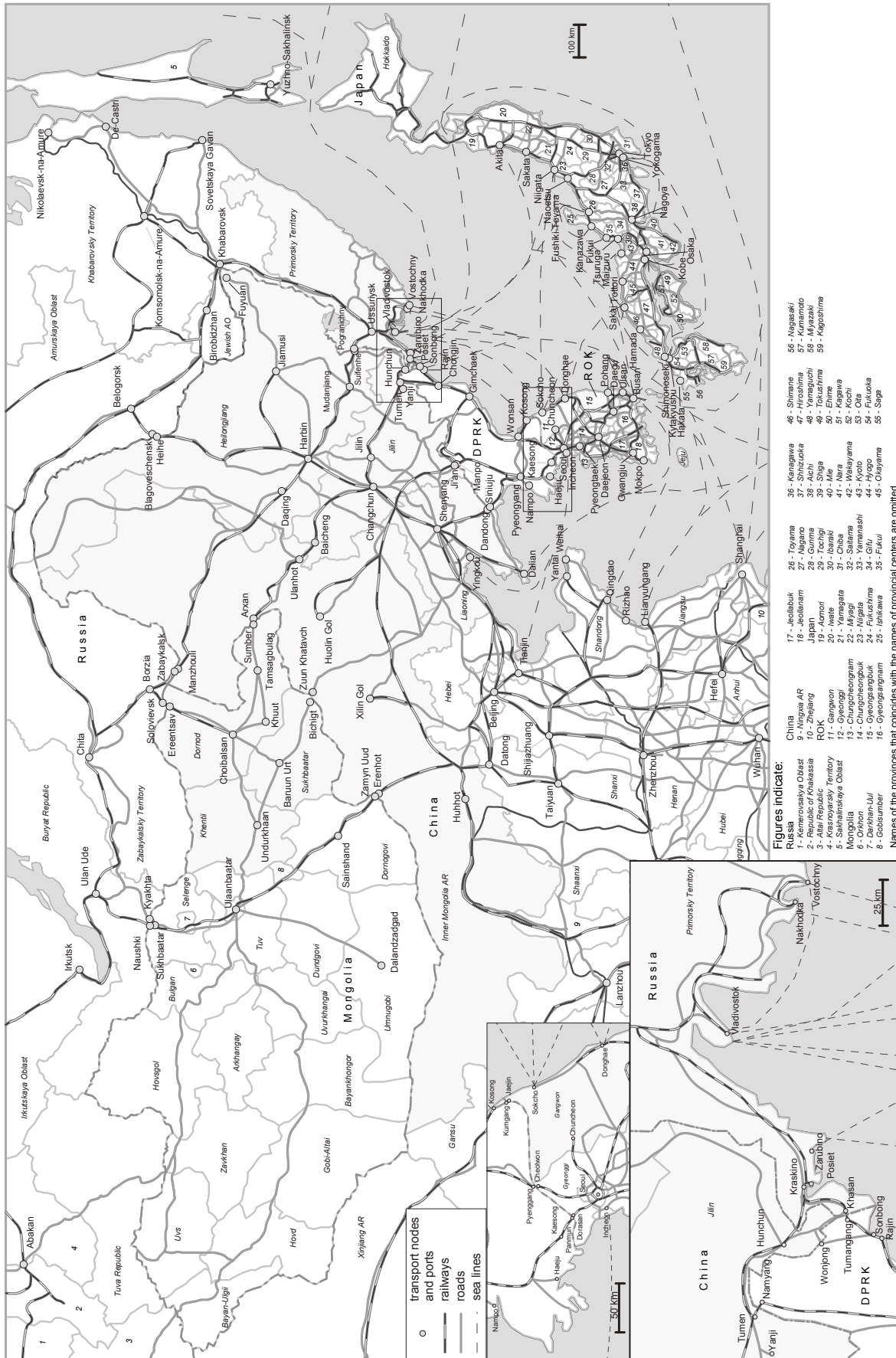
- Even though significant mineral resources exist in the Project Area, it will be very difficult to attract private sector investors without building the basic transportation and other required infrastructure. With the exception of some mega-projects, such as the Tavantolgoi (coal mine with proven reserves of 6 billion tons of coking coal) and Oyu Tolgoi (copper and gold mine) Project, it is very unlikely that mining companies will assist in the required transportation infrastructure investment

Photograph 4.1 Nomrog river bridge (Sumer BCP) with 340 meter length



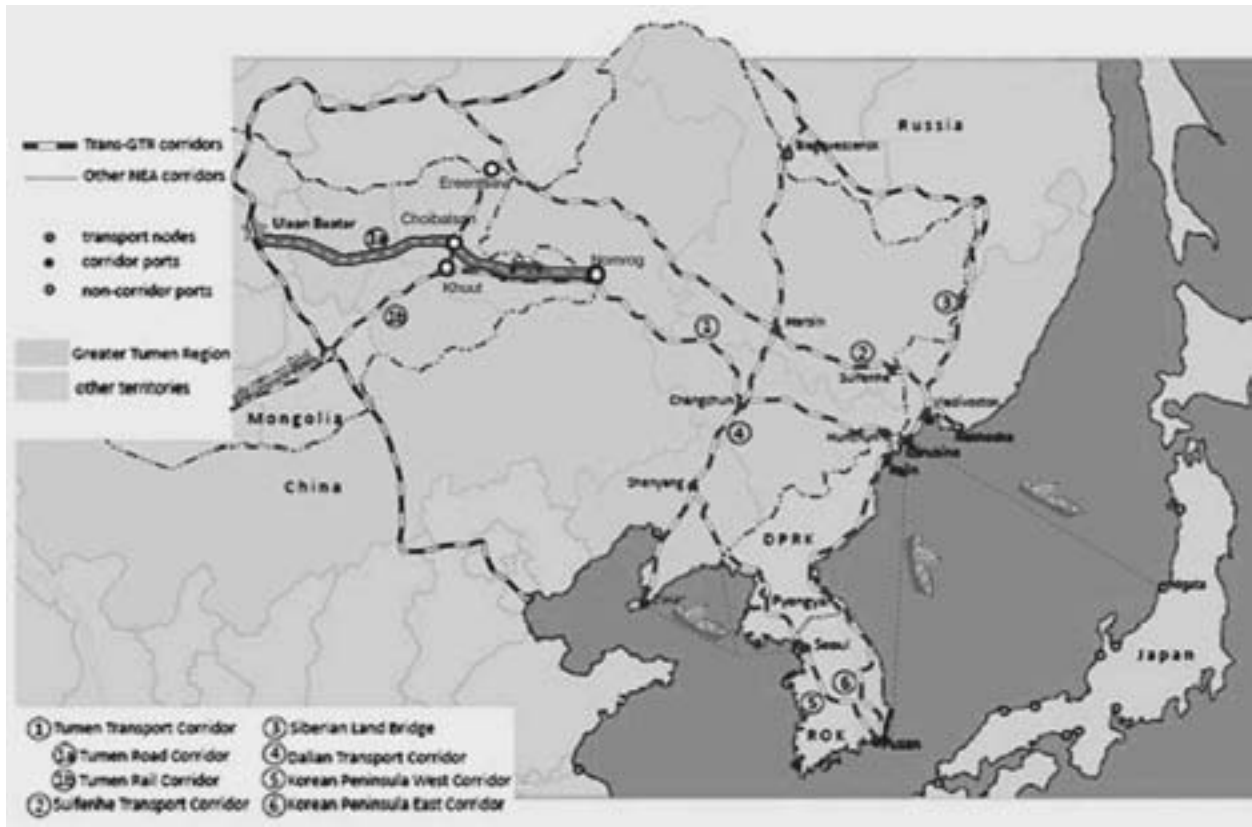
Source: Photo by author (2012)

Figure 4.1 Existing rail and road networks in GTI region



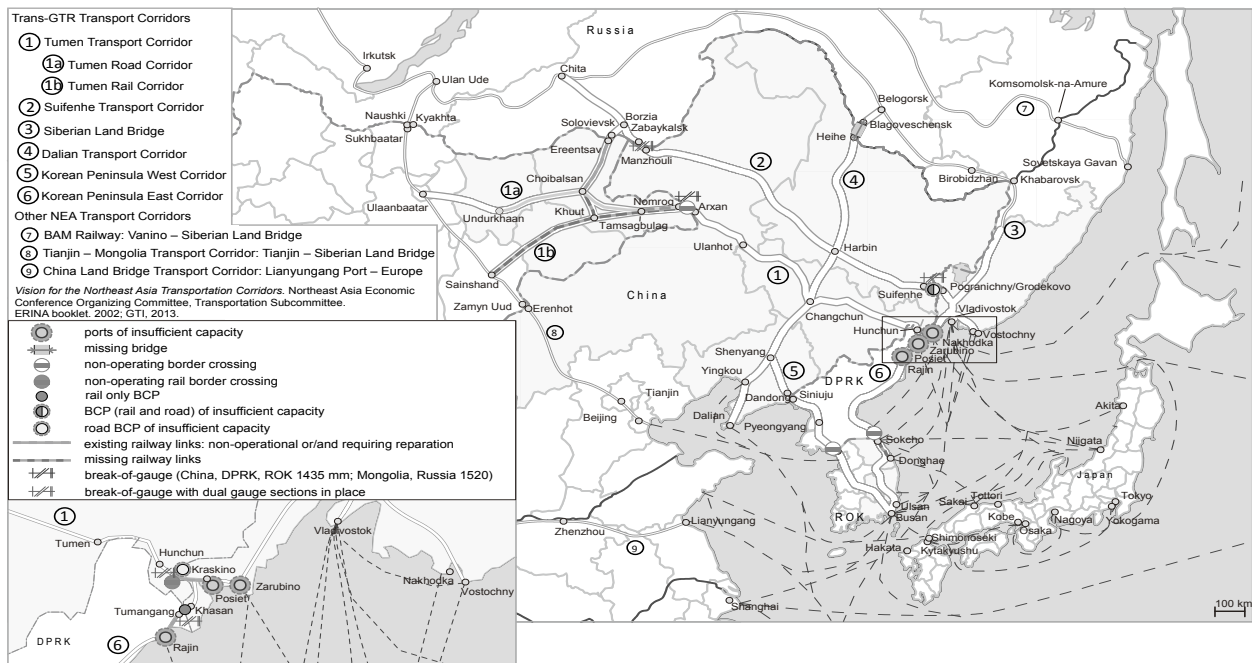
Source: Final report of the GTI transport corridors

Figure 4.2 Trans-GTI corridors



Source: by the Dr. D.Gotov

Figure 4.3 Major bottlenecks along the trans-GTI corridors



Source: Final report of the GTI transport corridors

- in the Project Area.
- A detailed market study that aims to develop detailed traffic forecasts by different commodities and origin-destination (O-D) pairs between PRC and Mongolia, as well as other international destinations should be undertaken.
 - The competitiveness of the proposed new rail line through the Project Area against the existing rail networks, both in Mongolia as well as in PRC and the Russian Federation, should be evaluated in further detail.
 - Main constraints and problems limiting the use of the transport corridors are inadequate development of the infrastructure, especially missing rail and paved road sections along the Corridors. In addition to that, there is no any BCP at the Sumber (Nomrog river) area in operation. Also we need to reach suitable technical decisions to solve potential negative impacts on environment.
 - If the constraints were lift up, traffic would be increased to great extent. Particularly, tourism and border trade between Mongolia and PRC would be much increased along the Road Corridor and freight traffic of coal, coking coal, copper concentrate and iron ore to PRC and further to ROK and Japan would be increased enormously along the Rail Corridor.
 - In order to implement these corridors it is required

to make negotiations on railway transportation with neighboring countries such as China and Russia.

- Investment Programs are required to missing infrastructure links, namely:
 - Conduct feasibility studies, design and construction Railway section between Khuut and Sumber (Nomrog) BCP;
 - Upgrading rail section between Choibalsan and Ereentsav including replacement of existing wooden sleepers with concrete ones, introducing modern signalization system and electrification, and
 - Preparing feasibility study, detailed design and construction of paved road between Choibalsan city vicinity and Sumber (Nomrog) BCP.

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輸送ネットワークの発展を通じた北東アジアと モンゴルの経済協力強化

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(要旨)

北東アジア地域の輸送ネットワークの発展は、鉱物資源の豊富なこの地域において統合的な関係を確立するためのカギとなる。モンゴルにとっては、自国の輸送ネットワークは世界における孤立や国内の孤立を低減するために戦略的的重要性を持っている。アジアにおいて7番目に大きな国であるモンゴルは、世界最大の内陸国でもある。国境線の総延長は8,162kmであり、このうち北側の3,485kmはロシア連邦と接している、残りは東部、南部および西部で中国と接している。海港もしくはゲートウェーへの交通アクセスを改善することは、モンゴルの外国貿易における競争力を強化するためにカギとなる要素の一つだ。他の北東アジアの国々もまた、地域の輸送ネットワークの発展により裨益するであろう。

[英語原稿をERINAにて翻訳]