INTEGRATED TRANSPORT INFRASTRUCTURE AND CROSS-BORDER FACILITATION STUDY FOR THE TRANS-GTR TRANSPORT CORRIDORS

INDIVIDUAL COUNTRY REPORT

MONGOLIA

GTI Greater Tumen Initiative

2013

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Mongolia individual country report is prepared as part of GTI "Integrated Transport Infrastructure and Cross-Border Facilitation Study for the Trans-GTR Transport Corridors" by Dr. Gotov Dugerjav.

The Study has been carried out to assess general situation, bottlenecks and traffic potential of the transportation corridors in Northeast Asia and in the Greater Tumen Region in 2012 in accordance with the decisions GTI Consultative Commission and GTI Transport Board (2010-2011). The set of Study reports consists of five individual country reports: China, Mongolia, ROK, Russia and Japan; and Regional Summary report. The Study results and conclusions served as basis for development of joint agenda in transport cooperation by GTI.

CONTENTS

Abbreviations

AREMA –American railway standard
BCP – border crossing point
BOQ –Bill of quantities
BOT – Build – Operate – Transfer
BTO – Build-Transfer-Operate
CR – PRC (China) Railway
CTC – Computer based Train Control
CWR - Continuous Welded Rail
ERM – Eastern Regions of Mongolia
EIA – Environmental Impact Assessment
ER – "Energy resources" company
ETCS – European Train Control System
FEU – 40-foot equivalent unit
GDP- Gross domestic product
GoM – Government of Mongolia
GTI – Greater Tumen Initiative
GTR – Greater Tumen Region
ICT – Information and Communication Technologies
IRR – Internal Rate of Return
JICA – Japan International Cooperation Agency
KN- Khuut-Nomrog
LEDPA - Least Environmentally Damaging Preferred Alternative
LRT - Law on Railway Transport
MAK – Mongolian Gold Company
MCA - Mongolian Customs Authority
MGT-metric gross tons
MMC – Mongolian Mining Companies
MPZ – Mongolian Plateau Zone
MRA – Mongolian Railway Authority
MRT – Ministry of Roads and Transport
MT – metric tons
MTZ – Mongolyn Tumur Zam (Mongolian Railways)
PIU – Project Implementation Unit
O-D- origin and destination
PPP- public and private partnership
PRC – People's Republic of China
PSO – Passenger Satisfaction Obligation
RBM – Rail Bound Manganese Frogs
RoI – Return of Investment
ROK – Republic of Korea
RZhD – Russian Railways

SEZ – Special Economic Zone

SIC – State Infrastructure Company

SoE – State owned Enterprises

SOGR – State of Good Repair

SPA – Special Protected Area

SRIB – State Railway Inspection Body

TEU – 20-foot equivalent unit

Tog – togrog (Mongolia's currency unit)

TPC – Train Performance Calculations

TREDA – Tumen River Economic Development Area

TT – Tavan Tolgoi coal field

UBTZ – Ulaanbaatar Tumur Zam (Ulaanbaatar Railway)

UNDP-TRADP – United Nations Development Program – Tumen River Area Development Program

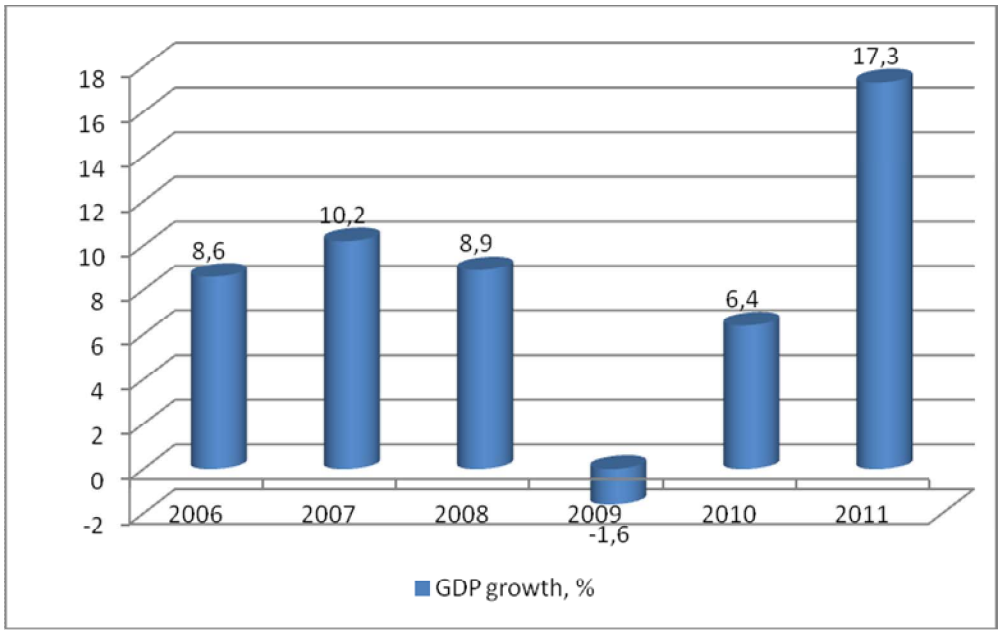
USD- United States dollars

ZULC – Zamyn Uud Logistic Center

1 Background

1.1. Macroeconomic Review (macroeconomic indicators with time series)

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 final disbursements of cash to the citizens ahead of the 2012 elections.



Source: Mongolian Statistical Yearbook, 2011

Figure 1.1: GDP growth, Mongolia

The trade deficit has climbed to record levels in recent months as imports have surged. Exports are growing strongly too, up 176% compared to the previous year supported almost entirely by large coal shipments to China from coal mines in Southern Mongolia. Constituting 44 % of the value of total exports, coal exports increased by 178 % over the previous year.

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 USD 11.3 billion, Mongolia's external trade grew 3.8 times in last 5 years (see table 1.1). Amount of import is 39% higher than the amount of export

Table 1.1: Foreign Trade of Mongolia over the last 10 years, Million USD

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

Year	Exports				Imports				Trade balance
	Russia	PRC	Others	Total	Russia	PRC	Others	Total	
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

Source: National Statistical Office, Mongolian Statistical Yearbook, various annual publications.

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.

Table 1.2: Main items of Mongolia's export, million USD

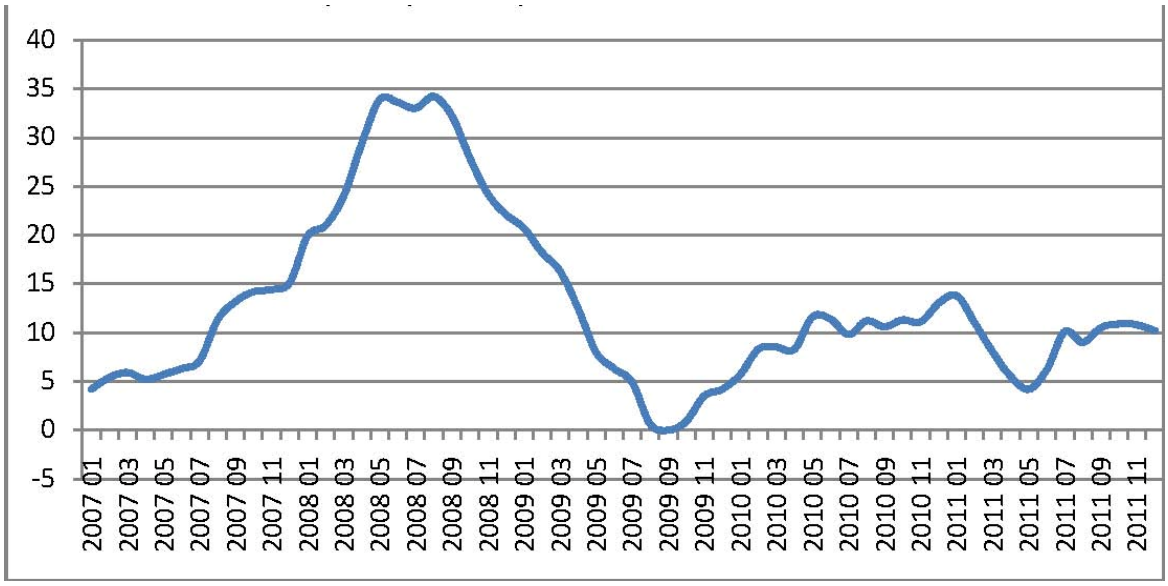
Items	2008	2009	2010	2011	2011/2010%
Cooper concentrate	835 66	501 924	770 595	963 596	25,0
Thousand tons	582,9	587,0	569	573	0,7
USD/ton	1433,7	855,1	1355,1	1682,3	24,1
Kathod copper	18 526	11 850	20 357	21 028	3,3
Thousand tons	2,6	2,3	3	2	-15,7
USD/ton	7115	5106	7 269	8 907	22,5
Coal	182 437,3	305 728,3	874 565	2 239 322	165,0
Thousand tons	8389,4	9349,7	16 599	20 956	26,2
USD/ton	22	33	53	107	102,8
Iron ore	92 285	88 770	250 942	437 328	74,3
Thousand tons	1013,1	1598,1	3 539	5 753	62,5
USD/ton	91	56	71	76	7,2
Zinc	154617	122 494	134 135	142 678	6,4
Thousand tons	137	151	120	121	0,8
USD/ton	1 125	812	1 120	1 182	5,5
Molybdenum	82 344	50 309	51 992	46 394	-10,8
Thousand tons	4,1	6,7	5	4	-12,1
USD/ton	20 194	7 563	10 903	11 070	1,5
Fluorite	59 197,2	48 223,9	63 196	94 877	50,1
Thousand tons	348,8	314,0	376	404	7,4
USD/ton	170	154	168	235	39,8
Unprocessed gold	599 883	308 473	178 320	113 047	-36,6
tons	22	11	5,06	2,66	-47,5
USD/kg	27108	28 360	35 241	42 572	20,8

Source: Mongolian Statistical Yearbook, various annual publications.

Table 1.3: Mongolia's main items of import, million USD

Items	2008	2009	2010	2011	2011/2010 (%)
Machinery, equipment and electronics	1065	692	1289	3269	153
Fuel	891	528	674	1135	68
Main metals and metal products	267	164	203	587	188
Food	231	182	240	329	37
Chemicals	151	128	168	253	50
Plastics, rubber and products	84	66	110	229	108
Agricultural products	205	132	145	147	1.0
Others	351	238	371	579	55
Total	3245	2131	3200	6527	104

Source: Mongolian Statistical Yearbook, various annual publications.



Inflation rate is unstable in Mongolia. Particularly, it rapidly reduced up to 0% in September 2009 from the level of 34.2% in August 2008. It was connected with instability of external economy. However, it was rising since 2010 and reached to 10.2% at the end of 2011.

Source: Mongolian Statistical Yearbook, various annual publications.

Figure 1.2: Inflation in Mongolia, %

1.2. Brief description of the Eastern Mongolia

On the Mongolian side of the Corridors, there is substantially less development of transportation infrastructure. As a country with large distances between markets both domestically and internationally, Mongolia has a small population spread over vast distances and it experiences extreme natural conditions. Mongolia's transportation network has strategic significance for reducing its isolation in the World and within its own borders, as well as playing a key role in the future economic development of the country.

There are three provinces or aimags in the Region.

Dornod Province:

Area 123,600 km2; population 73,600; Capital Choibalsan located 661 km from Ulaanbaatar. The Province is located in the easternmost part of Mongolia and bordered by Russia to the north, to the Inner Mongolia Autonomous Region of China to the east and south, and the Khentii and Sukhbaatar provinces of Mongolia to the west. Almost all of its territory is steppe and at 600-800 m above sea level. The Capital city of the province is Choibalsan that has a population of 38 000. A railway connects Choibalsan with the Russian Trans-Manchurian Railway at Borzya in Russia. The distance from Choibalsan to the Russian border is 238 km. The distance from Choibalsan to the easternmost part of the Chinese border is about 450 km.

In Choibalsan enterprises such as wool washing factory and a flour combine are operating. These factories as well as an existing construction material enterprise could be expanded if the transport infrastructure is improved and reduces the relative isolation of the city.

Economically active population is 27.5 thousand persons, unemployed persons are 917 (unemployment rate is 4%) in 2010. The coal mine of Aduunchuluun 3 km north of Choibalsan has identified deposits of 140 million tons and a present capacity of 600 000 tons of coal per year which if needed may be increased to 1 million tons per year. This open-pit brown coal-mine fully supplies the local demands and a small amount of coal was also exported into the Russian Federation.

Sukhbaatar Province:

Area 82,300 km^2; population: 54,900; Capital: Baruun Urt is located 565 km from Ulaanbaatar and 193 km from Choibalsan. The province is bordered by Dornod province to the northeast and Khentii and Dornogobi provinces to the northwest, and the Inner Mongolia Autonomous Region of China to the south. The territory of the province is 1000-1200 m above sea level, a steppe area with some mountains. There are a number of deposits of brown coal, rare earth metals, non-ferrous metals and construction materials like fireproof limes.

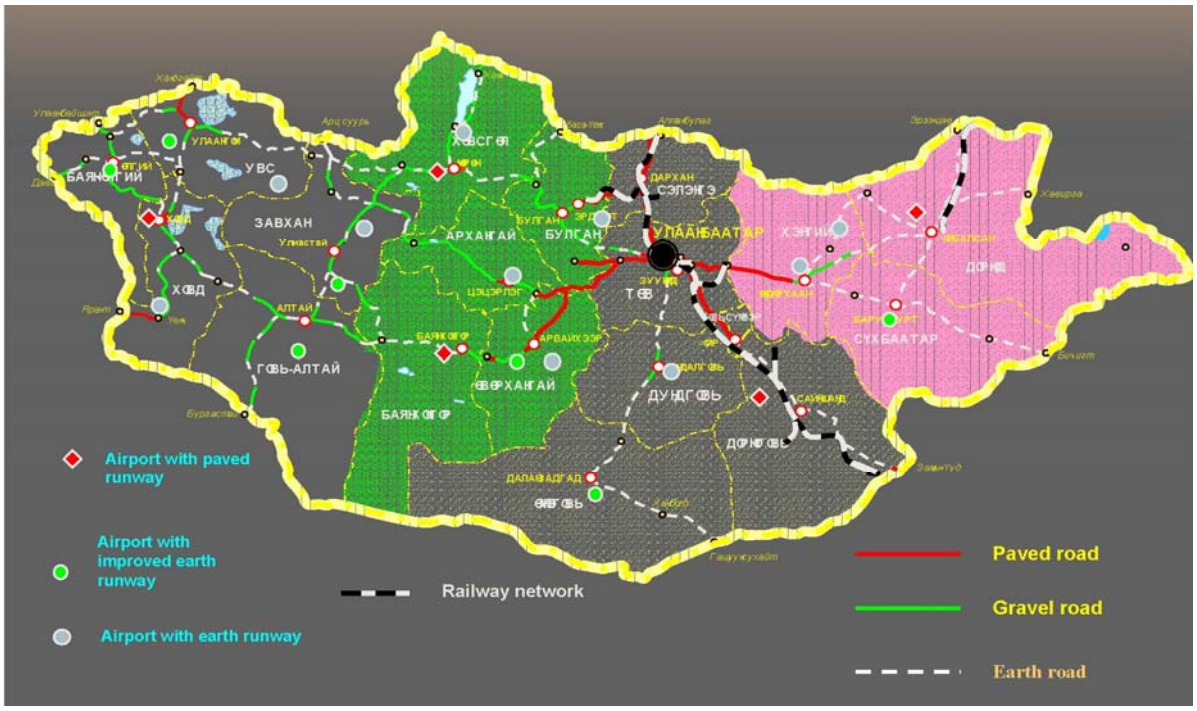
The coal-mine of Talbulag is used for local needs. Economically active population is 23.5 thousand persons and unemployed persons are 696 (unemployment rate is 3.0%) in 2010.

It is planned to explore and use the rich zinc deposits of Tumertein ovoo jointly with Chinese side. In this province there are also mineral deposits such as polymetal and tungsten.

Khentii Province:

Area: 80,300 km2; population: 71,000; Capital: Undurkhaan is located 338 km from Ulaanbaatar and 323 km from Choibalsan. The Province is located west of the Dornod province and is bordering to the Chita region of the Russian Federation in the north. The eastern and southern parts of the province belong to the steppe area. In Khentii province mining has been developed and the fluorite mines of Berh and coal-mines of Chandgana tal have been used for many years. In the southern part of the province there are rich deposits of fluorite, of which Bor-Under and Hajuu-Ulaan are the biggest and now producing 100 thousand tons of fluorite concentrate. These are connected to the Mongolian main railway line via a new city Bor-Under.

Economically active population is 27.5 thousand persons and unemployed persons are 1,067 (unemployment rate is 3.9%).



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

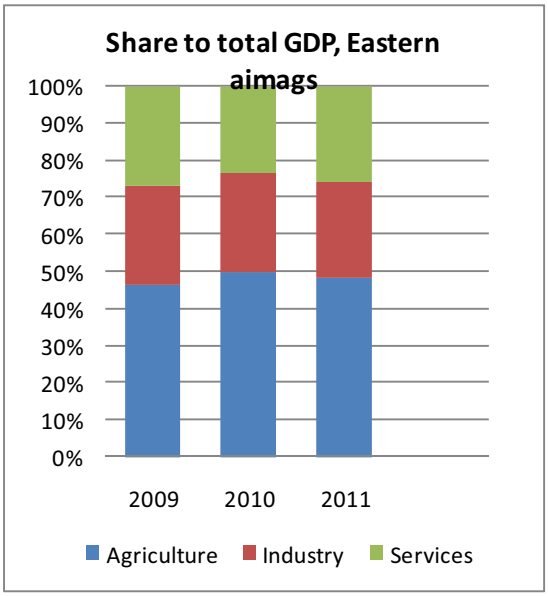
Figure 1.3: Transport Networks of Mongolia

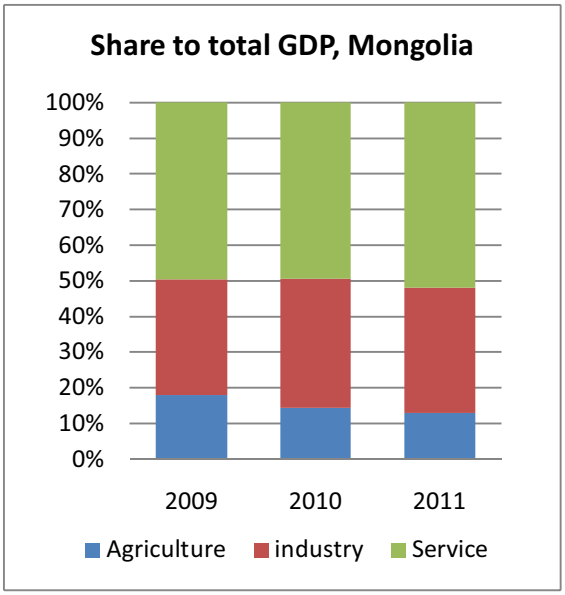
Based on forest resources in the Khentii mountain range, the forest plants of Batshireet and Burenkhaan are operating and supplying eastern provinces' construction enterprises with wood and wooden products. The crop entities of Chandgana tal and Undurkhaan and flour and fodder factories of the province are the important sectors for food supply of the region (see Figure 1.3).

Table 1.4: GDP product, for the Mongolia and the 3 eastern aimags at current prices

Country' Region and aimags	2009				2010				2011			
	GDP, million tog	Share to total, %			GDP, million tog	Share to total, %			GDP, million tog	Share to total, %		
		Agriculture	Industry construction	Services		Agriculture	Industry construction	Services		Agriculture	Industry construction	Services
Mongolia	6590637.1	17..9	32.5	49.6	8414504.6	14.3	36.2	49.5	10829689.6	13.0	35.0	52.0
Total, Eastern aimags	264777.7	46..7	26.7	26.6	294577,3	50.2	26.4	23.4	344222.1	48.3	26.1	25.6
Dornod	77421.7	50.5	7.9	41.6	74705.2	52.4	11.0	36.6	91137.9	48.4	11.7	39.9
Sukhbaatar	111130.3	30.4	55.5	14.1	133101.9	36.1	50.1	13.8	153508.9	36.4	48.8	14.8
Khentii	75315.7	66.9	3.3	29.9	86770.2	69.7	3.3	27.0	99575.3	66.7	4.2	29.1

Source: Mongolian Statistical yearbooks





Source: Consultant of the base of Mongolian Statistical yearbooks

Figure 1.4: Share of GDP, Mongolia

Figure 1.5: Share of GDP, Eastern aimags

There are higher shares of agriculture and services in GDP for the Dornod and Khentii aimags. As per Sukhbaatar aimag, industry has bigger share due to mineral deposits such as zing and fluorite.

Priority area of the Mongolia's Government Medium term policy for Eastern region is to pursue policy on development of animal husbandry, crop production, mining, processing industry and tourism. In the policy framework following measures will be taken:

- to establish plants for extracting and processing of uranium and zinc, and oil refinery plant;
- to develop intensified agriculture in area of Khalkhyn gol, establish meat processing factory in Choibalsan that will export meat products to NEA;
- to increase passenger and freight transferring capacity at the BCPs in Ereentsav, Bichigt and Nomrog.

2 Due Diligence Review of GTI Corridor

2.1. Passenger and Freight Road transportation routes between Mongolia and PRC

During the meetings of the representatives of Mongolia and PRC held in 2011, the two sides agreed following Road Transport routes between Mongolia and PRC in order to implement the Road Transport Agreement between the People's Republic of China and Mongolia on June 24, 1991:

Table 2.1: Road Passenger transport routes

	Routes	Route length, km	Road condition
A	Regular		
1	Herlen soum-Choibalsan-Havirga- Ar hashaat-Altan emeel balgas	230	Earth road Road grade III
2	Erdenetsagaan- Bayan Hailaast tourist camp-Bichigt-Zuun hatavch-Uliastai balgas		Earth road Road grade II
3	Zamyn Uud soum- Zamyn Uud- Erenhot-Erenhot city	17	Paved road
4	Hanbogd soum- Tsagaan had-Gashuunsuhait-Gants mod-Chuani Jin balgas-Haliut balgas	238	Asphalt/Concrete road Road grade I
5	Gashuunsukhait border post-Gants mod border post	25	Asphalt/Concrete road
B	Temporary		
1	Choibalsan soum-Havirga-Ar hashaat-Altam-emeel balgas	175	Earth road Road grade III
2	Halh gol soum-Yalalt bag-Bayanhoshuu-Uvdug-Amgalanbalgas	92	Earth road Road grade III

	Routes	Route length, km	Road condition
3	Baruun Urt soum-Asgat soum-Tavaar brigad-Erdenetsagaan soum-Bichigt-Zuun hatavch-Uliastai balgas-Eej nuur balgas-Rashaan bulag balgas	538	Earth road Road grade II and III
4	Hatanbulag soum-Sulinheer-Hangi-Mandal-Tsagaannuur soum-Ulaantug-Bayan Ovoo balgas-Bathaalga balgas	238	Earth road Road grade III
5	Noyon soum-Shivee huren-Seheet border post-Dalai huv balgas	223	Earth road Road grade II
6	Gurvan tes soum-Nariin suhait- Shivee huren-Sehee-Dalai huv balgas	177	Asphalt/Concrete road Road grade II

Source: Road Transport Authority, Mongolia

Table 2.2: Road Freight transport routes

	Routes	Route length, km	Road condition
A	Regular		
1	Tansag gazryn tosny ord-Tsarityn hoshuu- Undur huree-Tsaidmyn hudag-Yizngiin hudag-Bor hooloin zam- Bayanhoshuu- Uvdug- Shine barga Suhu station	317	Earth road Road grade II and III
2	Tamsagiin gazryn tosny ord- Erdenetsagaany salaa- Bichigt- Zuun hatavch- Uliastai balgas-Shiliin hot Rashaan oil station	350	Road grade II and III
3	Zamyn Uud soum- Zamyn Uud- Erenhot-Erenhot city	17	Asphalt/Concrete road
4	Elstain uurhai-Sulinheer- Hangi-Mandal-Tsgaannuur balgas-Ulaan tug- Bayan ovoo soum- Bathaalga balgas	304	Earth road Road grade III
5	Hariin suhait deposit-Shiveehuren-Seheet border post	53.2	Asphalt/Concrete road
B	Temporary		
1	Choibalsan soum-Havirga-Ar hashaat-Altam-emeel balgas	175	Earth road Road grade III
2	Halh gol soum-Yalalt bag-Bayanhoshuu-Uvdug-Amgalanbalgas	92	Earth road Road grade III
3	Erdenetsagaan soum-Bayan hailaast tourist camp-Bichigt- Zuunhatavch-Uliastai balgas	151	Earth road Road grade II
4	Hatanbulag soum-Sulinheer-Hangi-Mandal-Tsagaannuur soum-Ulaantug-Bayan Ovoo balgas-Bathaalga balgas	238	Earth road Road grade III
5	Gurvan tes soum-Nariin suhait- Shivee huren-Sehee-Dalai huv balgas	177	Asphalt/Concrete road Road grade II
6	Hanbogd soum-Tsagaan had-Gashuun suhait-Gants mod-Chuani Jin Balgas- Haliut balgas	268	Asphalt/Concrete road Road grade I

Source: Road Transport Authority, Mongolia

Table 2.3: Number of vehicles, freight and passenger traffic through BCPs in 2011

1	BCPs	Vehicles, units									Passengers		Freight	
		Inward				Outward				Total	Inward	Outward	Import	Export
		Truck	Cars	Others	Sub-total	Truck	Cars	Others	Sub-total				Weight, tons	Weight, tons
1	Zamyn Uud	26 415	61 414	2645	90 494	26 874	59 828	2639	89 341	179 817	389060	398046	884 903	135 628
2	Bichigt	12 027	246	0	12 273	2531	1994	0	4525	16 798	32 999	32 859	39 205.43	516 008.49
3	Bayan-khoshuu	461	120	446	1027	455	120	446	1021	2048	1394	1382	1927	0
4	Khavirga	719	651	1463	2833	768	651	1413	2832	5665	8331	7612	9937	0
	Total	39 622	62 431	4554	106 627	30 628	62 593	4498	97 719	204 328	431 784	439 899	935 727.43	651 649.49

Source: Road Transport Authority, Mongolia

Table 2.4: Imports and Exports Handled by Zamyn-Uud BCP in 2010 (in tons)

BCP	Imports	Exports	Total
Zamyn-Uud	870,744	75,651	946,396

Source: Mongolian Customs Authority

Table 2.5: Traffic data at the Rail Station Bayantumen

	Indicators	Units	Performance by years									
			2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
1	Loaded wagons	Wagons	421	469	662	407	379	1032	741	546	515	819
2	Dispatched wagons	Thousand tons	17.76	17.13	26.46	17.00	18.10	57.41	41.07	29.15	28.61	47.54
3	Unloaded wagons	Wagons	601	530	831	598	687	821	558	627	719	783
4	Static capacity	Thousand tons	38.95	56.52	39.97	41.76	47.76	55.63	55.42	53.38	55.55	58.10
5	Carried freight	Thousand tons	34.60	29.27	44.20	32.49	36.37	87.56	59.49	54.00	57.29	76.70
6	Freight turnover	Million ton. km	7.71	6.06	9.46	7.33	7.58	20.02	13.74	13.25	13.00	20.00
7	Carried passengers	Thousand passengers	27.92	25.77	26.81	23.71	26.93	26.60	27.09	21.93	19.53	21.31
8	Passenger turnover	Million passengers km	3.84	3.60	4.43	3.87	4.37	4.47	4.81	3.90	3.29	3.92
9	Transferred ton . km	Million ton. km	11.89	9.66	13.89	11.20	11.95	24.49	18.55	17.14	16.29	23.93

Source: Bayantumen Station Administration

Figure 2.1: East most Rail Station in Bayantumen, Choibalsan

2.2. Infrastructure capacity review

The transport sector in Mongolia is divided over four modes – railway, roads, air, and inland waterway. As can be seen in Table 2.6 in freight transport, the railway is the dominant mode both in terms of tons and ton-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 2.6, 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 tons (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.

Table 2.6: Summary Transportation Statistics for Mongolia

	2007	2008	2009	2010	2011
Freight (Thousand tons)	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

Main Mongolia Road Corridors:

Route 1 (GTI Road corridor- 1a among the studied trans-GTR transport corridors): Ulaanbaatar- Undurkhaan- Choibalsan- Sumber- Nomrog (Figures 2.2 and 2.3).

This route will be constructed in the framework of the Millennium Road in nearest future.

Route 2: Altanbulag-Darkhan-Ulaanbaatar-Choir- Sainshand- Zamyn Uud

This route is being built now and will be completed in 2013. The development plans for the route include implementation of an international highway construction project.

Main Mongolia Rail Corridors:

Rail Corridor 1: Sukhbaatar-Darkhan-Ulaanbaatar-Sainshand-Zamyn Uud (existing main line);

Rail Corridor 2: Ukhaa Hudag (Tavantogoi)- Zuunbayan- Sainshand- Baruun Urt-Khuut-Choibalsan-Ereentsav;

The section "Uhaa Hudag-Zuunbayan-Sainshand-Khuut- Choibalsan" is going to built within 2 years. Therefore, the existing section between Choibalsan and Ereentsav needs to be upgraded.

Rail Corridor 3 (GTI Rail Corridor -1b among the studied trans-GTR transport corridors): Ukhaa Khudag-Zuunbayan-Sainshand- Khuut- Tamsagbulag- Sumber BCP (Nomrog bridge).

The section of Rail line "Ukhaa Khudag-Zuunbayan-Khuut" will be built under the route 2. Thus, the new construction of the section between Khuut and Nomrog with total length of 338 km would be main focus area under GTI Transport Corridors Project (please see Figure 4.1.).

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 1.1). Roads in Mongolia are administratively classified into two: (i) State Roads, which are intended to connect Ulaanbaatar with aimag centers, important towns, and important border crossings; and (ii) Local Roads, which are intended to connect aimag centers with other aimag and soum centers.

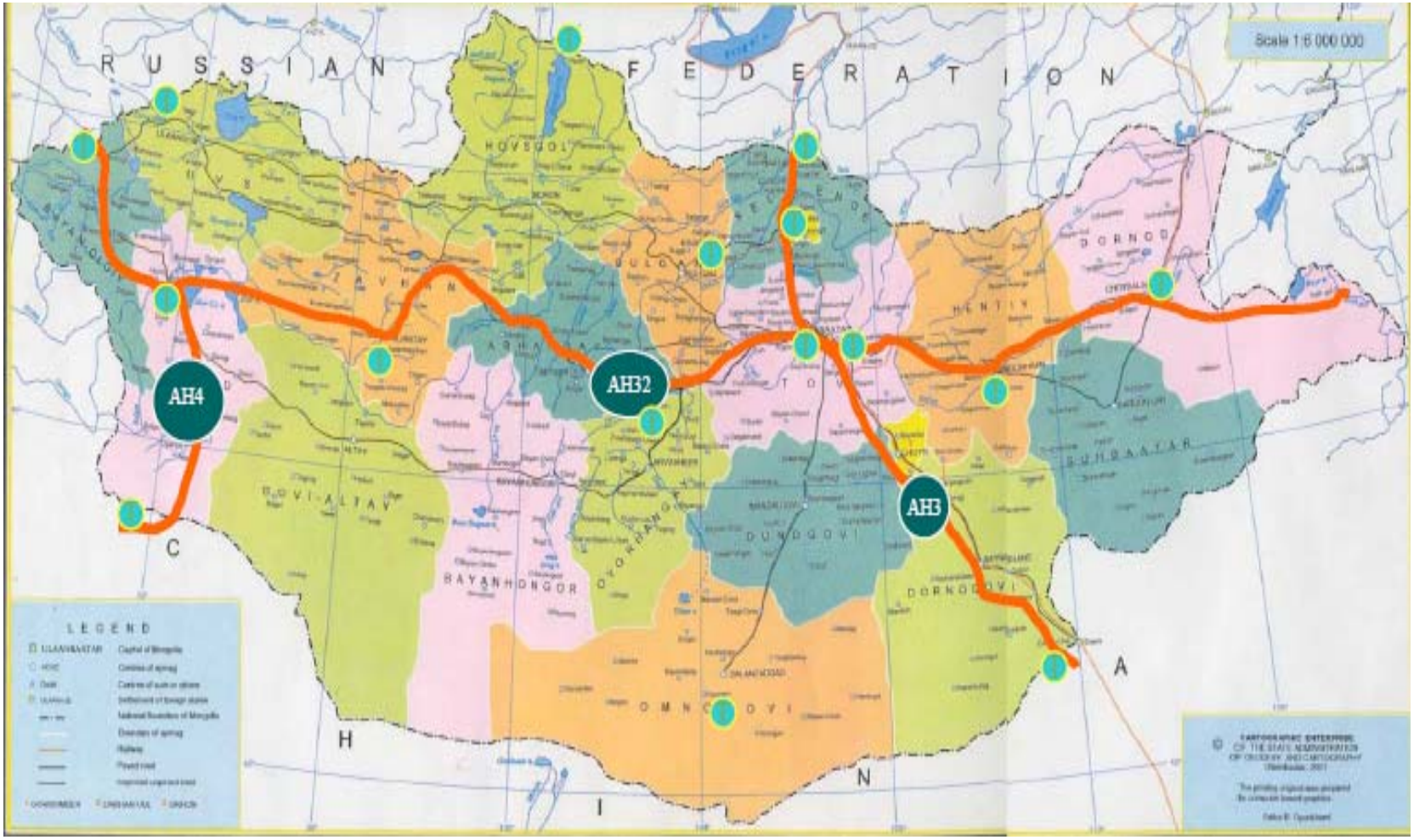
There are approximately 11,063 km of state roads and 38,187 km of local roads in Mongolia. Most of the roads in Mongolia are poorly maintained gravel or earth roads and as much as 75.6% of state roads and 97.7% of local roads are earth roads. Only about 1,670 kilometers of state and local roads are classified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

The main horizontal link of the Millennium Road is planned to connect the most west border point of Mongolia with its most east border crossing point. The planned route for the eastern section of the Millennium Road is from Ulaanbaatar to Baganuur, to near Choibalsan to the border settlement of Sumber (Nomrog). The Millennium Road is also planned to be intersected by north-south links that would run through each of the major economic regions of Mongolia. In the eastern region, this vertical link is planned to run from Ereentsav on the border with Russian Federation, through Choibalsan to Baruun Urt, and then Bichigt crossing on the border with PRC. (Figure 2.4).

Table 2.7: Road Traffic forecast between 2010 and 2020 (thousand tons)

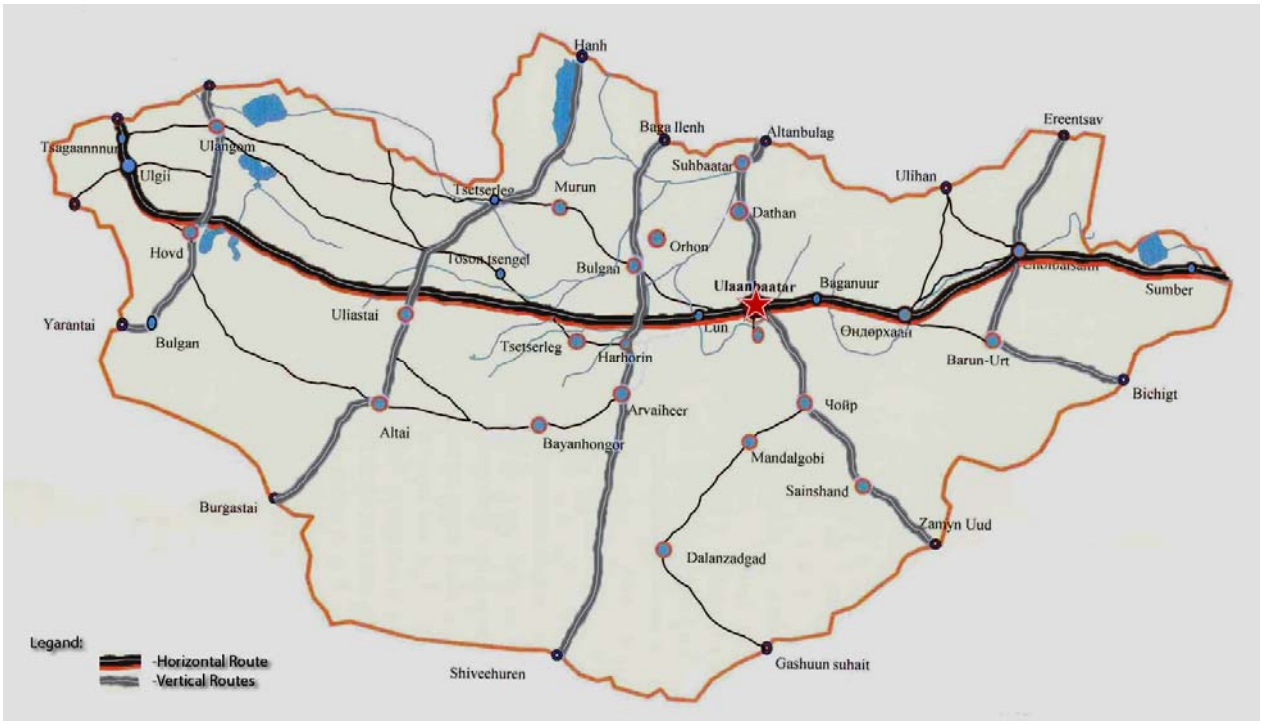
	Commodities	2010	2011	2012 exp.	2013*	2014*	2015*	2016*	2017*	2018*	2019*	2020*
1	Coal	27 304,00	33 469,30	40 255,30	45 276,70	58 030,00	58 848,20	53 758,50	48 668,70	43 579,00	38 489,20	33 408,50
1	Of which for export	16 726,00	21 296,00	30 000,00	33 000,00	40 000,00	32 000,00					
2	Copper concentrate	723,60	694,80	1 060,00	1 075,00	1 130,00	1 185,00	1 240,00	1 300,00	1 370,00	1 440,00	1 510,00
3	Oil products	832,10	1 009,30	1 250,00	1 460,00	1 670,00	1 820,00	2 030,00	2 530,00	2 730,00	2 930,00	3 110,00
4	Potato, vegetables	450	458,5	467,3	476	485,2	494,4	503,8	513,4	523.10	533,9	543,2
6	Construction materials	916,00	1 150,00	1 380,00	1 600,00	1 840,00	2 060,00	2 270,00	2 480,00	2 690,00	2 900,00	3 120,00
7	Flour	225,00	229,00	233,60	238,00	242,60	247,20	251,90	256,60	261,60	266,50	272,00
8	Food (liquid)	186,30	189,80	193,40	197,10	200,80	204,50	208,50	212,50	216,60	220,70	225,00
9	Wheat	356,10	421,30	486,60	495,80	505,30	414,80	524,60	534,60	544,80	555,10	565,00
10	Meat	836	851,7	868,7	886	903,7	922,2	940,2	959,2	978	998	1018
11	Fluorite	867,70	886,00	904,00	928,00	952,00	980,50	1 007,00	1 034,00	1 061,00	1 088,00	1 115,00
14	Zinc	142,60	104,70	115,00	127,00	130,00	134,00	140,70	143,00	145,00	151,00	174,00
15	Crude oil	242,80	250,80	252,00	254,50	256,00						
19	Others	3 799,00	4 095,00	4 918,00	5 353,00	6 640,00	6 800,00	5 737,30	5 400,00	4 761,60	4 160,80	3 365,30
	Total	**36 881,20**	**43 810,20**	**52 383,90**	**58 367,10**	**72 985,60**	**74 110,80**	**68 612,50**	**64 032,00**	**58 337,60**	**53 733,20**	**48 426,00**

Source: For the years 2010-2011 – Mongolian Statistical Yearbook-2011; for the years 2012-2020 – Consultant's forecasts.



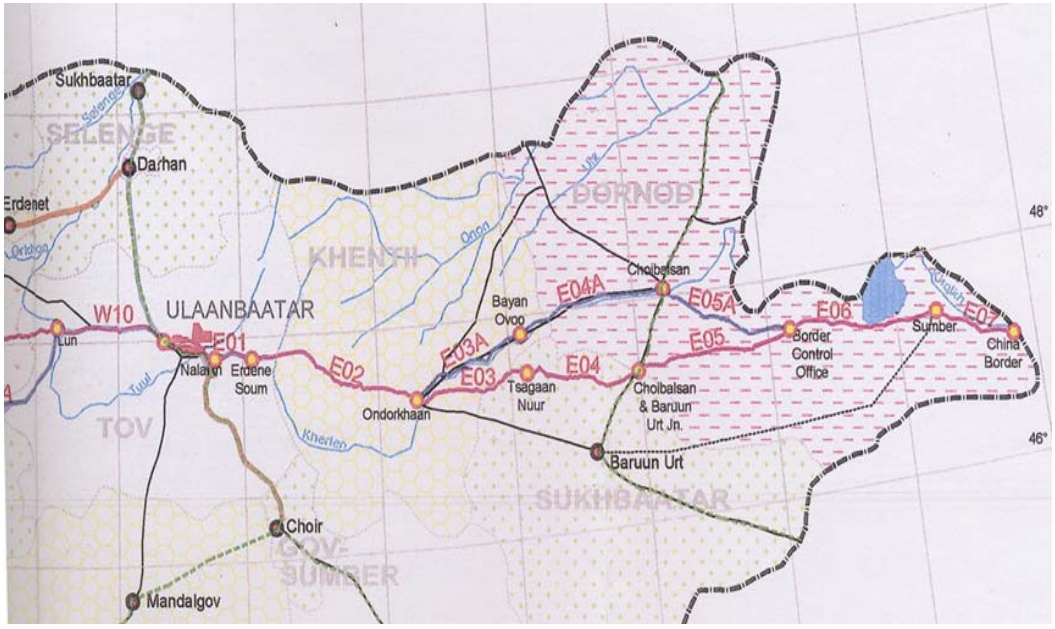
Source: formerly Road Authority, Mongolia

Figure 2.2: Mongolia's connection to the Asian Highways



Source: Formerly Ministry of Roads, Transportation, Construction and Urban Development, Mongolia

Figure 2.3: Millennium Road Routes, approved by the Resolution 9 of the State Great Hural (Parliament of Mongolia) in 2001 and amended in 2008



Source: Pre-Feasibility Study of Millennium Road; prepared by Intercontinental Consultants and Technocrats Pvt. Ltd. of India; April 2002.

Figure 2.4: Eastern Sections of the Proposed Millennium Road

What has limited the use of the road sector so far has been its underdevelopment due in part to insufficient traffic to justify the investment of limited resources, as well as insufficient maintenance of existing assets. International and bilateral financing institutions have recognized the importance of the Mongolian road sector to support the nation's economic development and its transition to market economy as evidenced by a number of recent loans:

- World Bank IDA Loan #1 (1995-2000) – USD 8.4 Million
- World Bank IDA Loan #2 (2001-2005) – USD 34 Million

- Asian Development Bank Loan #1 (1996-2000) – USD 22.2 Million
- Asian Development Bank Loan #2 (2000-2002) – USD 25 Million
- Kuwait Fund Loan (2000-2002) – USD 18.2 Million.

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 number of vehicles in Mongolia grew at an average annual rate of approximately 7.1% from 1990 to 2001. 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. The number of trucks, on the other hand, only grew by 0.13% annually on average during the same period, which reflects the heavy reliance of freight traffic on rail in Mongolia.

The road network in four eastern Mongolian provinces is characterized primarily by earth roads. According to the government's classification, some 3,502 km of state and 7,155 km of local roads are located in the four provinces of Tuv, Khentii, Sukhbaatar, and Dornod. These provinces are served by the Ulaanbaatar-Baganuur- Undurkhaan east-west corridor. This is a 331 km road of paved road. Two routes (Undurkhaan-Baruun Urt and Undurkhaan-Choibalsan) connect this east-west corridor with the capitals of Dornod and Sukhbaatar provinces.

The Undurkhaan-Choibalsan route, which was constructed during the period of 1934-1941, is a 322 km gravel road. The types of roads in eastern Mongolia are presented in Table 2.5.

Source: formerly Mongolian Railway Authority.

Figure 2.5: Transport Network in Eastern Mongolia

Dornod Province has 2,563 kilometers of road, of which only 60 kilometers are paved, mainly in and around the aimag capital of Choibalsan. In Sukhbaatar Province, the state roads cover a distance of 535 kilometers, and in the Khentii Province state roads consist of 639 kilometers. Table 2.9 presents the road distances between important cities in eastern Mongolia.

Table 2.8: Types of Roads in Eastern Mongolia*

Type of Road	State (Km)	State (%)	Local (Km)	Local (%)
Paved	546	15.6	215	3.0
Gravel	556	15.9	57	0.8
Improved Earth	305	8.7	7	0.1
Earth	2,095	59.8	6,876	96.1
Total	3,502	100.0	7,155	100.0

Source: Mongolia Department of Roads, Ministry of Infrastructure; September 2002. Note: *-This information was available for the four aimags – Tuv , Khentii, Sukhbaatar, and Dornod, as a group and not individually.

Table 2.9: Road Distances in Eastern Mongolia

From To	Distance (Km)
Ulaanbaatar Undurkhaan	331
Undurkhaan Baruun Urt	229
Undurkhaan Choibalsan	324
Choibalsan Baruun Urt	191
Choibalsan Ereentsav	240
Choibalsan Khavirga Port	135
Choibalsan Tamsagbulag	200

Source: Mongolian Ministry of Infrastructure and Dornod Local Government.

While there are state-owned and private companies that are charged with maintaining the state roads in the aimags (one company per aimag), maintenance funds are limited and the condition of the roads make travel difficult and result in low traveling speeds, posing considerable challenges for the further development of commercial and passenger traffic.

Vehicle ownership is also low in eastern Mongolia. The number of vehicles in Dornod, Sukhbaatar, and Khentii aimags account for 1.7%, 1.4%, and 1.7% of the total number of vehicles in Mongolia, respectively.

The length of Choibalsan-Halkgol (Sumber)-Nomrog-PRC Border road is 404 km and consists of earth roads. There is no formal road from Tamsagbulag (a former agricultural village which has since been abandoned) to the border port at Arxan, which is approximately 200 km across mostly flat, grassland steppes.

Source: Consultant

Figure 2.6: Paved road between Ulaanbaatar and Undurkhaan

Source: Consultant

Figure 2.7: Earth road between Undurkhaan and Choibalsan

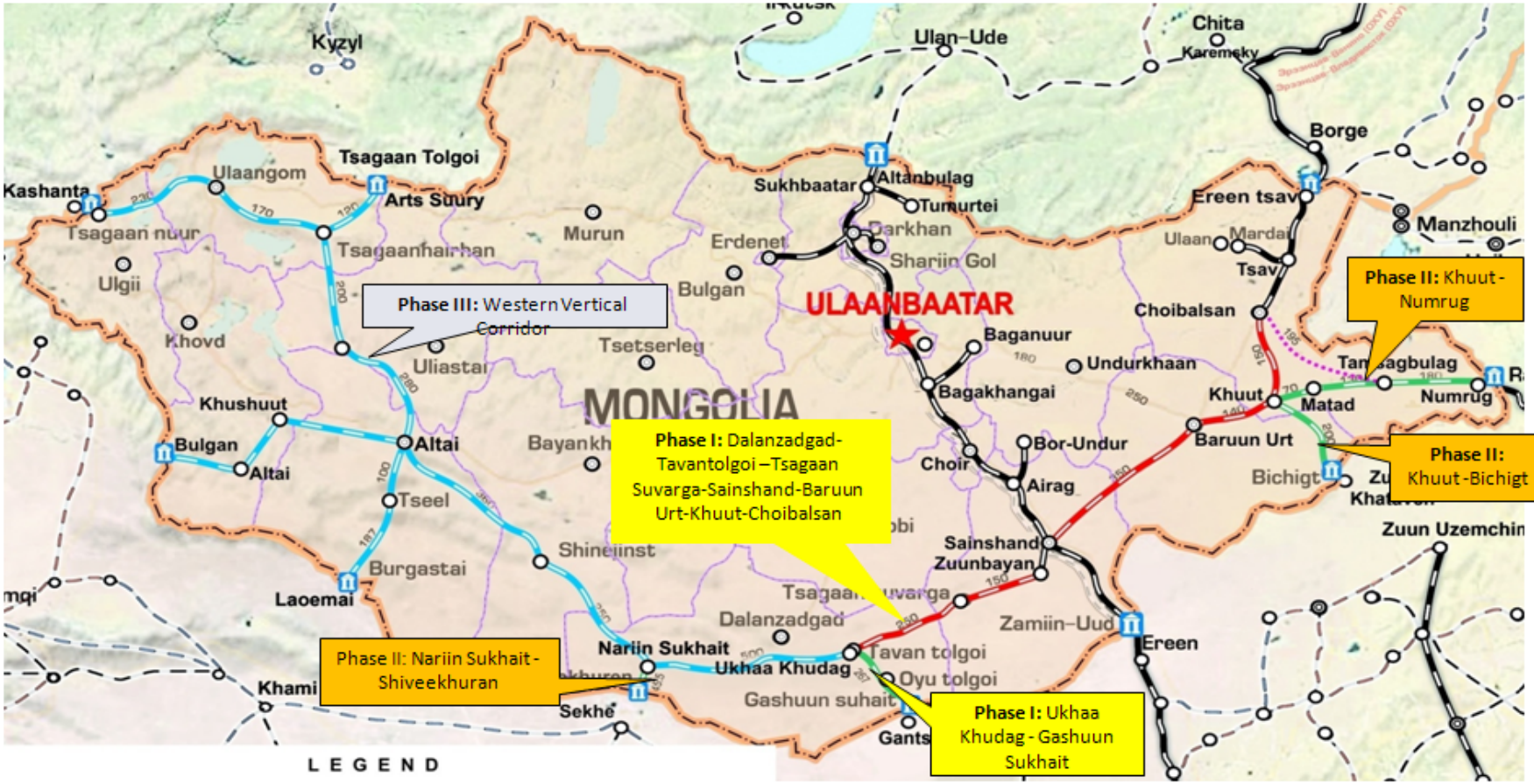
Source: Consultant

Figure 2.8: Earth road between Choibalsan and Sumber (Nomrog)

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 1400 km. The transport network in eastern Mongolia, which also shows the Choibalsan-Ereentsav rail line, is presented in Figure 2.9 and 2.12.

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 Zabaykalsk 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 the future the wooden sleepers should be replaced with concrete ones. Also it is needed to upgrade this rail line by electrifying and installing a modern signalization system.



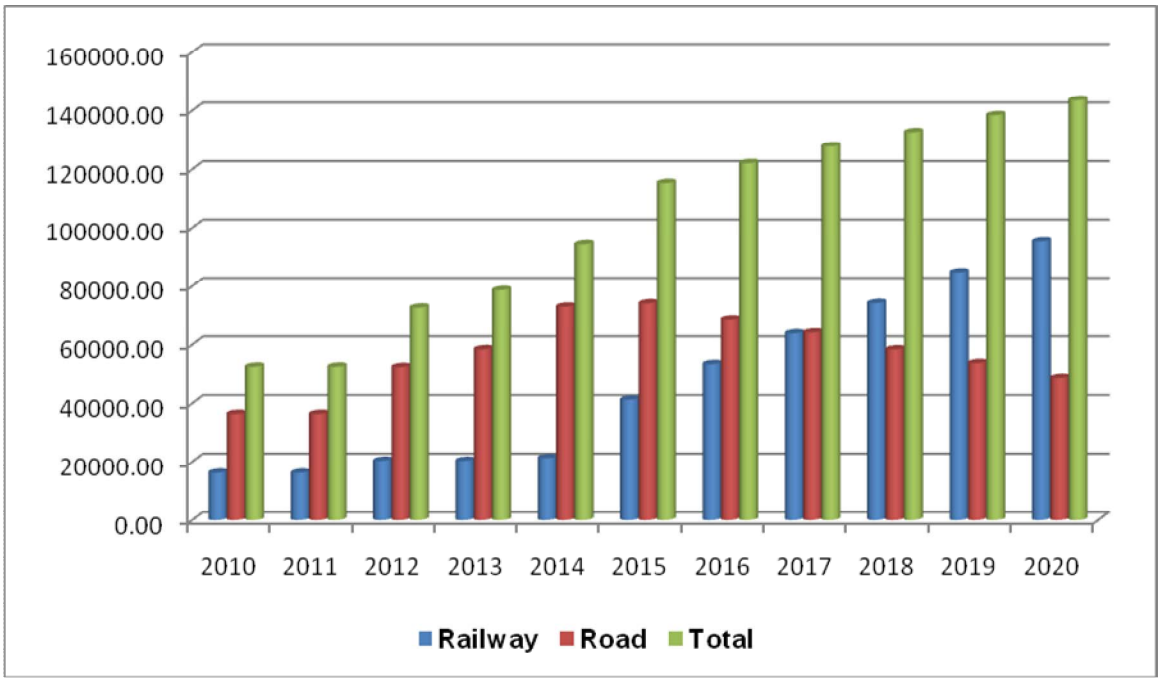
Source: formerly Mongolian Railway Authority

Figure 2.9: Rail network development policy of Mongolia (Phases of development)

Table 2.10: Rail Traffic forecast between 2010 and 2020 (thousand tons)

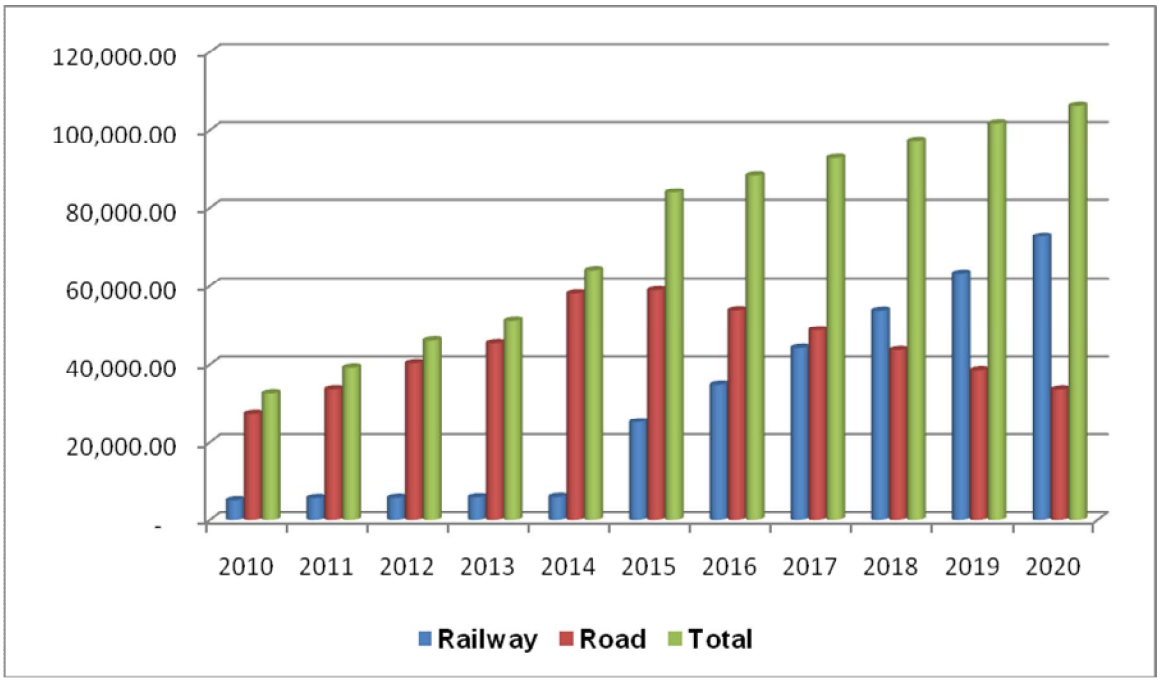
	Commodities	2010	2011	2012 est.	2013*	2014*	2015*	2016*	2017*	2018*	2019*	2020*
1	Coal	5 141,50	5692,31	5 752,76	5 886,31	5996,05	25 105,80	34 615,50	44 125,30	53 635,00	63 144,80	72 645,50
1.1	Of which for export						18 000,00	27 400,00	36 800,00	46 200,00	57 600,00	65 000,00
2	Copper concentrate	573,60	591,94	530,00	537,50	564,38	592,59	622,22	653,33	686,00	720,30	756,32
2.1	From Oyu Tolgoi							615,43	683,13	758,28	841,69	934,27
3	Crude oil	104,63	127,62	122,77	132,71	142,69	152,67	2 162,65	2 172,63	2 282,61	2 292,59	2 352,57
3.1	Oil products	805,60	989,30	1 088,23	1 197,05	1316,76	1 448,43	750,00	700,93	655,08	612,22	572,17
4	Wood	125,89	133,59	158,12	126,70	120,53	114,35	108,17	101,99	95,81	89,63	83,45
5	Wooden products	13,58	14,76	9,41	10,35	9,59	8,82	8,05	7,28	6,51	5,74	4,98
6	Construction materials	1 140,76	1413,77	1 931,25	1 773,97	1888,68	2 003,40	2 118,11	2 232,83	2 347,54	2 462,26	2 576,97
7	Bread	135,91	133,51	131,72	141,67	153,47	165,28	177,08	188,88	200,69	212,49	224,29
8	Food	63,34	58,28	60,28	63,36	66,59	69,98	73,55	77,30	81,25	85,39	89,74
9	Fast spoiled products	111,25	118,07	107,19	110,89	110,34	109,78	109,22	108,66	108,10	107,54	106,98
10	Leathers	42,29	47,61	31,65	37,76	37,40	37,04	36,68	36,32	35,96	35,60	35,24
11	Animal	0,56	0,39	1,25	1,27	1,29	1,31	1,34	1,36	1,38	1,41	1,43
12	Flourspar	578,80	579,74	582,11	610,05	637,67	665,29	692,91	720,54	748,16	775,78	803,40
13	Iron ore	3 268,29	4477,35	5 350,00	5 617,50	5898,38	6 193,29	6 502,96	6 828,11	7 169,51	7 527,99	7 904,39
14	Zinc	118,88	114,19	110,10	121,05	116,71	128,31	123,71	136,01	131,13	144,17	139,00
15	Chemicals	1,27	3,23	3,30	3,40	3,50	3,61	3,71	3,83	3,94	4,06	4,18
16	Metals	131,49	202,63	710,76	210,00	218,61	227,35	236,45	245,91	255,74	265,97	276,61
17	Containers	1 084,86	1419,04	1 682,39	1 668,46	1813,41	1 958,36	2 103,30	2 248,25	2 393,20	2 538,14	2 683,09
18	Transit	2 312,60	1888,20	1 551,77	1 599,87	1649,47	1 700,60	1 753,32	1 807,68	1 863,71	1 921,49	1 981,06
19	Others	358,07	321,87	363,71	411,00	464,43	524,80	593,02	670,12	757,23	855,67	966,91
	Total	**16 113,19**	**18327,40**	**20 278,78**	**20 260,87**	**21209,93**	**41211,07**	**53 407,40**	**63 750,38**	**74 216,83**	**84 644,93**	**95 142,55**

Source: For the years 2010-2011 – Mongolian Statistical Yearbook 2011; for the years 2012-2020 – Consultant's forecasts



Source: Consultant

Figure 2.10: Traffic forecasts, 2010-2020, thousand tons



Source: Consultant

Figure 2.11: Coal traffic forecasts, 2010-2020, thousand tons

Source: formerly Mongolian Railway Authority.

Figure 2.12: Mongolia and NEA transportation connections

Source: Consultant

Figure 2.13: Planned Rail networks in Eastern aimags of Mongolia

In 2010 The State Great Hural (Parliament) of Mongolia has endorsed the State policy on Railway Transportation. According to the Policy approximately 5683.5 km of main railway composition shall be newly built in Mongolia in 3 stages. The first stage (approximately 1100 km in total) is:

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

In May 2012, the Government of Mongolia made a decision to build 3 sections of the new railway within 2.5 years and allowed some private contractors to start construction activities on the basis of Concession order (build, operate and transfer). These railway lines will be owned by the contractors for 24 years of operation. Afterwards the railway lines will be transferred to the Government ownership. The rail lines will have broader gauge of 1520 mm with axle load of 25 tons per axle (Figure 2.14).

Ukhaa Khudag-Gashuun Sukhait Rail line by“Energy resource” LTD and “Energy resource Rail” LTD

Ukhaa Khudag-Tsagaan Suvarga Rail line by the “Infrastructure Development” LTD

Tsagaan Suvarga-Sainshand Rail line by the “Eastern Railway” LTD and “Mongoltrans Line” LTD

Source: Consultant

Figure 2.14: Recent decision of the Government of Mongolia to build some sections of new rail lines within 2.5 years

Project area 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. Therefore, it is essential to consider under this project. Some traffic would be diverted from Zamyn Uud to the GTI transport corridors. 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.

Mongolia's BCPs are invariably in remote locations. All are situated in the Gobi desert and their immediate hinterland is sparsely populated, except for the mining complexes. Except for the newly constructed private mine roads, paved roads do not exist. Moreover, except at Zamyn Uud, there is no significant settlement located at the border.

General Assessment

Mongolia has been attempting to upgrade its border infrastructure in recent years. The PRC has assisted in designing the facilities and has in some cases also provided funding. The pressure for modernization and expansion has in part been due to the surge in traffic, especially at the South Gobi and western BCPs, which only recently became all-year BCPs.

However, there is a requirement for upgrading the existing common-user infrastructure. This is because these crossings will become busier as a result of the growing mining activity. The current BCP designs did not incorporate this traffic growth or the likely changes in border procedures. The core facilities, such as processing lanes and passenger halls, are generally in reasonable condition, as would be expected from such recent structures. However, there is a need for selective rehabilitation of existing structures, combined with an expansion in processing areas to increase the processing capacity. All proposed developments can be accommodated within the existing security zone or associated fenced areas.

Another investment priority is the need to address the problem of utilities. While the electricity supply is reasonable, often by the combination of connecting to the power supply on the PRC side and the emergency generators, the supply of water and sewerage is inadequate. Most of the water is sourced from adjacent wells, but is regarded as unsafe for drinking purposes, with high salt and iron levels. Despite this, it is the only supply for cooking and washing purposes. Water is often trucked in from nearby, but the same quality constraints still apply. Due to the lack of water there is no sewerage system. This is a common problem at remote BCPs in desert or semi-desert locations.

Modernization of the border processes and procedures is necessary to cope with the changing demand and needs to be supported by enhancements of the technology. While it is intended for the private sector to fund the automation of the coal sector border processing, there is a need for communication developments to improve reliability and processing speeds, especially between the BCP, their border agency's regional and head offices and with the mines. In addition, there is a need for additional computer hardware and software.

The situation at Zamyn Uud is different from the other BCPs. This is because it is both a road and rail BCP and in contrast to the other BCP processes only small quantities of coal traffic. However, it handles substantial volumes of transshipment rail freight due to the change in rail gauges between China and Mongolia.[1] Thus, instead of a single BCP it is in reality a complex of terminals covering the processing of road and rail traffic as well as the transshipment activities. An added complication is the development of a Special Economic Zone and a Logistics Center which do not appear to be well coordinated.

In the absence of an integrated border infrastructure plan, it is difficult to determine the need for infrastructure. The prevailing uncertainty emanates from the intended role of the Logistics Terminal. The related feasibility study[2] seems to presume that one component of that project will alleviate the existing congestion, as all rail and truck traffic will utilize the Logistics Center. However, this understanding is not shared by Customs, which regards the Logistics Center as a rail container handling facility. Customs suggest that the location of the Logistics Center is too far from the BCP and that any freight facility for road traffic should be built close to the proposed Special Economic Zone (SEZ), located in the vicinity of the BCP and the ring-road. On the other hand, this site is not suitable for rail traffic, which is why the feasibility study has proposed a new site. However, it is noted that the road freight infrastructure on the PRC side of the border is

[1] Using the 1520 mm Russian gauge and the PRC using the 1435 mm gauge.

[2] ADB. 2010. TA 7110-MON: *Regional Logistics Development Project*. Manila

directly aligned with the SEZ. The Consultants consider that until there is an integrated plan covering the entire border infrastructure, it is not possible to recommend any specific infrastructure development at this border.

In the meantime the PRC has constructed a major freight complex further west providing a direct connection to the designated Mongolian SEZ. Unfortunately, there are no parallel plans on the Mongolian side for construction of such a partner facility. Moreover, the new multimodal terminal is designed and funded on the basis of handling all the road freight, as well as the rail cargo. This assumption does not appear to have been agreed by the relevant authorities, as Customs are still assuming that processing of the road will take place in the vicinity of the border rather than at the new terminal. They indicated the function of the new multimodal terminal as being for the handling of containers by rail, not functioning as a road border facility.

The situation is further complicated by the existing border clearance activities with part of the traffic being cleared at the BCP, another part at the x-ray terminal and a third part at a private terminal. The result is heavy congestion and traffic mixing within the BCP, long delays at the X-ray facility as all outbound and container cargo has to be x-rayed and queues along the roads at the various checkpoints. In essence, while clearly there is a problem at the road BCP, it is far more complicated in that the procedures are not compliant with international best practice and there is a need to evaluate the border complex in its totality, rather than the road BCP in isolation.

In summary, before new infrastructure is constructed, it would be desirable if the entire situation at the BCP be reviewed and a plan prepared, which would define the functions of the different components of the border infrastructure. This should be undertaken in combination with a procedures review, as these are not compliant with international best practice and the funding of new infrastructure could not be supported without modernization of the procedures.

The proposed improvements to the BCPs also need to be seen within the context of the development of the border areas in general. The National Development and Innovation Committee is mandated to develop longer term plans and strategies for the border regions. In 2010, the Committee has prepared a report on the development of the southern border settlements, which was endorsed under Government Resolution 310. Following on from that, the Ministry of Road, Transport, Construction and Urban Development will prepare master plans for the border areas.

Customs recognize the need to have their border infrastructure incorporating international best practice design techniques. This particularly would involve the use of ‘form follows function’ approaches whereby the design is based on the processing (function) and the resulting ergonomics and only later is the structure (form) added over as a ‘shell’. BCPs are processing facilities and need to be designed on the basis of those operations, rather than as a structure within which the processes have to fit. The current design approach is predominantly data-driven rather than process-driven. Customs have requested ADB consider the provision of some part-time technical assistance to help with BCP designs. The Consultant worked with the architects appointed by the Ministry of Road, Transport, Construction and Urban Development who also appreciated the need for external assistance in finalizing and agreeing BCP designs. The improvements will be done first of all in Zamyn Uud. A project on trade facilitation funded by ADB will be implemented in coming years. The Project will focus on introduction of Single Electronic Window system and improvement of BCPs in Zamyn Uud and Bulgan/Yarant.

Infrastructure Requirements

Infrastructure requirements at the Mongolian BCPs have partly been met by the investment program undertaken by Mongolian Customs in recent years. However, as indicated above the principle requirement is for upgrades and extensions to existing posts, combined with the provision of living accommodation and enhancement of utilities and ICT. Details of the proposed infrastructure and equipment needs are discussed in the following sections at an example of Zamyn Uud border crossing facilities development.

Zamyn Uud is the most important BCP in Mongolia, handling not only bilateral traffic with PRC, but also transit traffic using the rail link to/from the Trans Siberian Railway. The border facilities for the road and rail traffic are spread over a large area, and the operations are complex, involving both transshipment and gauge changes, as well as standard import/export activities. The focus of the RIBS program is on enhancement of border infrastructure at both road and rail facilities.

However, 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 USD 71.59 million, of which USD 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.

The Zamyn Uud Border Crossing Point is located in the south east of the country, approximately 600 km from Ulaanbaatar. This BCP is located on the important CAREC Corridor 4b which not only links PRC and Mongolia but also PRC and Russia by rail, as the spur line from the Trans-Siberian Railways runs along this corridor. Thus, it is important not only for bilateral but also for transit traffic. Unlike the other Mongolian borders with PRC it is not dominated by mineral traffic and is the most important BCP for Mongolia in relation to the processing of general cargo. There is a rail transit corridor from this BCP to the Chinese port of Tianjin for handling third country trade.

The main traffic flow is inbound of which about 25% comes in by road, 5% loose by rail and 70% by rail, much of which is containerized traffic from Tianjin port. The profile for exports differs because 90% is loose by rail, 8% by road and only 2% by container. In addition to this traffic, there is the substantial transit traffic to and from Russia and Europe, almost all of which moves by rail and involves either transshipment or gauge changing at either Zamyn Uud or Erenhot.

Unfortunately, the procedures being used at the road BCP do not appear to be transparent and are not compatible with international best practice. This is in part due to the major import volumes and segregated clearance system, which appears to make standardization and streamlining difficult. However, this is compounded by the low implementation of modern border processing applications and poor coordination between the various agencies. It is clear the current procedures and their application directly result in major congestion, both at this road BCP and at the x-ray terminal. Merely providing yet more infrastructure is unlikely to resolve these difficulties. Indeed, there is concern that the development of the multimodal terminal may not relieve the congestion, but merely transfer it to another location. This suggests that consideration should be given to providing a Technical Assistance project which could undertake a more detailed processing audit, undertake some business re-engineering of the routines and provide a 'pathway' to the introduction of procedures based on international best practice.

This is not to suggest that there are no infrastructure needs. The major investment involved in the provision of a Regional Logistics Development Project, which will have no direct impact on passenger and cross border trading activities. It is also unclear whether it will result in major improvements in road traffic, with its main benefits being related to the handling of rail container traffic. There is general acceptance that there is a need to segregate the passenger and freight flows at the road border, but not on how this could be undertaken.

The original plan was to develop the existing road BCP into a dedicated passenger terminal processing only pedestrians, car passengers and drivers and the jeep activity, as well as taxis and buses. The freight activity would be moved to an adjacent freight terminal directly south-west of the passenger terminal, in effect a freight extension. A contract was awarded and construction started, but it has been suspended for over a year due to legal difficulties. Indications were given that work is unlikely to recommence in the near future.

There does not appear to be a clear understanding of what infrastructure is needed at this border. The proposed Logistics Terminal is expected to greatly alleviate congestion as the entire rail and truck traffic is assumed to utilize the Logistics Center. However, Customs regards it as essentially a rail container handling facility. Customs suggest that the location of this terminal is too far from the BCP and that any freight facility for road traffic should be built within the proposed Special Economic Zone (SEZ), which is near the BCP and the connecting ring road. It is noted that the road freight infrastructure on the PRC side is directly aligned with the SEZ. Even if the new multi-modal terminal cleared the road traffic, a road BCP acting as a border checkpoint would still be required. Until there is a clear delineation of functions among all existing and planned border infrastructure facilities, it is not possible to recommend any specific infrastructure development at this border.

Customs has indicated that inadequacy of ICT-related hardware and poor communication speed is contributing to the slow throughput at the BCP. There is a need for replacement of the dated hardware by a full complement of workstations and associated facilities with more up-to-date configuration. Provision for communication services for an extended period at a higher bandwidth would also provide immediate relief.

Freight Procedures

The outbound freight vehicle procedures are that the driver queues outside the gate and when space is available, the Border Guards allow entry. The driver proceeds through a radioactivity monitor to the freight-processing lane and parks. He then proceeds to the passenger entry hall, completes a departure card; passes through Customs completing a personal declaration, and lastly presents a departure card and the passport to the Immigration who then check and stamp the passport. If the vehicle is empty, it is then subject to three consecutive inspections. Firstly, the State Professional Inspection Agency representing sanitary, photo-sanitary and standards requirements, secondly, the Customs check no exports are present, and thirdly, the Border Police check there are no illicit materials.

If the vehicle has export goods, after stamping of the passport, the driver proceeds to the freight broker windows to hand over the documents. The broker completes the declaration online on the Customs computer system. The documents are returned, and the driver proceeds to the State Professional Inspection Service who checks the declaration, go to the truck and undertake the inspection/examination and stamp documents. The driver completes a health declaration, which is then stamped, and will later be presented to the Chinese officials on entry (this also applies to empty vehicles). The driver returns to customs and presents documents and an examiner is appointed.

The examiner inspects/examines the load and stamps, adding any comments as necessary. The officer returns to customs and goods are assessed for export duty. If duty is liable, Customs raise an invoice. The driver goes to the bank and pays, with the bank entering the payment onto the Customs computer system and returns to the Customs who stamp the documents for release. The driver proceeds to the Border Police who check the documents and the load before finally stamping the documents. On completion of all checks and stamping, the driver drives the vehicle to the exit gate. The Border Guards check all of the documents have been stamped and the vehicle proceeds across to the Chinese border facility.

Inbound, the vehicle arrives at the entry gate and the Border Guard checks for a passport and issues an arrival card. The driver moves forward to the Sanitary Department and drives through a recessed pit to clean the tires. They issue a certificate and then the vehicle passes through a radioactivity monitor and moves forward to the weighbridge, to the vehicle-processing lane, and parks up alongside the inspection platform. The driver then proceeds to the passenger entry hall, completes an arrival card and presents it with his passport to the Border Police who check and stamp. The driver then passes through Customs completing a personal declaration.

Assuming the vehicle is carrying imported goods, after stamping of the personal declaration the driver proceeds to the freight broker window handing over all documents. The broker completes the declaration on line on the Customs Computer system. The documents are returned and the driver proceeds to the Border Police who check the documents and inspect the load before they stamp the papers. The State Professional Inspection Service then checks the declaration and documents, goes to the truck and undertakes an inspection/examination and stamp the documents. The driver proceeds back to the Customs and presents the declaration and an examiner is appointed.

The Examiner inspects/examines the load and writes any comments as necessary. The Officer returns to Customs, and the goods are assessed for import duty. Assuming duty is liable, they raise an invoice. The driver goes to the bank and pays, with the bank entering payment onto the Customs computer system. He then returns to the Customs who stamp documents ‘as released’; and on completion of all checks and stamping, the driver drives the vehicle to the exit gate. The Border Guards check the documents are all stamped and the vehicle proceeds into Mongolia.

The procedures for the inbound empty coal vehicles coming in from the Chinese side are that they drive to the weighbridge according to which mine they are destined for. The weighbridge is manned by Customs who have a vehicle database. The operator observes the vehicle number and enters the empty weight in the database. There is a CCTV gantry at the weighbridge, which allows Customs to check remotely that the vehicle is empty. The truck is then driven forward to the Immigration Office, where the driver gets out and presents his passport for stamping. On completion the trucks drives to the paved road entry point and continues to the mine. The overall process takes only 2-3 minutes.

Outbound trucks come from the various mines ‘cross country’ using unpaved roads. On arrival they park up in the export queue. The vehicles firstly go to the Immigration booth for passport checks and then drive to their mine’s weighbridge. The vehicle is weighed and the difference in weight between inbound entry and the outbound full load is compared automatically. The driver then drives forward to the Chinese side. The Declarations for the coal cover bulk shipments, thus there is not a declaration for each vehicle, but a consolidated declaration for a number of vehicles is lodged periodically.

Passenger Procedures

The normal passenger traffic is processed by using an airport-type system. There is very little pedestrian traffic at most BCP because of the remote location. Cars and vans park up in the processing lane and all passengers have to exit and enter via the hall, first completing a personal declaration form. This is followed by Customs inspection, including x-raying of all luggage, and finally immigration. The inward processing is identical, but in reverse, i.e. firstly, immigration, and this could be followed by a medical check.

Potential Processing Improvements

The key requirement is to develop modern procedures for the processing of the coal traffic, given both its importance and volume. A key feature is that within Mongolia there is no export duty on coal, and therefore any Customs controls are solely for anti-smuggling purposes, for instance, the potential smuggling of gold hidden in coal shipments. Table 2.9 provides trade volumes cleared through customs for import or export in

Zamyn Uud. UBTZ as the national railway provides customs-bonded rail transport between Zamyn Uud and Ulaanbaatar and most of the foreign trade by rail pass through Zamyn Uud without customs clearance. Therefore, the trade statistics reported by the Zamyn Uud Customs do not capture most railway traffic by UBTZ which are cleared in Ulaanbaatar or move in transit between PRC and Russia. This trade will be covered separately in the traffic forecast for ZULC.

Table 2.11: Number of foreign trade records of commodities cleared through customs in Zamyn Uud

	2006	2007	2008	2009
Imports				
Arrival by truck	1,001	946	2,423	1,187
Arrival by Rail	88	237	535	246
Containers (arrival by truck)	86	371	696	371
Sub-total	1,175	1,554	3,654	1,804
Exports				
Arrival by truck	236	151	343	218
Arrival by Rail	45	53	69	59
Containers (arrival by truck)	30	20	19	26
Sub-total	311	224	431	303
Total records	1,486	1,778	4,085	2,107

Source: Compiled by Consultant from Mongolian Customs Authority data

With respect to foreign trade moving across the border by rail, Table 2.12 shows only goods cleared for import or export in Zamyn Uud. Therefore, it is substantially lower than the actual railway traffic moving across the border. This is also true for the summary number of records shown above, since truck-related records are substantially higher than rail-related records and container-related data rarely includes arrivals by rail. For example, of the 371 records of imports in containers cleared in Zamyn Uud in 2009 reported in Table 2.10, all arrived by truck and none involved onward shipment by rail.

Figures for freight traffic obtained from Customs as shown below may not represent the full picture as data from the project implementation unit shows 2011 total tons as 2.1 million – a giant leap from the 2010 Customs figures.

Table 2.12: Foreign trade records of commodities cleared through customs in Zamyn Uud

Year/traffic	2007	2008	2009	2010
Imports (tons)	728,056	1,232,829	668,489	870,744
Exports (tons)	34,257	52,719	74,260	75,651
Trucks inward	18,919	34,501	21,446	19,190
Trucks outward	18,106	34,302	21,152	17,453
Cars in/out	80,634/81,659	95,350/95,059	98,493/99,246	116,089/104,844
Passengers in and out figures rounded	750,000/766,000	809,000/810,000	698,000/702,000	861,000/863,000

Source: Mongolian Customs

In addition to freight the road BCP is also a busy passenger crossing. A significant part of this traffic is 'cross-border' trading activities where small traders cross by jeep each day to the markets in Erenhot to buy supplies, often returning back to Mongolia the same day.

Table 2.13: Foreign trade cleared through Zamyn Uud customs, 2006-2009

All commodities:	Net tons				Value (thousand USD)				Average value per ton (USD)			
	2006	2007	2008	2009	2006	2007	2008	2009	2006	2007	2008	2009
Imports:												
By truck	408,043	263,165	330,485	230,382	145,534	166,155	287,536	177,412	356.66	631.37	870.04	770.08
By rail	34,787	22,647	45,051	79,436	8,031	13,832	42,096	26,877	230.86	610.75	934.42	338.35
Containers	18,641	75,149	883,960	399,083	3,050	40,139	152,203	76,882	163.61	534.12	172.18	192.65
Total imports	461,471	360,961	1,259,496	708,901	156,615	220,126	481,836	281,171	339.38	609.83	382.56	396.63
Exports:												
By truck	6,957	3,781	4,752	6,020	12,308	14,926	17,746	2,056	1,769.14	3,947.95	3,734.25	341.56
By rail	8,567	26,653	47,859	71,582	11,664	24,922	42,284	33,550	1,361.47	935.04	883.51	468.69
Containers	4,272	4,394	1,085	427	2,953	3,892	1,463	519	691.30	885.82	1,348.15	1,217.03
Total exports	19,796	34,828	53,697	78,028	26,925	43,740	61,493	36,125	1,360.10	1,255.90	1,145.20	462.97
Total Trade:												
By truck	415,000	266,946	335,237	236,401	157,842	181,082	305,282	179,468	380.34	678.35	910.65	759.17
By rail	43,354	49,300	92,910	151,018	19,695	38,753	84,381	60,427	454.28	786.07	908.20	400.13
Containers	22,913	79,543	885,045	399,510	6,003	44,031	153,666	77,401	262.00	553.55	173.63	193.74
Total exports+imports	481,267	395,789	1,313,192	786,929	183,540	263,866	543,329	317,296	381.37	666.68	413.75	403.21

Source: Report on Zamyn Uud Logistics Center by TERA International Group Inc

From Table 2.13, the following general observations can be made:

- Trade handled through Zamyn Uud Customs is highly imbalanced. In terms of weight, the ratio of imports to exports was 23:1 in 2006 and 2008; 10:1 in 2007; and 9:1 in 2009.
- In terms of value, the ratio ranges from 5:1 to 8:1, resulting in a higher value per ton for exports compared to imports. In fact, the average value per ton of exports is higher than imports by a range from 17% (in 2009) to 301% (in 2006). Considering that Mongolian exports are mostly raw materials, animal products, and scrap metals compared to imports of mostly consumer goods and finished products, the higher average value per ton for exports is unexpected.
- With respect to trade in containers, trade imbalance is much more pronounced: In terms of weight it ranged from 4:1 in 2006 to 935:1 in 2009. The principal reason for this unusual trend is the extraordinary surge in imports of commodities in containers in 2008 (at 884 thousand tons, 11 times more than the previous year), which was somewhat decreased in 2009 to 399 thousand tons, but has still remained considerably higher than the 2006 and 2007 volumes of 18,641 and 75,149 tons, respectively. The 2008 surge of imports in containers was principally due to construction materials with cement (492 thousand tons accounting for 56% of imports in containers) taking the lead. The high proportion of cement imports in containers continued into 2009 with 211 thousand tons accounting for 53% of imports in containers in that year.
- In terms of value, the general observation made above for the total trade is also more pronounced in trade in containers where the ratio ranges from 1:1 in 2006 to 148:1 in 2009. As a result, the average value of exports in containers is higher than imports by a range from 66% in 2007 to 683% in 2008. Considering that most exports in containers are coal, animal products, and waste materials (plastic, paper, scrap metal, etc) with garments only appearing in 2009, the higher average value per ton for exports in containers is also unexpected.
- The surge of imports of construction materials in containers in 2008 and 2009 occurred at a time when the global economy was experiencing a crisis. During this time period Mongolian constant GDP increased by 7.3% (growth of 8.9% in 2008, followed by a contraction of 1.6% in 2009). In 2008 construction increased by 30%. Based on the expected increase in mining as a result of the signing of the Oyu Tolgoi Mining Agreement in September 2009 and the more recent changes in the mining legislation, construction sector is expected to continue growing in the future. This trend will result in imports of more construction materials through Zamyn Uud.

Trade through Zamyn-Uud under bonded transport

Trade which moves through Zamyn Uud without Customs clearance in Zamyn Uud is by rail. The trade records for 2006 to 2009 do not include any arrival or departure by truck with transport within Mongolia under bond. This is because (i) the Regional Road connecting Zamyn Uud to Ulaanbaatar is not yet completed resulting in very few road transport of cargo through the existing unimproved earth tracks; and (b) as a result of the first reason, all road transport companies currently operating in Zamyn Uud are small entities, which do not have neither the financial capability nor sufficient road transport business between Zamyn Uud and Ulaanbaatar to place a bond with the Mongolian Customs Authority (MCA).

Traffic handled in Zamyn Uud by UBTZ from 2003 to 2008 is summarized in Table 2.14. The table provides the traffic statistics by type of freight and direction. Imports from PRC arriving by rail as well as imports arriving by road transloaded to rail have been steadily increasing. In particular, road to rail transloading is the largest share of UBTZ's operations in Zamyn Uud accounting for almost 40% of UBTZ's historical business since 2003. The reason for this high share is the lack of a hard surface road between Zamyn Uud and Ulaanbaatar. The road to rail transloading is the only method for importers crossing the border by road to ship their goods domestically, principally to Ulaanbaatar.

Table 2.14: Traffic Handled by UBTZ in Zamyn Uud

Type of freight	Unit	Years					
		2003	2004	2005	2006	2007	2008
Imported goods arriving by rail	No of Wagons	11,253	11,673	9,964	14,076	19,878	30,437
	Thousand tons	262.5	313.1	235.0	374.5	456.6	651.0
	Containers (Boxes)	9,544	8,891	7,711	11,130	16,804	26,993
Imported goods arriving by road transloaded to rail	No of Wagons	10,635	14,904	18,596	21,354	24,566	25,842
	Thousand tons	350.2	423.3	557.7	638.0	771.9	1,035.3
	Containers (Boxes)	6,492	10,552	13,230	14,893	15,517	12,531
Exported goods by rail	No of Wagons		206	264	544	1,325	983
	Thousand tons		2.6	4.2	8.4	26.5	17.1
	Containers (Boxes)		226	172	177	378	153
Exported goods transloaded from rail to truck	No of Wagons						
	Thousand tons	3.9	52.0	62.1	75.8	57.4	45.8
	Containers (Boxes)	888	6,736	8,676	9,916	7,796	5,227
Transit freight	No of Wagons	3,374	3,055	6,454	8,309	9,864	7,250
	Thousand tons	191.2	178.2	360.3	461.7	516.6	381.2
	Containers (Boxes)			570	283	639	365
Other freight	No of Wagons	5,471	9,142	9,226	11,080	10,463	7,030
	Thousand tons	160.5	192.1	222.7	277.6	267.5	211.5
	Containers (Boxes)	14,696	17,750	21,930	25,524	25,485	18,080
Total	No of Wagons	30,733	38,980	44,504	55,363	66,096	71,542
	Thousand tons	968.3	1161.3	1442.0	1836.0	2096.5	2341.9
	Containers (Boxes)	31,620	44,155	52,289	61,923	66,619	63,349

Source: Consultant from data provided by UBTZ.

The facilities used by UBTZ (Terminal 1 in Zamyn Uud) are old and all operations are manual (Figure 2.10). There has been no significant investment by UBTZ to improve cargo handling, and provide faster service to importers. Wagon availability is chronically low, with frequent waits of 5-7 days to load wagons for dispatch to Ulaanbaatar. Despite frequent complaints from shippers and importers, UBTZ has not made any improvements in its facilities to accommodate user needs.

With the anticipated completion of the ADB-funded Regional Road between Sainshand and Zamyn Uud in 2013 and the Choir-Sainshand Road funded by a grant from the U.S. Millennium Challenge Corporation in the same year (2013) and given the inability of UBTZ to effectively respond to market conditions and shipper needs, it is certain that substantial freight now moving by rail will divert to road transport. When the rehabilitated road from Altanbulag to Ulaanbaatar was completed in 2000, the railway experienced a loss of 32% in southbound traffic and 40% in northbound traffic within two years. Without adequate and efficiently managed logistics facilities in Zamyn Uud such as Zamyn Uud Logistics Center, which effectively respond to market needs, the history is certain to repeat along the rail corridor between Zamyn Uud and Ulaanbaatar.

An interesting fact revealed by Table 2.12 is that cargo transloaded from rail to truck in Zamyn Uud, thus passing through customs by road to Erenhot (39,240 boxes from 2003 to 2008), constitutes more than 53% of the cargo which arrive by road from Erenhot and transloaded to rail (73,215 boxes). It can, therefore, be concluded that there is an established intermodal transfer of cargo between rail and road in Zamyn Uud. In fact, the table reveals that 41% of UBTZ business in tons from 2003 to 2008 in Zamyn Uud was intermodal transfer between rail and road.

The table also reveals that containers are not typically used in transit trade between PRC and Russia. Most transit trade is in bulk commodities not suitable for containerization. The trade imbalance between imports and exports by rail is also evident as in the case of road transport. In the case of rail the Import:Export ratio has been 39:1 during the 2003-2008 period.

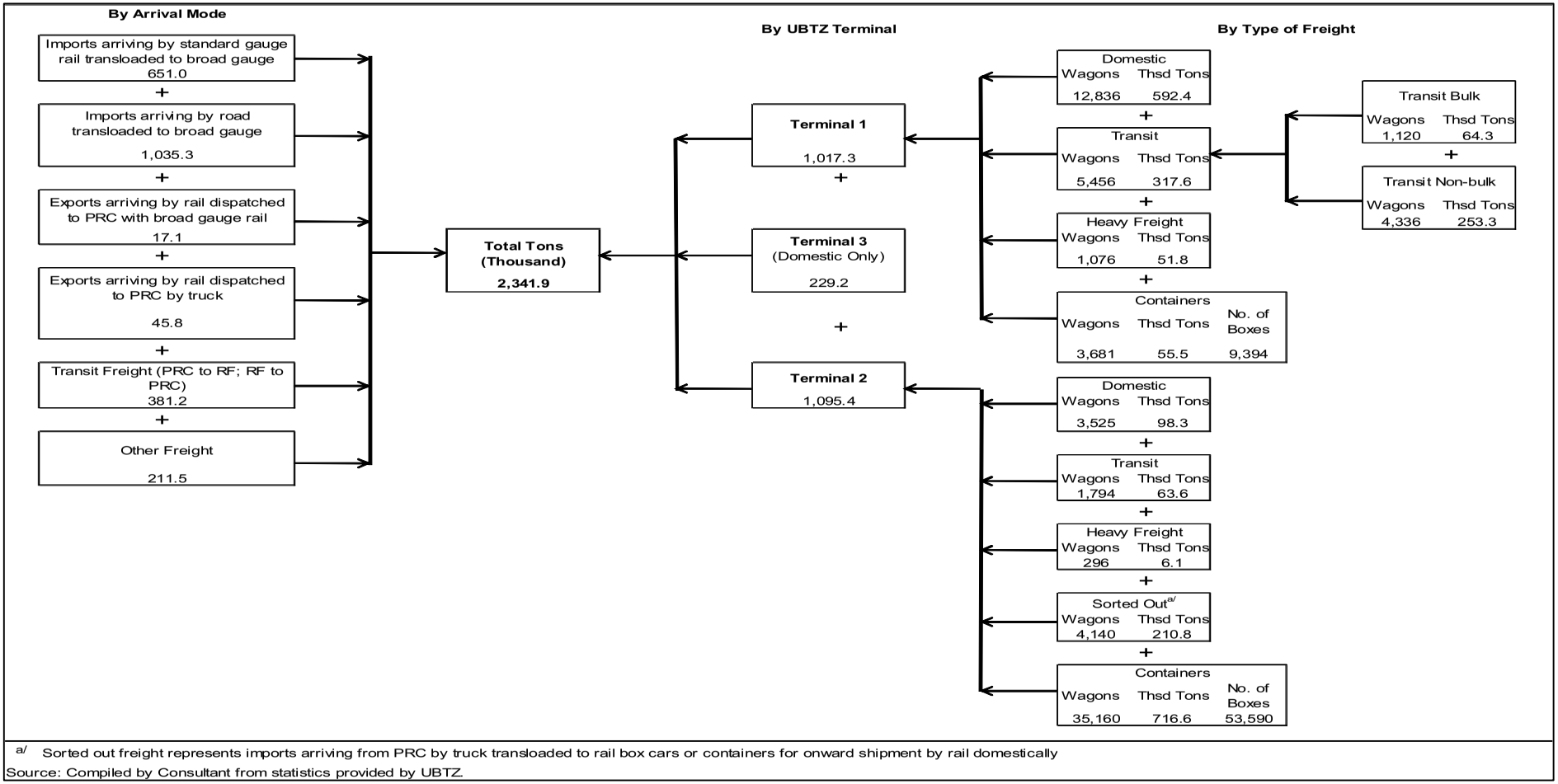
The following patterns can be observed from these figures:

- Terminal 1, where rail-to-truck and truck-to-rail interface takes place for general cargo generally in box cars and transit bulk and non-bulk cargo is about one-half of the total freight volume handled by UBTZ in Zamyn Uud.

- Transit volume through Terminal 1 is much larger than transit volume in Terminal 2 where containers are handled. Roughly for every one ton of transit freight handled in Terminal 2, Terminal 1 handles 6 tons. This shows that transit freight uses relatively few containers; it is mainly in box cars and bulk carriers. The gauge change from standard (Chinese) to broad (Mongolian) gauge of transit freight in Terminal 1 consists of manual unloading of cargo from Chinese wagons and loading in Russian wagons. This is a time consuming, tedious process prone to damage.

- Exports arriving by rail dispatched to PRC by truck are 2 to 9 times higher than those dispatched to PRC by rail. This shows the preference of shippers to pass through the border by road than by rail due to delays in rail-to-rail transfer.

- “Heavy freight” is defined by UBTZ as oversized and/or overweight cargo, which uses the crane to load/unload. However, the average weight per wagon for heavy freight ranges from 34 to 48 tons, which is lower than the average weight for domestic (43 to 46 tons) or transit (56 to 58 tons) wagons.



Source: Final Report of the Zamyn Uud Logistics Center project, TERA International Group Inc.,2010

Figure 2.15: Traffic at the Zamyn Uud terminals in 2008, thousand tons

- Freight handled in Terminal 2, where rail-to-rail and truck-to-rail (termed as "sorted out" by UBTZ) transfer of mainly containers take place, comprises the other half of UBTZ's operations in Zamyn Uud.
- The new Terminal 3 which has been active since 2008 for domestic shipments has a relatively small share of UBTZ freight operations in Zamyn Uud. Whereas Terminals 1 and 2 have direct access to both standard and broad gauge tracks, Terminal 3 is on the UBTZ mainline and is primarily designed for domestic freight. Its utility for international freight operations is, therefore, limited.
- In Terminal 2 domestic trade in box cars (rail-to-rail transfer of imports from China) is relatively small accounting for approximately 10% of Terminal 2's volume.
- Transit trade of containers (rail-to-rail transloading from standard to broad gauge from Chinese-owned to Russian-owned flat cars) also comprises a small share of Terminal 2's operations, accounting for 4% to 7% of the annual freight handled in Terminal 2.
- 13% to 20% of Terminal 2 freight consists of cargo arriving by truck from PRC transloaded to rail boxcars or containers for shipment domestically principally to Ulaanbaatar. This road-to-rail transfer in Terminal 2 is an inefficient utilization of Terminal 2's layout, which consists of a narrow platform with the standard gauge track on one side and the broad gauge track on the other. The platform and the track configuration of Terminal 2 were intended for rail-to-rail transfer of containers by reach stackers. The narrow platform does not have sufficient space for road-to-rail transfer and if used for this purpose the congested space would interfere with efficient operations of rail-to-rail transfer of containers.
- 65% to 70% of Terminal 2 freight is containers (rail-to-rail, road-to-rail, and rail-to-road). It has handled 53 thousand to 56 thousand boxes.
- In 2007 and 2008 a box represented a mixture of 31% 20-foot equivalent units (TEU) and 69% 40-foot equivalent units (FEU). Based on this mixture, the number of containers handled in Terminals 1 and 2 totaled 111,506 TEUs. The corresponding TEUs in 2008 were 106,403. The average cargo weight per TEU in 2007 was 6.7 tons and in 2008 it was 7.3 tons, considerably less than the worldwide average weight of 12.8 tons per TEU. The reason for this low weight is that the number of boxes reported in UBTZ statistics include empty containers being returned to China and international shipping lines/customers. UBTZ reported that in 2007, about 48% of boxes were empty containers. In 2008 this figure was 43%.

Sumber (Nomrog) BCP:

Railway infrastructure. As previously mentioned in freight transport railway is the dominant mode in Mongolia both in terms of tons and ton-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. The rail share is very high compared to other developing countries, where highways carry the majority of the freight traffic in terms of tons (e.g. in PRC highways carry 76.5% of freight traffic whereas railways carry only 13.1%). This can mainly be attributed to the condition of the highways in Mongolia. In terms of passenger traffic, the railway share is quite small and approximately 95.5% of passengers are handled by highways (the corresponding figure in PRC is 91.1%).

The difference in modal share between freight and passenger traffic indicates a pattern generally associated with transition economies. Railways are traditionally the primary mode of freight transport in centrally controlled economies. However, as countries move toward free markets, the dominance of railways usually declines as the nature of the economy changes from an emphasis on heavy industry and redundant shipping to less transport-intensive sectors such as consumer goods and services. Therefore, it can be expected that as the Mongolian market economy grows and matures further, the dominance of the railway in freight transport may decline.

The transition to market economy or potential for private sector investment in railways in Mongolia is limited at the present time. The major reason for this is the lack of a proper legal and business environment under the present structure of the railway management and transportation system. The railway sector is managed by the Mongolian Railway Authority (MRA), which is a government agency. Interest for improved cross-border cooperation in the Project Area between the two countries, to some extent, has arisen out of a proposal by UNDP-TRADP to construct a railway line from Choibalsan in Dornod aimag to Arxan in Hinggan

League (PRC), to link with the existing PRC Railways (CR) network that would provide a connection to Hunchun as part of the TREDA. The proposed rail link would give Mongolia a more efficient route to the sea and would help in further development and commercial exploitation of Mongolia's rich mineral resources. Although the existing Choibalsan-Borzya rail line provides a link to PRC and the Tumen Region via Zabaykalsk/Manzhouli, this route is indirect; it requires two border crossings (first from Mongolia into the Russian Federation and from there to PRC); it involves a break of gauge; and the line from Manzhouli to Tumen River is highly congested and cannot be economically upgraded. Hence, a more direct and efficient railway link into PRC would provide a more reliable low cost transportation link from the three aimags eastbound to PRC.

The Choibalsan (or Khuut)-Arxan rail link not only takes into account the regional synergies – significant mineral resources in ERM, increasing demand for minerals in PRC, and a fairly well-develop transportation network in PRC - but it also provides an alternative corridor for Mongolian minerals to world markets via the Tumen River Economic Development Area.

Route A involves the construction of a new line from Choibalsan through Halkgol (Sumber) to Arxan in Hinggan League to connect with the CR rail line continuing to Ulanhot and then to Baicheng. From Baicheng, the trains can travel through Changchun, Jilin to Tumen.

Even though a detailed alignment is not provided for the proposed rail connection between Choibalsan (or Khuut) and Arxan, it will most likely travel through the Nomrog SPA in Mongolia and Zhangzi Pine Zone in Arxan. Due to the pristine environmental resources on both sides of the border, this alignment is not recommended by the Consultant. Any railway link between PRC and Mongolia through the Project Area should be aligned further north of 47°40'N latitude to minimize environmental damage.

2.3. Performance Review of Corridors

2.3.1. Applicable legal frameworks

Road sector legal and regulatory framework:

Between Mongolia and PRC:

- Road Transportation Agreement between the People's Republic of China and Mongolia on June 24, 1991;

Between Mongolia and Russian Federation:

- International Road Transportation Agreement between Russian Federation and Mongolia on February 07, 1996.

The applicable laws of a general nature that have an impact on the Transport infrastructure include and are summarized below:

- Constitution of Mongolia, 1992;
- Land Law of Mongolia, 2004;
- Civil Code of Mongolia, 2002, amended in 2005 (CC);
- Foreign Investment Law of Mongolia (FILOM) and other laws relating to foreign investment;
- Unfair Competition Law of Mongolia;
- Company Law of Mongolia (CLOM);
- Law on State and Local Property of Mongolia 1996 (LOSALP), and Resolution No. 134 made pursuant to it;
- Privatization Law of Mongolia 1991 (PLM);
- Public Procurement Law of Mongolia, which entered into force 2006);
- Import and Export Regulations and Procedures, including the Customs Law of Mongolia; and
- Law on Financial Leasing 2006 (LOFL) and amendments to the Taxation Laws relating to the enactment of this Law.

Railway sector legal and regulatory issues

The applicable laws of a specific nature applying to the railway subsector as a whole are:

- 1996 Law on Railway Safety (1996 Law);
- Law on Railway Transport (LRT);
- Parliamentary Resolution approving the establishment of Mongolian Railway Authority (MRA);
- MoRTT (now MRT) Regulation dated February 2, 2005 Amendment 2; and
- Law of Government Inspection 2003.

The applicable agreements of a specific nature applying to the railway subsector as a whole are:

- 1949 Agreement between Russia and Mongolia on the Establishment of the Ulaanbaatar Railway Joint Stock Company (UBTZ) and its protocols (1949 Agreement), and
- Multi-Lateral Agreements on Rail Transit Transportation:
- Border Railway Agreement between Mongolia and Russia, 1953;
- Border Railway Agreement between Mongolia and PRC, 1954; and
- Border Railway Agreement between Mongolia, Russia and PRC, 1956.

The 1996 Law on Railway Safety (1996 Law)

The 1996 law which had set out UBTZ's duties and responsibilities with respect to safety and includes safety procedures, instructions, approvals and other safety measures, has been replaced by the Law on Railway Transport. According to the 1996 Law, the railway is essentially self-regulating on safety matters and is governed by the 1949 Joint Stock Agreement (see Subsection 7.3.6 below) and its Rules and Protocols with respect to organizational structure and railway operations. It is regulated by other domestic laws of general application, such as the Law Against Unfair Competition, which applies to all monopolies, including UBTZ. Whether these Mongolian laws are enforced against UBTZ is another issue.

Under the 1996 Law, UBTZ adopts technical, signaling and operating rules already in existence. These rules are also in force for any other railway, such as private industry railways which must follow the same regulations adopted by UBTZ.

The Law on Railway Transport 2007 (LRT)

LRT relates to regulatory issues and the regulatory framework for railway operations. It represents a new approach to railway regulation in Mongolia by setting out a comprehensive regulatory scheme for the railway sector, covering railway safety, economic issues and independent regulatory oversight. The policy which gave birth to the law originated in Parliamentary Resolution No. 24 of 2004, which itself was issued as a result of the Government Action Plan 2004-2008. In that Resolution, the GOM approved a plan that included undertaking legal reforms to allow for the reorganization of the railway sector, in particular to separate infrastructure from railway operations and to implement changes to increase the competitiveness of the railway in the international rail transport market.

The stated goal of LRT is to ensure railway transport safety and develop the railway transport sector while balancing the interests of the state, the public, customers, carriers and owners of railway infrastructure.

The means to achieve this was initially through the creation of MRA, an independent government entity, formed in 2004 by Parliamentary Resolution. MRA's mandate under this Resolution is to oversee and regulate railway safety and implement railway policy relating to both safety and economic issues. Additional powers are given to MRA in LRT relating to a licensing scheme for market entry and a track access regime permitting new operators to use the railway infrastructure on which to operate their services.

LRT also defines the respective roles of the GOM, the Central State Administrative Body in charge of railway transport issues, the aimag, the city of Ulaanbaatar, the soum and the district governors, and UBTZ, giving each of these a role in railway safety.

Regarding safety regulations, the railways will be covered by the same codes and rules followed before, but now, in Article 15 of LRT, these rules are enshrined in legislation. A State Railway Inspection Body (SRIB) was created within MRA, thus separating rail safety enforcement from UBTZ and transferring this function to a division within the independent regulatory authority. The SRIB is empowered to exercise administrative supervision over railway safety (employee and public safety) and over service matters (Article 13), and will consist of the State Railway Senior Inspector and the State Railway Inspector (Article 13.4) who will supervise the implementation of all safety legislation under the guidance of the MRA Chairman. The SRIB

also has a role in the choice of new license holders under the proposed new market entry provisions (Article 13.7.5), most likely by advising on safety aspects of licensing applications.

Important new features of LRT are new market entry provisions (licensing of new operators of railway services) and an open access scheme whereby railway infrastructure continues to be owned by UBTZ, with what appears to be a duty on the part of UBTZ to enter into contracts with other carriers (Article 19.2.3) allowing them non-discriminatory track access subject to capacity restrictions of the infrastructure operator. Where the railway is both infrastructure operator and a railway service provider, the railway has a duty to keep separate accounting (Article 19.3).

Another important new feature of LRT, closely related to the open access provisions noted above, is the new licensing scheme for railway operators. It would appear from LRT that a company that manufactures rolling stock would be considered to be a rail operator. Would a leasing company incorporated to acquire rolling stock also be required to hold a license? LRT states that a special license is needed for building infrastructure, repairing, manufacturing and installing infrastructure and rolling stock and for carrying out railway transportation services (Article 16). It, therefore seems, unlikely that purchase or leasing of rolling stock is included in these categories. An oversight role for MRA regarding such leasing would have to be accomplished by specifically giving MRA this role rather than it being inherent in the mandate. This approach is recommended by the Consultant.

Thus, while the law enables other railway operators to utilize track and other facilities, there have been no other operators or licenses granted as of August 2010. The Government, however, established Mongolian Tumur Zam (MTZ) in March 2008 as a fully state-owned railway transport company under the State Property Committee's ownership with its operations and overall supervision delegated to MoRTT (now MRTCUD) and with regulatory oversight by MRA. MTZ will be the company to manage the newly build railway lines in Mongolia. The following issues are noted with respect to the open access provisions under LRT:

- The open access provisions should be carefully thought out, especially the degree of control that UBTZ as the infrastructure provider will have over the choice of operators. There does not appear to be any control by the railway under the provisions, as long as the new operator meets safety and financial requirements under the licensing provisions; and
- The open access provisions appear to make assumptions regarding land and usage of railway track covered by the 1949 Agreement that may be open to question by the Russian partner of the Agreement. They assume that any rights granted to UBTZ under the Agreement are not exclusive, which would seem to be a contentious position to take.

It is recommended with respect to open access provisions that additional powers be given to MRA in LRT to make regulations regarding open access, but for the time being, omit the general principle of open access now provided in Article 19.2.3. This would allow for such provisions if and when necessary, and would give the MRA flexibility to decide on the type and degree of access desirable.

1949 Agreement between Russia and Mongolia on the Establishment of the Ulaanbaatar Railway Joint Stock Company and its Protocols (1949 Agreement)

The 1949 Agreement represents the current legal framework governing the operations and infrastructure of the UBTZ. The 1996 Law also applies to UBTZ but it is mainly safety oriented and does not conflict with the 1949 Agreement. It does, however, contain some insight into the interpretation of the 1949 Agreement and the intention, at least from the Mongolian side, as to what was transferred in the Agreement.

The 1949 Agreement consists of 15 articles. It is of unlimited duration, with termination only by agreement of both parties (Article 14). In it, the parties agree to establish a Soviet-Mongolian joint venture for the construction and operation of a railway line from the Soviet–Mongolian frontier point of Naushki to Ulaanbaatar (402 km). Protocols to this Agreement extend the line from UB southward to the Chinese-Mongolian border to a point just beyond Zamyn Uud (712.69 km) with a branch line from Salkhit to Erdenet (163.5 km) and other branch lines from Khonkhor to Nalaikh (12 km), Darkhan to Sharyn Gol (61.8 km), Tolgoit to Songino, Bagakhangai to Baganuur (94.4 km), Airag to Bor-Undur (58.2 km) and Sainshand to Zuunbayan (47.3 km).

The Agreement was signed by the Ministry of Railway of the former USSR and the Ministry of Transport for the former Mongolian People's Republic (MPR) and provides for equal ownership of stock in the joint venture.

The Agreement provides for the formation of a Railway Board of Directors consisting of 3 members from each country including a Chairman of the Board appointed from the Mongolian members and a Deputy

Chairman appointed from the Soviet side. The Rules signed in 1968 relating to the Agreement specify that the Chairman of the Railway rotates every 3 years between a Mongolian and a Russian member.

Under the Rules of 1968, the Chairman of the Railway has extensive powers to act on his own and in particular, to procure, rent, transfer and sell property, both movable and immovable.

Article 5 of the Agreement is of particular importance with regard to the issue of available land for use by UBTZ. That article sets out what was transferred to UBTZ by GOM to pay for its share of the joint stock. It uses the words "transferred for unlimited use," with unlimited referring to time, of 120 meters of railway strip (60m on each side of the railway track), 300 meters in width of the station (150m on either side of the station) and 2,000 meters lengthwise beyond the station land. It also provides for the transfer of 10,000 hectares of land over and above the land referred to above, for unlimited use, unlimited again referring to time, of this land for purposes of obtaining construction materials, coal and oil to operate the railway and to construct technical facilities, buildings and other construction.

The following conclusions can be drawn from the 1949 Agreement, along with its Rules and Protocols, which total about 27.

Legally, it is an international agreement but is not registered as a treaty in accordance with the Vienna Convention of the Law on Treaties, 1969. It predates that Convention, but the Convention is a codification of customary law regarding treaties and as such requirements such as the one found in Article 1, that the instrument be signed by heads of State or other persons specially authorized, would most likely have applied even in 1949. The significance as to whether it is a valid treaty is that under Mongolian Law, the terms of a treaty will prevail over domestic law unless it conflicts with the Constitution and as a corollary, cannot be amended or changed by domestic law. Moreover, if it is not a valid international treaty, an authentic "international treaty," could supersede it.

If the 1949 Agreement is a valid international treaty and prevails over domestic law, it is submitted that the provisions on transfer of land cannot be read to mean transfer of ownership. The present Constitution (passed in 1992) as noted earlier, prohibits the transfer of ownership of state-owned land to anyone but a Mongolian citizen. The Constitution in effect in 1949 contained similar provisions; in fact it was more specific and peremptory regarding state ownership and stated that among other things, air, water, land, railways, roadways, minerals and communication systems were the property of the State and could not be alienated. A strong argument therefore can be made that any transfer of land or other resources under the Agreement cannot be taken to mean transfer of ownership. This approach is consistent with the treatment of land on the financial books of UBTZ where land is not included as an asset in the UBTZ accounts.

It is also consistent with the wording itself of the Agreement which, as noted earlier, refers to transfer of the track for use and not ownership. As to the other 10,000 hectares, these were transferred, again only for use, for particular purposes, such as for logging and lumbering to be used for constructing the railway and for certain facilities related to railway operations. It can be further argued that "use" is a more restrictive term than "possession" and that as long as the land referred to in the 1949 Agreement is not being used, the GOM, the owner of the land, is free to allow another party to use it.

The Law of 1996 mentioned earlier, is in essence consistent with the interpretation of the land in question being "transferred for use", although it does refer to "possession and use" with respect to the right of way. Article 11.7 states that the railway strip line belongs to the State and the railway organization, i.e. UBTZ only has the rights of its possession and utilization. This is GOM domestic legislation that in principle cannot overrule an international treaty, but it does emphasize that State land, especially when being used for the public benefit, is treated in a special manner in Mongolian Law; it also echoes the protection given State land in the current Constitution, which was even more explicitly given to railways in the pre – 1992 Constitution.

The LRT does not contain the above provision, but goes even further in its interpretation of how the land transferred to UBTZ can be used. It clearly provides in Article 6 that the railway infrastructure, defined in Article 3 as the track and all other associated facilities and construction, is the property of the State, not UBTZ. It also provides for the licensing of other rail operators (Article 16) and sets out the principle of open access by those operators on the railway infrastructure (Article 19.2.3). It is evident that the GOM position with regard to what was transferred in the 1949 Agreement, whether it was use or use and possession, was nonexclusive use or possession.

On the question as to the nature of the right given to UBTZ in the 1949 Agreement, there is a similarity in the rights of use and possession granted to UBTZ in 1949 to the right of usufruct, a right of use and enjoyment that is found in the Civil Code at Article 152. Usufruct is a real right and as with all real rights has registration formalities. In 1949, these could not have been followed as there was no Civil Code, no usufruct rights and no registration procedure. Usufruct would not have applied to State land in any case. The analogy to usufruct is simply to indicate that ownership of the land itself does not pass with wording that gives a right of enjoyment and use. Even on the question of use, there are distinctions in the 1949 Agreement between use

of the railway strip and associated land and use of the 10,000 hectares. In the case of the railway strip, the right of use relates to operation of the railway and as long as it is used as such, UBTZ could argue an exclusive right to use. In the case of the 10,000 hectares however, the right of use is narrower than that granted with respect to the right of way and is limited to specific purposes. It would be difficult to argue that UBTZ's rights over this land are exclusive.

From this perspective, it is submitted that there are good legal arguments to support the view that the Agreement does not affect ownership of any of the land, including the right of way, transferred to UBTZ for operating uses of the railway. There are also good legal arguments to support the right of the GOM to use unproductive or unused land for other purposes, such as to grant a possession or use permit under the Land Law to someone else, for example to build an intermodal terminal.

Bilateral/Multilateral Agreements on Rail Transit Transport

In recent years, PRC has become the major market for Mongolian exports. Trade between Mongolia and PRC has been rapidly increasing and is likely to grow in the years to come. In addition, transit traffic of goods through the territory of Mongolia is ongoing with dramatic increases and decreases in annual volumes.

Mongolia has entered into three agreements regarding transit and import/export rail traffic, one with Russia, one with PRC and one tripartite agreement involving all three parties:

- Border Railway Agreement between Mongolia and Russia, 1953;
- Border Railway Agreement between Mongolia and PRC, 1954; and
- Border Railway Agreement between Mongolia, Russia and PRC, 1956.

The above three Agreements govern the relationship of border operations such as which party is responsible for gauge change (between PRC and Mongolia), receipt and return of one party's wagons and other equipment by the other party, rules governing repair of a party's rolling stock by the other party, distribution of revenue on goods moving under through bills of lading, etc.

2.3.2. Overall noted Constraints and Challenges of freight and passenger movements

Based on observations during the desk and field surveys interviews, the following overall noted constraints and challenges are seen for road and railway infrastructure development strategy in the Project Area:

- Main constraints and Challenges of freight and passenger movements are missing rail and road sections in Mongolian side.
- The Parliament of Mongolia's made an amendment to initial plans align the eastern parts of the Millennium Road along the 47°20'N latitude. However, Nomrog area is in the list of Specially protected area.
- The Halkgol (Sumber) - Arxan connection through the Nomrog Bridge seems to be the most cost-effective and feasible connection between Mongolia and PRC at this time for further development of the tourism sector in both countries. This bridge has been constructed. However, due to environmental considerations on both sides of the border, it is recommended that this bridge is only used for ecotourism and environmental protection related activities and all the other freight and passenger traffic should be carried through another route to be developed further north, away from the Nomrog Special Protected Area.
- 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 Tavan Tolgoi (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 invest in the required transportation infrastructure in the Project Area.
- Even though an efficient railroad network in the Project Area will play an important role for attracting private sector investment in the mining sector, its justification should be based on sound mineral estimates based on more detailed exploration.
- 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. For example, any minerals extracted to the south of Baruun Urt would be shipped through the Trans-Mongolian rail line. Also any

minerals extracted to the north of Choibalsan would be shipped through the existing rail line between Choibalsan and the Russian Federation.

- 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.

2.3.3. Net transport costs and Time factor (including by corridor the Cost/time/distance analysis)

In 2011 two Mongolian companies tried to export coal to Japan through Trans-Siberian railway. The results are sown in the tables 3.15 and 2.16. It is too long way to transport coal to Japanese market compared with proposed Eastern rail routes.

Results of trial haulage of coal from the "Tavan Tolgoi" deposit of strategic importance to Ports of the Russian Far East via Naushki

First: Freight sender: COO "Gobi Ural" and Mongolian-Russian JV " Infrastructure Development" in association of "Russian Railways-RZhD and "Ulaanbaatar Railways-UBTZ"

Table 2.15: Route: Choir-Ulaanbaatar-Sukhbaatar-Naushki- Nakhodka-port Vostochny

Indicators	Amount	UBTZ part	RZhD part	Total	Discounts
Volume of cargo and number of rolling stock	2,000 tons		30 wagons		
Time of delivery, days	7	2	5		
Return of wagons					No return
Distance	4,679 km	638 km	4,041 km		UBTZ 0.04USD/t.km RZhD 0.01USD/t.km
Leasing fee		0	0		
Tariff		15.54USD/t	31.90 USD/t	47.44 USD/t	UBTZ: no RZhD 0.48TP SNG 3.8 0.8 TP SNG 3.1 0.9 TP SNG 3.4
Expedition service		1.5USD/t	10.0USD /t	11.5USD/t	
Terminal service		10.0 USD/t	13.0 USD/t	23.0 USD/t	Sum 81.94 USD/t for rail parts
Road transport		38.0 USD/t		38.0 USD/t	If rail tariff is 22 USD/t
Total		64.04 USD/t	54.9 USD/t	118.94 USD/t	235-118.94 =116.04 USD/t (Price of coal and profit)

World price of coking coal concentrate FOB price in 2011 is 235 USD/t.
Source: formerly Mongolian Railway Authority

Conclusion:

1. It is required to expand UBTZ networks to the Tavan Tolgoi coal basin.
2. It is necessary to buy own rolling stock by the freight senders with rights of transportation of coal on the territory of Russian Federation to the Far East and with loading containers in return.
3. Set up through tariff from origin station to destination station.
4. Establish an International Train Control Center.

Second: Organization of transportation of coal by Freight sender COO "Energy Resources" with association "First Freight Company"

Table 2.16: Route: Choir-Ulaanbaatar-Sukhbaatar-Naushki- Nakhodka-port Vostochny

Indicators	Amount	UBTZ part	RZhD part	Total	Discounts
Volume of cargo and number of rolling stock	21,735 tons		315 wagons		Leasing / own
Time of delivery	18	6	12		Time to one direction
Return of wagons			9		Return within 27 days
Distance	4,679 km	638 km	4,041 km		UBTZ 0.03USD/t.km RZhD 0.018USD/t.km
Leasing fee of wagons	29.5 from tariff	0	0		3000 rubles/day "PGK" 26.87 USD/t for 27 days
Tariff		20.0USD/t	71.25 USD/t	91.25 USD/t	UBTZ: no RZhD 0.5TP SNG 3.8 0.8 TP SNG 3.1
Expedition service					Included in UBTZ and RZhD tariffs
Terminal service		10.0 USD/t	27.0 USD/t	37.0 USD/t	Sum 128.25 USD/t for rail parts
Road transport		38.0 USD/t		38.0 USD/t	If rail tariff is 22 USD/t
Total		68.0 USD/t	98.25USD/t	166.25 USD/t	226-166.25 = 59.75 USD/t (Price of coal and profit)

World price of coking coal concentrate FPB price in 2012 is 226 USD/t.
Source: formerly Mongolian Railway Authority

Conclusion:

Due to higher leasing fees of the Russian private wagons, it is necessary to organize freight terminals at the Sukhbaatar station for coal transshipment.

1. Study possibility of having own ports or area in the Far East by the freight senders.
2. Establish transnational company for freight expedition.
3. Grant discounts by the UBTZ for coal export.

Table 2.17: Possible routes to transport coal produced at the Tavan Tolgoi coalfield to Asia

Routes	Directions	Total length, km
Route A	Route via Russia (1): Tavan Tolgoi-Sainshand-Ulaanbaatar- bound for the Port Vanino (via the Baikal-Amur railway)	About 5,257
Route B	Route via Russia (2): Tavan Tolgoi-Sainshand-Ulaanbaatar-bound for the Port of Vladivostok (via the Siberia Railway)	About 5,152
Route C:	Route via China (1): Tavan Tolgoi-Sainshand-Zamyn-Uud-bound for the Port	About 1,675

Routes	Directions	Total length, km
	of Tianjin	
Route D	Route via China (2) or GTI corridor: Tavan Tolgoi-Sainshand-Khuut-Nomrog –bound for the Zarubino	About 2,704

From the Table 2.17 we can see that the shortest route is Route B, but this route is one of the busiest routes in this area and has no extra capacity for coal transportation. In 2009, China's Ministry of Railways prohibited coal freight cars from passing between Zamyn-Uud and Erenhot stations. As a result, the transport of coal by railway to Chinese side has been essentially stopped at present. Consequently, until China Railways lifts this restriction on coal transport via Erenhot station and until increases in transshipment capacity take place and proper railcars are deployed at Erenhot station, coal exports to China continue to be made exclusively by truck on surface roads.

The latest study measures only the effect of the shortening of transport times among direct effects, excluding all other direct effects (including transport costs saved, fuels saved and decreases in traffic accidents) in consideration of constraints on the collection of data as well as the accuracy and reliability of data collected.

Given that the construction and improvement of transport facilities would normally have an overwhelming effect in shortening transport time, however, we can assume that it is appropriate to measure the effect in the preparatory stage in the shortening of transport time.

Route D would be the possible shortest route (2704 km) for Mongolian coal export.

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 Tavan Tolgoi): 15.0 million tons per year;
    - East Tsankhi (Erdenes Tavan Tolgoi): 15.0 million tons per year;
    - Ukhaa khudag (Energy resources): 15.2 million tons per year;
    - "Small" Tavan Tolgoi (Tavan Tolgoi 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 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 Tavan Tolgoi 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 (by Scenarios and with elasticity estimates)

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 using 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:

$$GRPT = [\{(GDPpc \times IEp)/100 + 1\} \times (PGR/100 + 1) - 1] \times 100$$

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 and GDPa: GDP/capita and Q is traffic volume.

For freight transportation:

$$GRFT = GDP \times IEf$$

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 that 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):

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	1.9	5.7	1.75	1.39	25.2	10.70
2020	7.0	1.9	5.0	1.62	1.35	23.5	9.45
2025	7.0	1.9	5.0	1.35	1.15	19.9	8.05

Accordingly, traffic would increase per year by 19.9-25.2% for passenger transportation, for freight 8.0-10.7%- freight transportation until 2020. 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 have been used for traffic estimates through Sumber BCP (Nomrog bridge).

Table 3.2: Future growth rates of passenger and freight traffic, %

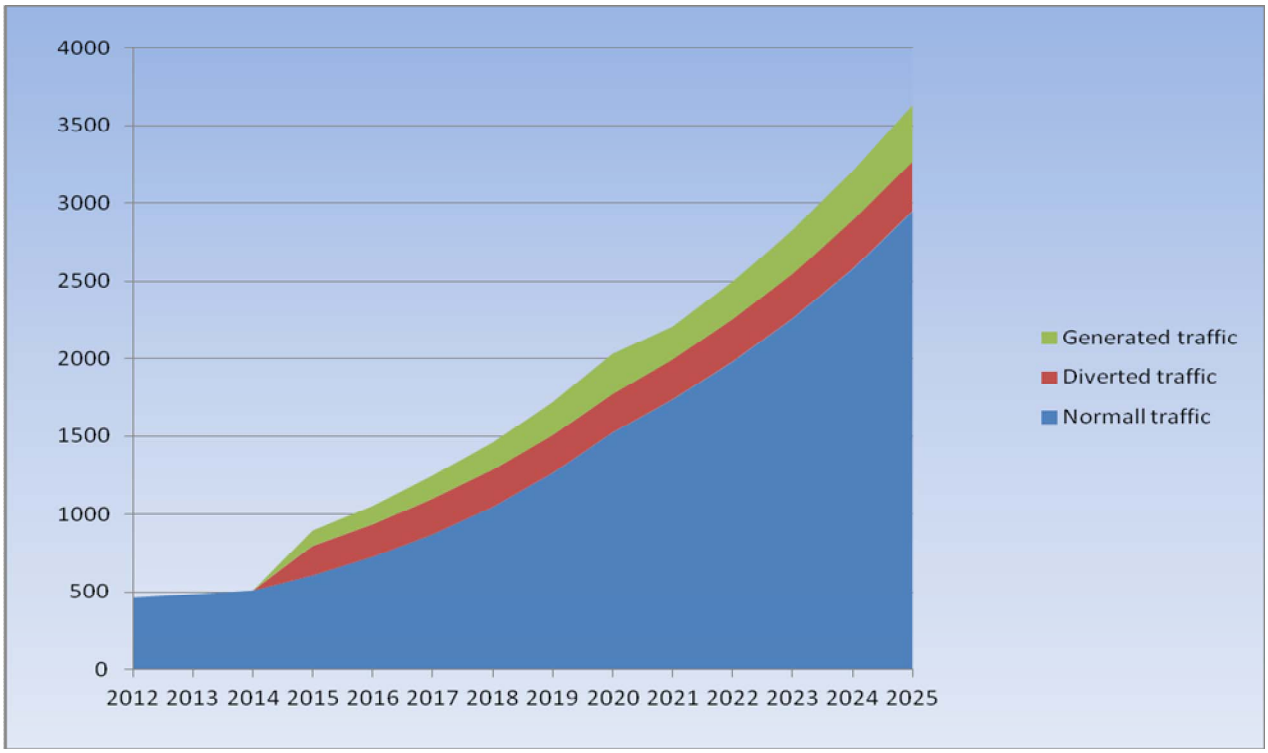
Type of Vehicles	2012-2015	2016-2020	2021-2025
Car Small/Medium	5.0	23.0	15.0
Jeep 4WD	5.0	23.0	10.0
Truck Light	3.0	9.0	8.0
Truck Medium	3.0	9.0	8.0
Truck Heavy	3.0	9.0	8.0
Truck Articulated	3.0	9.0	8.0
Bus Light	5.0	23.0	15.0
Bus Medium	5.0	23.0	15.0
Bus Heavy Duty	5.0	23.0	15.0
Weighted average	4.1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

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

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

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.



Source: Consultant

Figure 3.1: Traffic forecast diagram between Choibalsan and Sumber BCP (Nomrog bridge), units by axis

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.

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 (See Table 3.4).

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

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)	2,604
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)	2,364
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											6,138

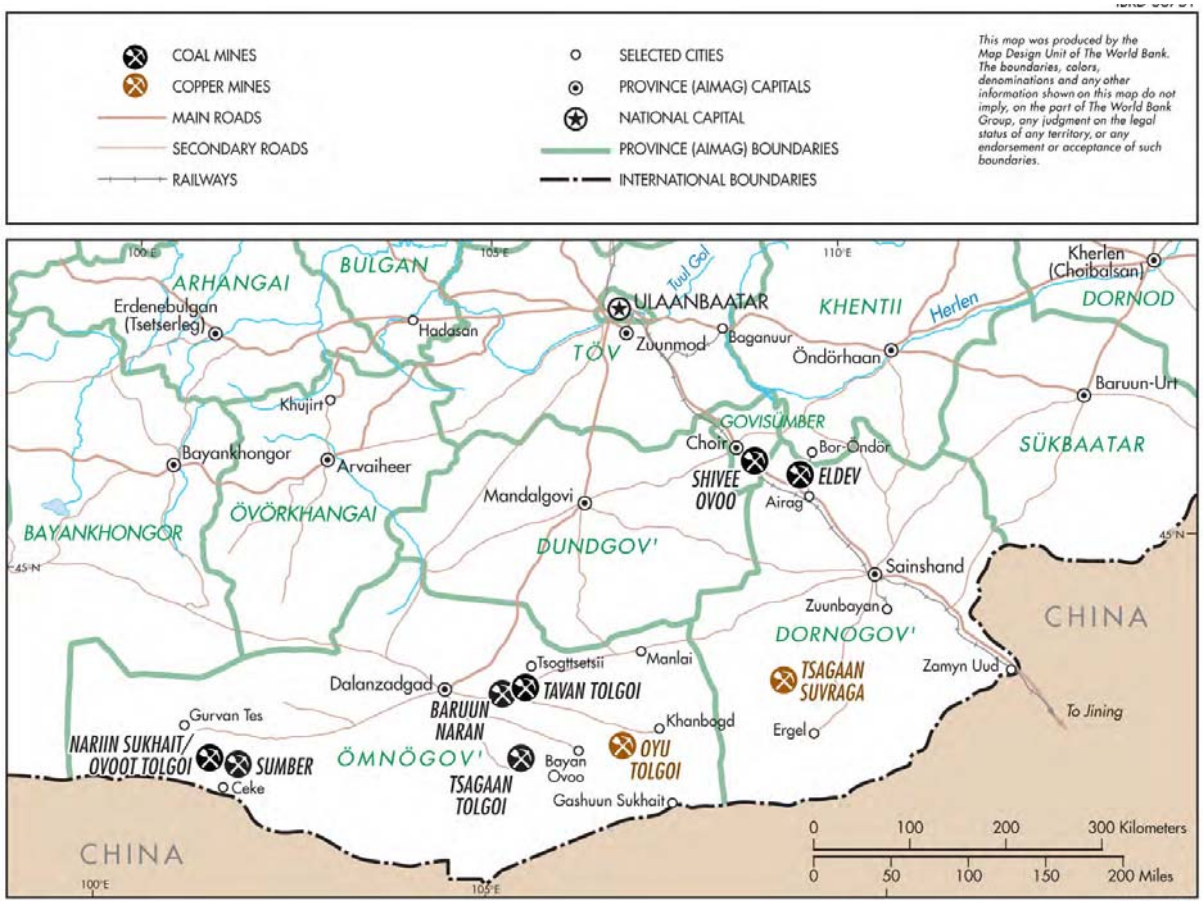
3.2.2. Rail traffic forecasts

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.

Table 3.5: Potential Major Mines in Southern Mongolia

Mine	Minerals	Life, years	Production (thousand tons/year)	Employment Estimate (units)	Start date Estimate
Tavan Tolgoi	Coal	200+	15,000	1,500	2012
Ukhaakhudag	Coal	40	10,000	1,000	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	4,000	2012
Tsagaan Suvrraga*	Copper	20	250	1,000	2012
Total				7,800	

Note: *- Production figure is for copper concentrate (30% copper)
Source: Mineral Resource Authority, Mongolia

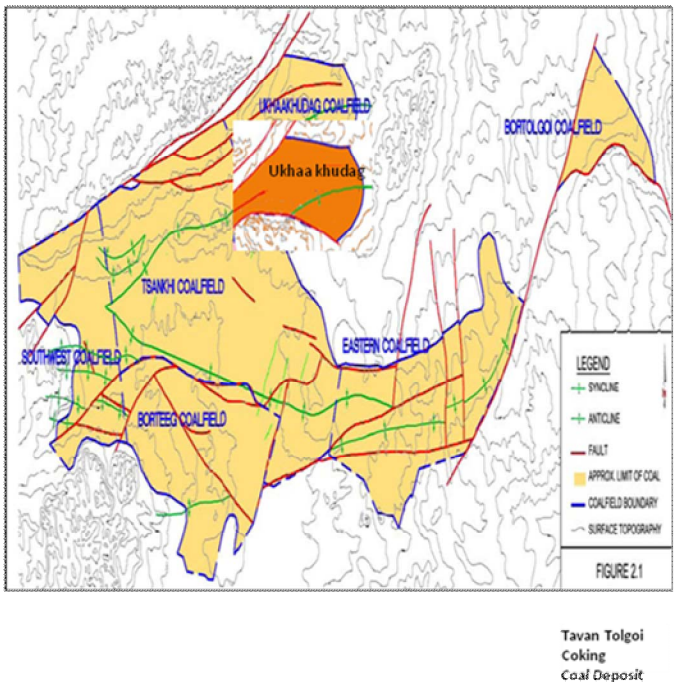


Source: Mineral Resource Authority, Mongolia

Figure 3.2: Important Mines in Mongolia

The Mines of principal interest are indicated in the map in the Figure 3.2. Significant copper deposits are found at Oyu Tolgoi and Tsagaan Suvarga. The coal deposits at Tavan Tolgoi and Nariin Sukhait are known to be particular significant.

Tavan Tolgoi strategic coal deposit covering totally 80 thousand hectors 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 Hural, 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 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.

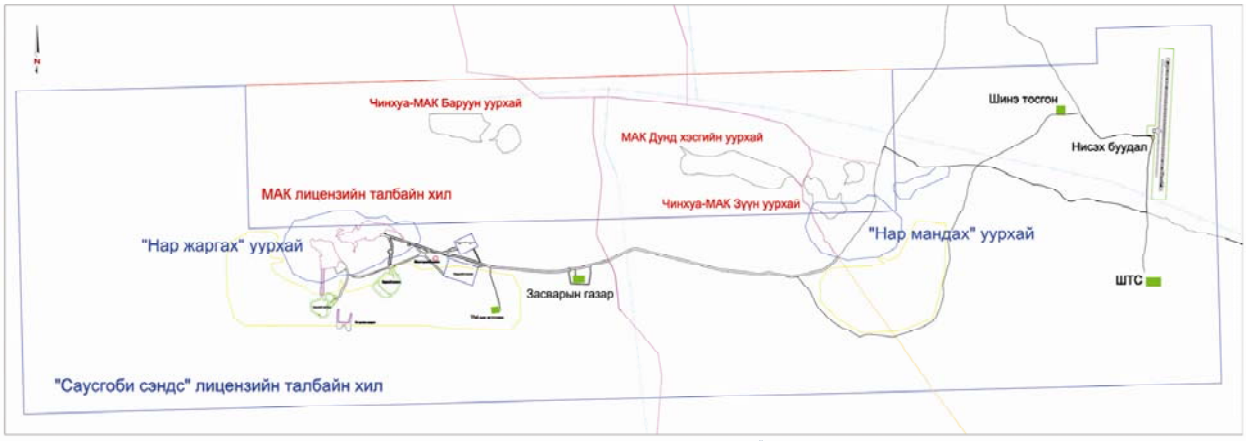


1. Tavan Tolgoi: 4.7 million tons
2. Energy Resources: 6.0 million tons
3. Erdenes TT: 1.0 million tons.

Total: 11.7 million tons in 2011

Source: Boston group

Figure 3.3: Tavan Tolgoi coal mine production in 2011

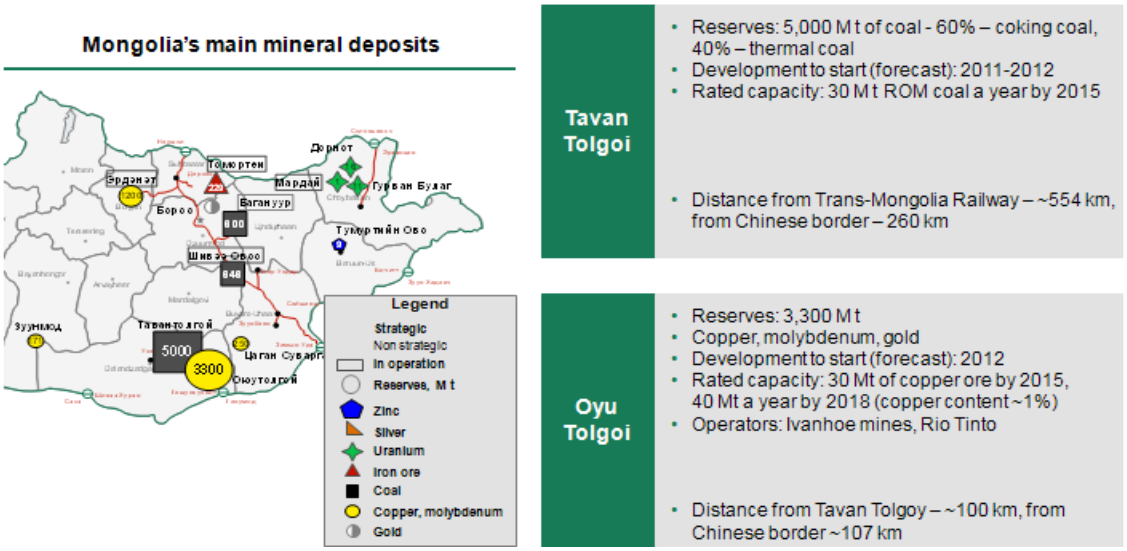


1. MAK company: 3.0 million tons
2. Chingqua-MAK: 1.6 million tons
3. South Gobi Sands: 4.5 million tons

Total: 9.1 million tons in 2011

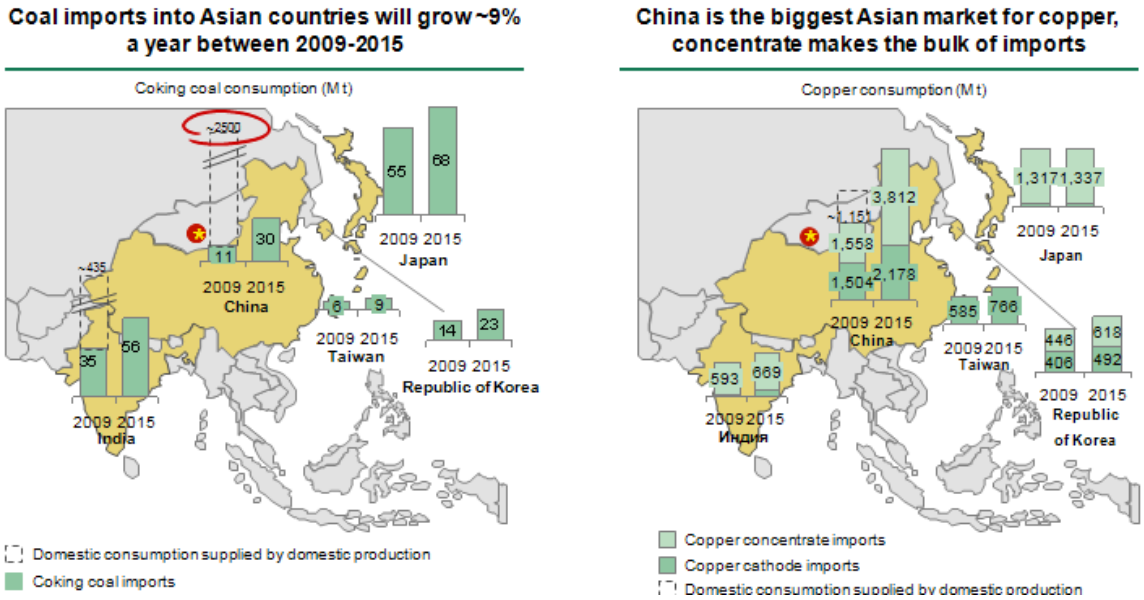
Source: Boston group

Figure 3.4: Nariin Sukhait coal mine production in 2011



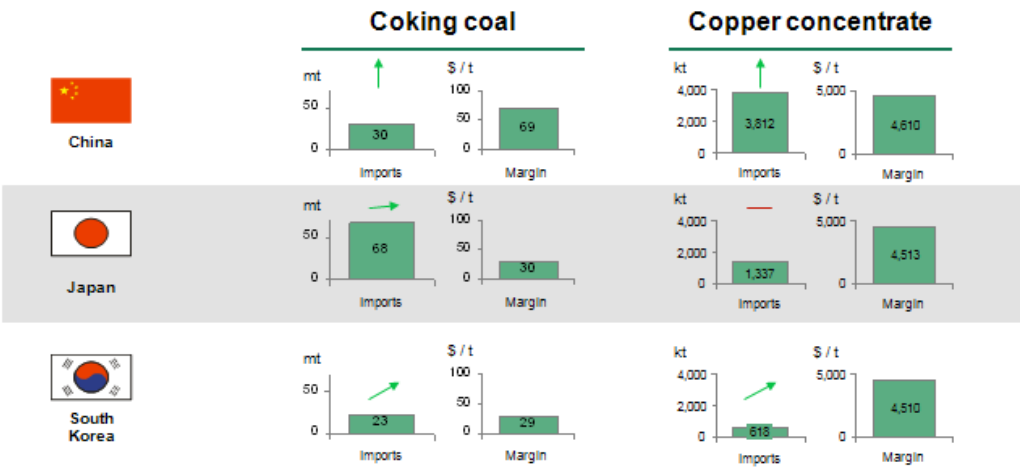
Source: Boston group

Figure 3.5: Asian countries, first and foremost China, have rapidly growing demand for coal and copper



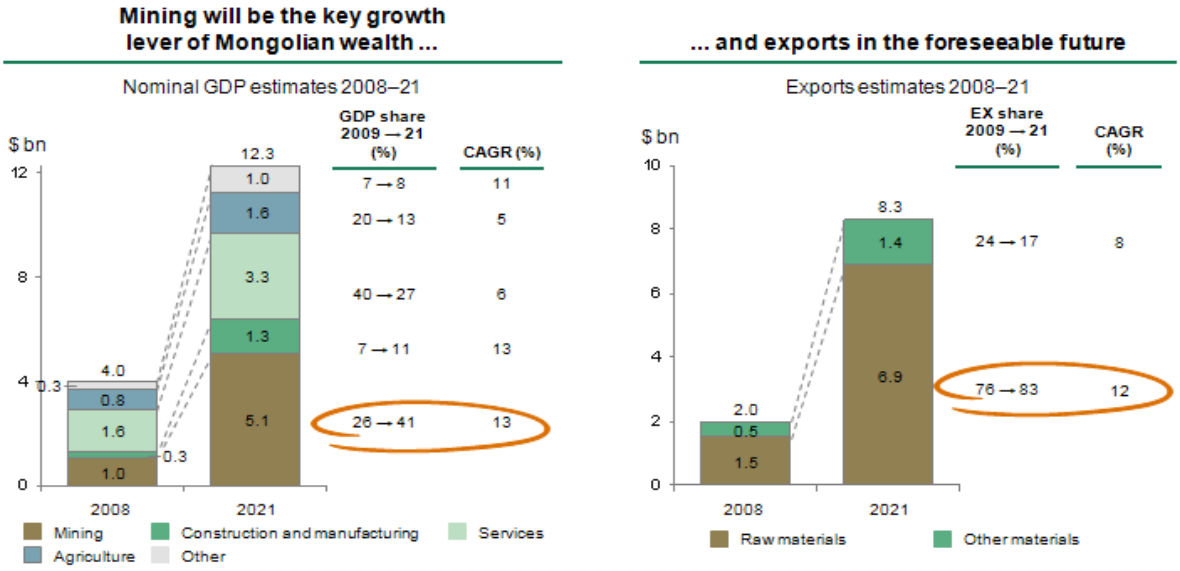
Source: Boston group

Figure 3.6: Mongolia has several profitable potential markets … diversification of exports desirable



Source: Boston group

Figure 3.7: Mongolia's Mining Resources are the major level to lift the economy to a high growth path



Source: Boston group

Figure 3.8: The modeling of macroeconomic effect was structured along five main groups of indicators

Other projects:

- Launch the development of coal deposits in the Choir-Nyalga basin (Shivee Ovoo –4800 mW) and build power, thermal and liquid fuel plants;
- Continue in phases technical upgrading of the Erdenet Corporation manufacture refined copper and molybdenum oxide from processed copper and molybdenum concentrate, and extract other elements attached;
- Build an iron ore extraction, concentration, and processing facility at the Tumurtei iron ore deposit to develop the iron industry;
- Outline a proposal to develop a group of phosphoric deposits at Burenkhaan to manufacture phosphoric fertilizers and other products and provide support to foreign investors in implementing the projects jointly.

Current problems:

Insufficient level of research of the territory leads to the

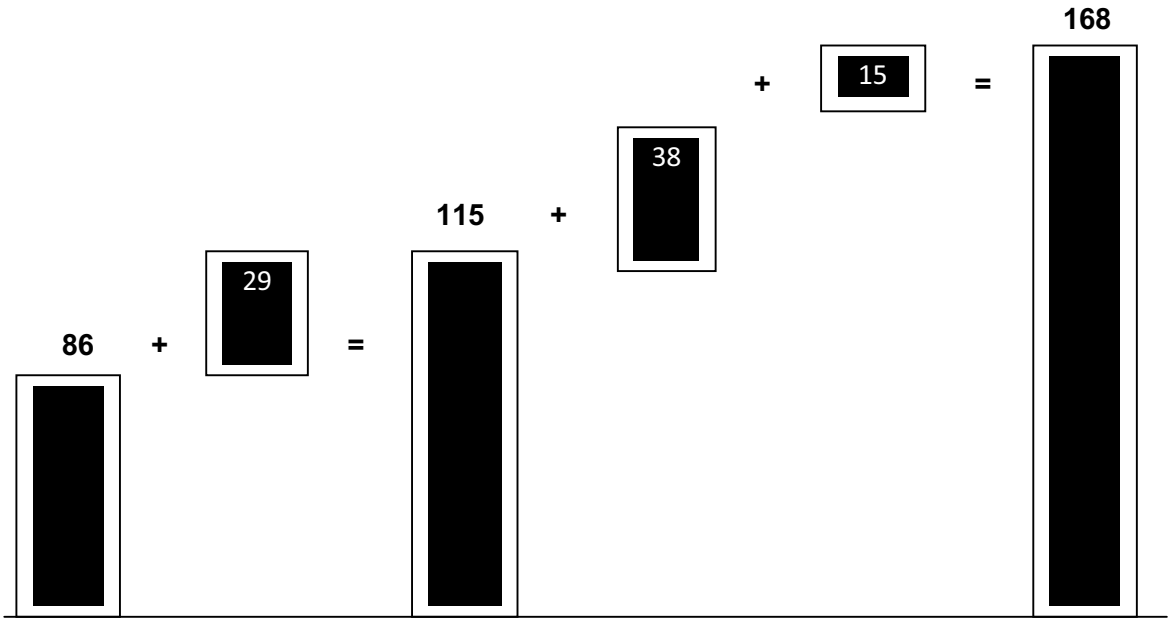
- Lack of infrastructure
- Lack of investment
- Low level of competitiveness of the local companies
- Instability of legal environment
- Different or divergent opinions on creating national welfare and distribution of it

Opportunities:

Due to results and outputs of the previous research and database created earlier

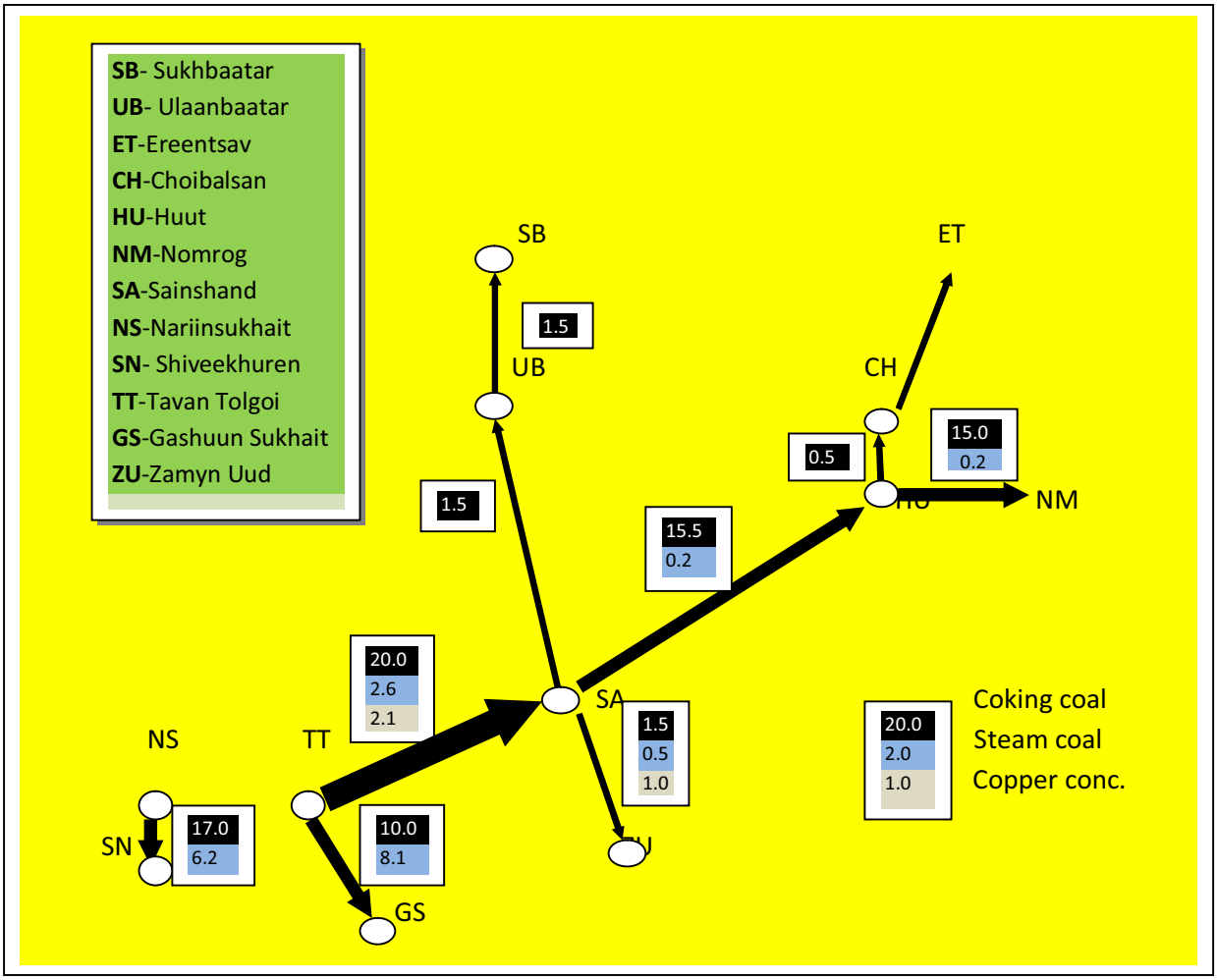
- Major deposits with favorable conditions revealed
- Greater potential to increase current reserves
- Steady increase in Commodity prices on the world markets
- Increase in demand for minerals in the region
- Increase of interest to invest into the sector from international potential investors

Demand of NEA for coal Northeast Asia demand for cocking coal would be 168 million tons in 2020. This is 5 times bigger than amount of processed coal in Tavan Tolgoi (Figure 3.9).



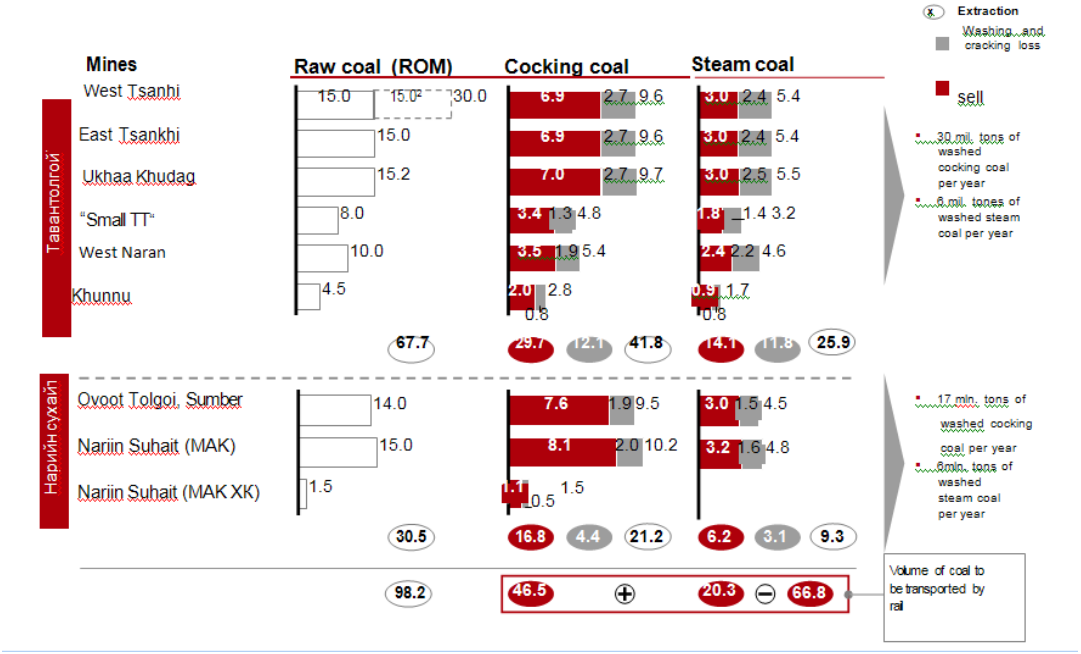
Source: Consultant

Figure 3.9: Demand for coal in Northeast Asia, million tons per year, 2020



Source: Consultant

Figure 3.10: Mineral transportation flow, million tons



Source: Pre- Feasibility study of the new Railways Project, MTZ

Figure 3.11: Coal extraction estimates per year, 2020

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 Dalandzadgad. 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 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 3.12 and 3.13):

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

Per year- 18.1 million tons from Tavan Tolgoi to Gashuun Sukhait;

Per year- 24.7 million from Tavan Tolgoi to Sainshand;

Per year- 15.7 million from Sainshand to Khuut;

Per year- 15.2 million tons from Khuut to Sumber BCP (Nomrog);

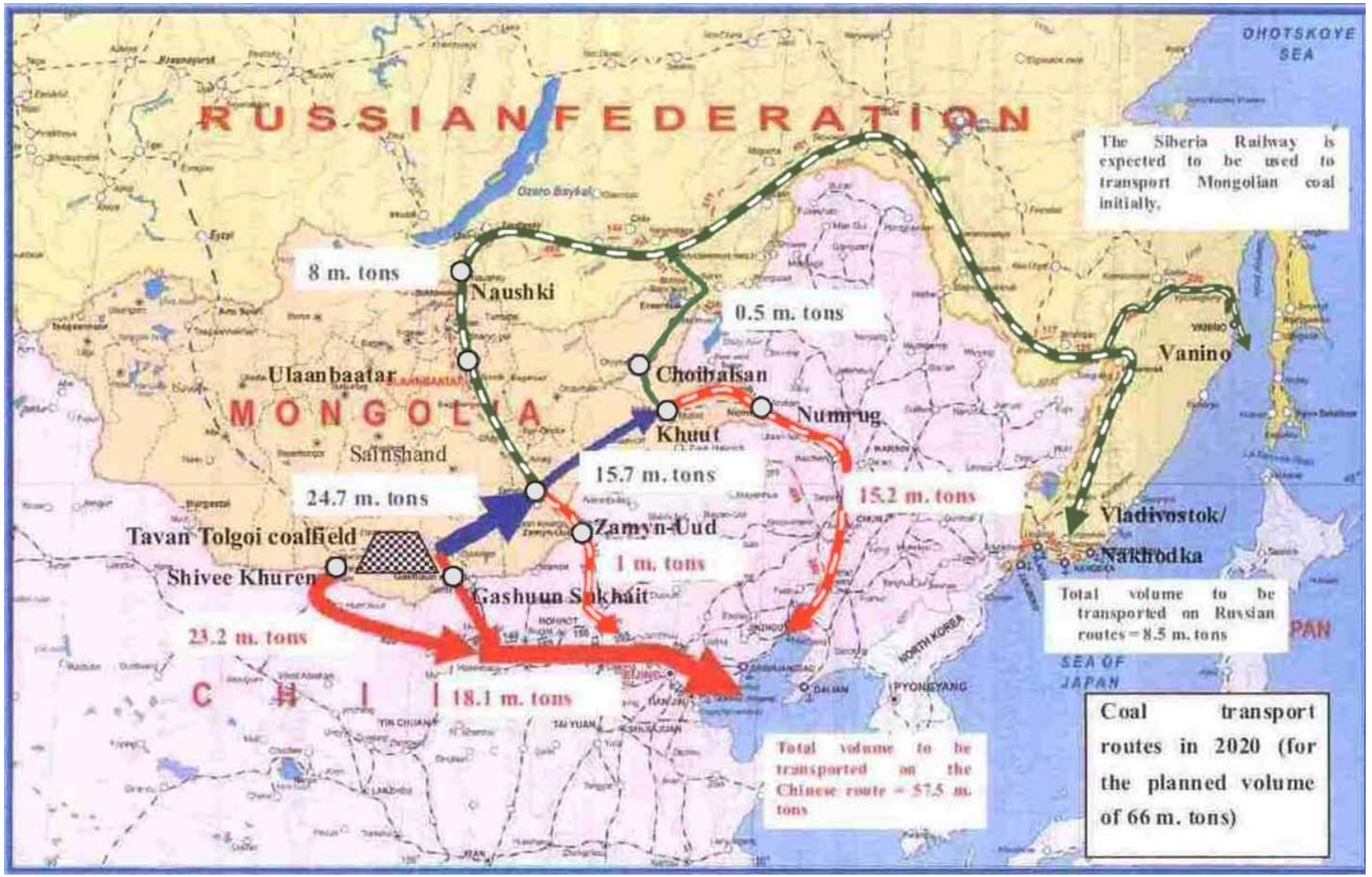
Per year- 0.5 million tons from Khuut to Choibalsan.

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:

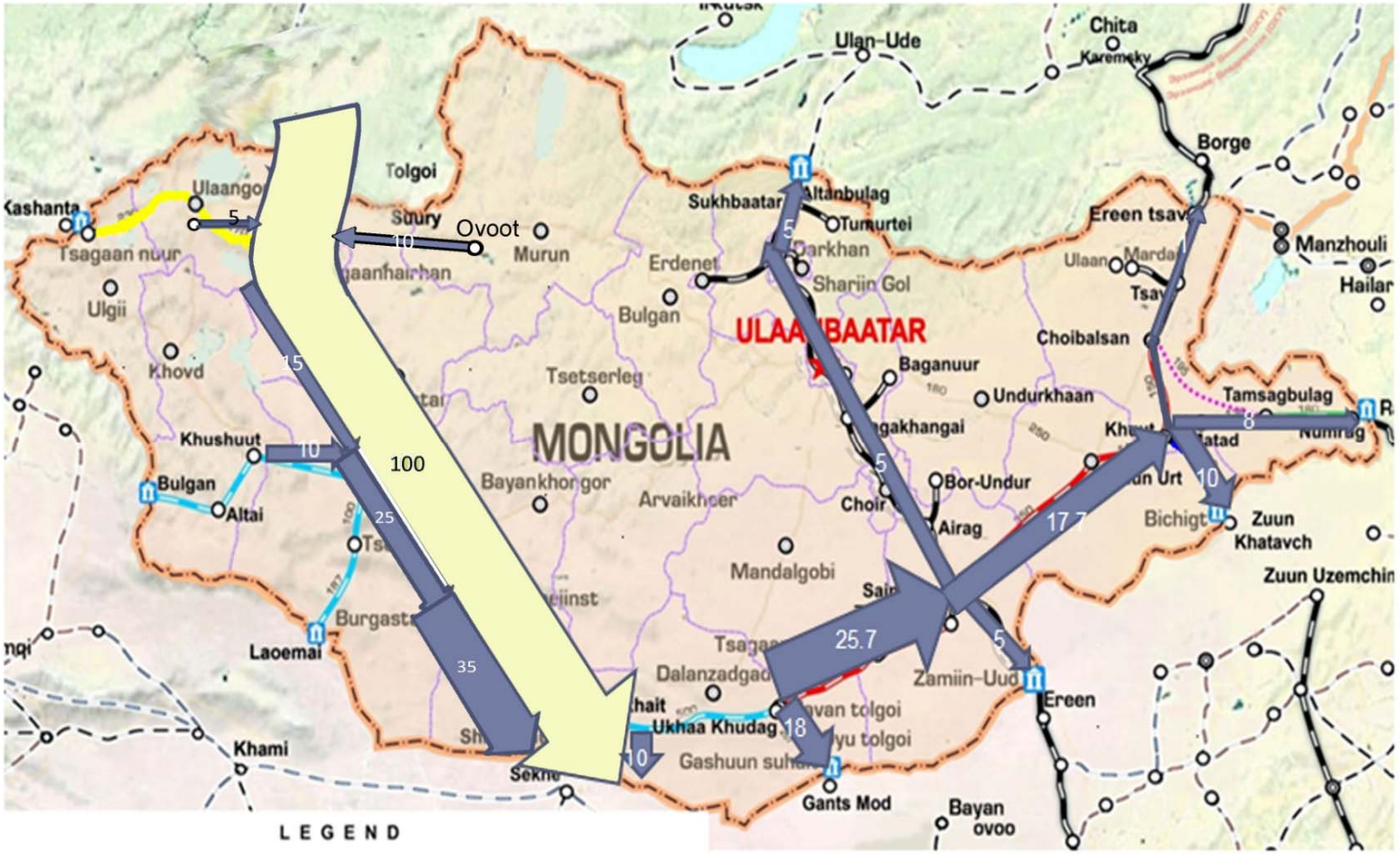
Eastern China: 10.6 million tons (70%) per year

ROK: 2.3 million tons (15%) per year
Japan: 2.3 million tons (15%) per year.



Source: Study of Transport Infrastructure to the Asia-Pacific Regarding Coal Resources Development in Southern Mongolia, NEDO, 2012

Figure 3.12: Possible routes of coal export from Mongolia

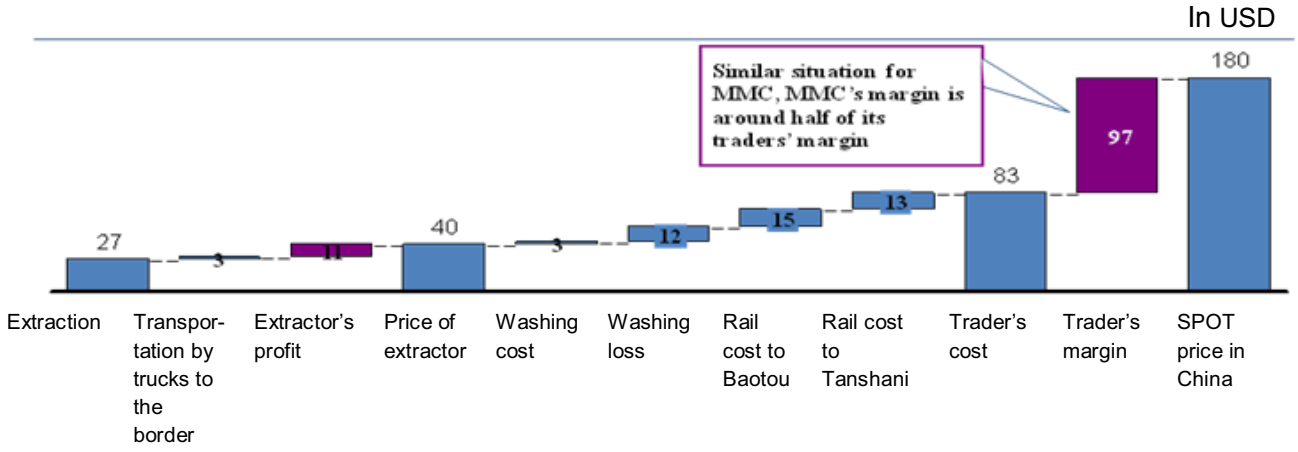


Source: Consultant

Figure 3.13: Traffic flow forecasts (coal) in 2020, million tons (yellow color means potential transit traffic from Russia)

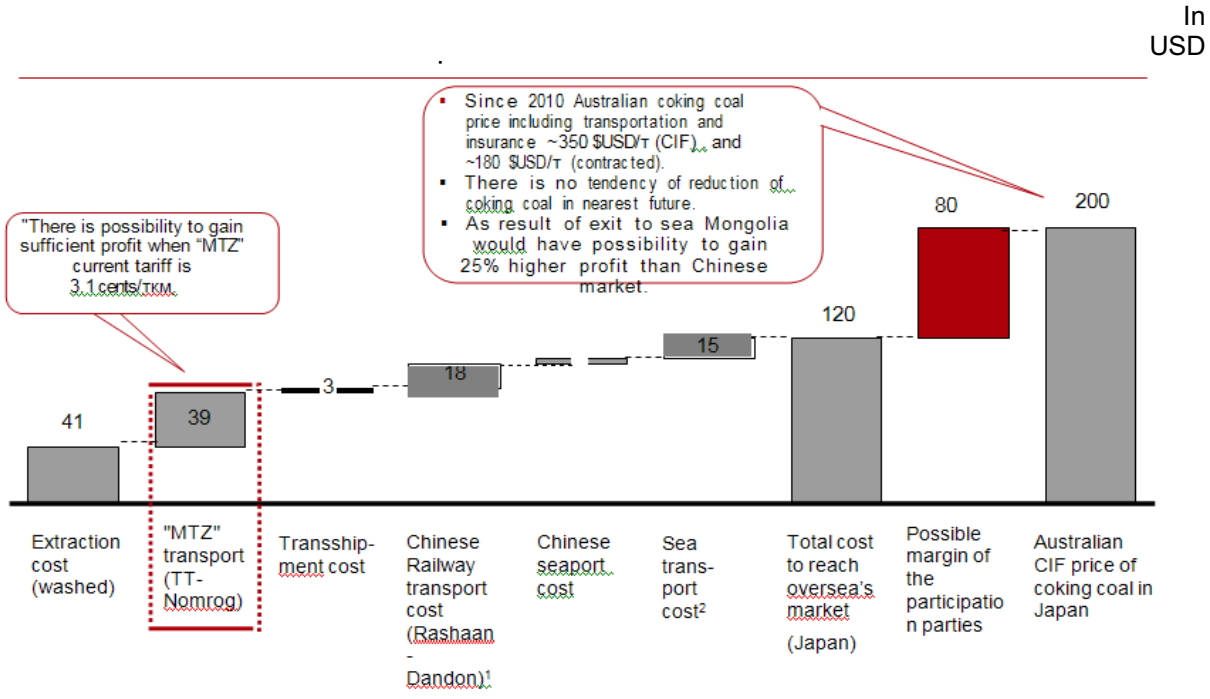
Above share is very rough and it will depend on transportation costs, market prices and so on.

Figure 3.14 and 3.15 show margin from Mongolian 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.



Source: Boston group

Figure 3.14: Margin from Mongolian coking coal export to China



Source: Boston group

Figure 3.15: Possible profit margin from Mongolian coking coal export

Minerals in Eastern Mongolia

Many developing (and developed) countries rely on mining to make an important contribution to their economies. In order to have a viable mining industry, the following basic components must exist:

- Good mineral potential;
- Stable and workable minerals-related laws that guarantee secure tenure and transfer rights for license holders;
- Stable investment climate;

- The right for foreign companies to repatriate profits;
- Acceptable rates of taxation and royalties;
- Basic pre-existing infrastructure in the form of highways, railways 50 and electric power;
- Supportive government policies; and
- Transparent regulatory framework governing licensing and operations with predictable enforcement.

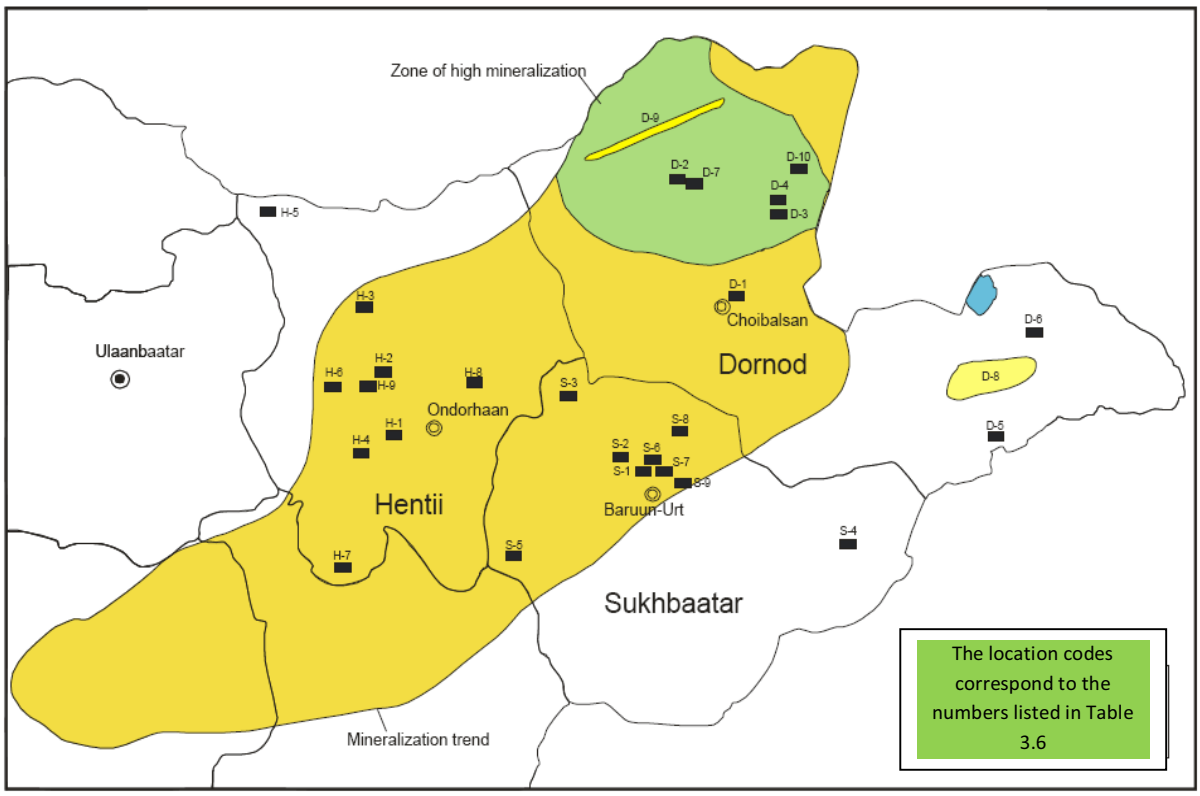
While most of the fluorspar and copper is produced in Central Mongolia, also East Mongolia has many known deposits of minerals which can be exploited and form a base for the traffic on a new line from East Mongolia towards China and Pacific.

Table 3.6: Important deposits of mineral in Eastern Mongolia

Code	Name of deposit	Mineral	Location	Proven reserves, million tons
D2	Ulaan	Polymetal	56 km SW, Dashbalbar soum	68
D7	Erdes, four deposits	Uranium	Erdes	24
D4	Baruun suuj	Fluorite	45 km WS Dashbalbar soum	8
D3	Tsav, Bayan-Uul	Polymetal	64 km NE Choibalsan city, 7 km East Railway	3.4
D1	Aduunchuluun	Brown coal	3 km NE Choibalsan city,	240 Prod 800 thousand tons
D8	Tamsagbulag	Oil	Tamsagbulag, Dornod province	
D9	Sangiin dalai	Salt	S Tamsagbulag	23
D6	Altan gol	Silica sand	Sumber soum	201
D5	Bulangiin hooloi	Brown coal	65 km S Tamsagbulag	150
S4	Eguzer, Omnod, Ar bayan, Tuv	Tungsten	Eastern part of Sukhbaatar province	
D10	Huut	Brown coal	130 km SSE Choibalsan	8.4
S1	Tumurtiin ovoo, Salhit, Hohl	Lopy, Zinc	20 km N Baruun Urt	15
S2	Talbulag	Coal	NW Baruun Urt	50
H8	Berh district	Fluorite	70-100 km NE Underhaan	
H6	Undertsagaan	Tungsten, Molybdenum	80 km NW Underhaan	141+45

Besides these resources there are also deposits of bentonite clay, tungsten, molybdenum, and gold and rare earth metals.

Source: Report of Facilitating Economic Cooperation in Eastern Part of Inner Mongolia Autonomous Region, PRC and Mongolia, by TERA International Group Inc.



Source: Report of Facilitating Economic Cooperation in Eastern Part of Inner Mongolia Autonomous Region, PRC and Mongolia, by TERA International Group Inc.

Figure 3.16: Location of minerals in the Project area

In the Dornod province more than 20 kinds of mineral deposits have been identified. The coal mine of Aduunchuluun 3 km Northeast Choibalsan has identified resources of 140 million tons, now mines 800 tons/year and is intended to mine 1 million tons per year. Besides the polymetal deposits of Tsav, Ulaan, Modon, Nomint and uranium of Mardai and oil around Tamsagbulag there are lots of construction materials and salt resources. The major potential volumes to be transported via a new railway are listed in the Table 3.6.

The following are generally accepted major points related to the minerals sector in the Project Area:

- The Project Area possesses abundant natural resources in a lightly populated region, particularly in Mongolia;
- Mongolia largely meets the minimum requirements of foreign investors which seek to minimize geologic and political risks;
- Mongolia's investment climate is generally favorable in terms of such investor preferences as right to mine, right to repatriate profits, management and equity control, fixed tax terms, modern minerals legislation, fixed rules for the life of the mining project, and guaranteed arbitration;
- Mining is an important economic sector in Mongolia, accounting for 8-11% of GDP and 45-50% of export earnings;
- PRC is one of the world's largest importers of minerals and PRC demand for minerals is expected to continue its growth in parallel with its economic development;
- PRC is a logical market for Mongolian minerals due to its proximity;
- Mongolia can export lead/zinc concentrates, coal, and iron ore from the eastern three aimags to potential markets and fluorspar, tungsten, molybdenum, and copper to other destinations in PRC and nearby countries; and

- Low cost transportation is a necessary pre-condition to increase exports of minerals from Mongolia.

The Mineral deposits in Eastern Provinces of Mongolia are small in terms of potential annual output compared with the mega projects in the South Gobi region. Most of the brown coal deposits would be used for domestic needs and transported in short distances.

3.3. Special Issue Analysis

3.3.1. Tourism demand in the project area

In August, 2012 in Ulaanbaatar representatives of China, Russia, Mongolia and the Republic of Korea signed an agreement to promote cross-borders tourism, considered an opportunity to increase regional prosperity and security.

The memo, also signed by representatives of the UN Program for Development (UNDP) and the authorities in the northern Chinese province of Jilin, is part of the Greater Tumen, an intergovernmental initiative that supports the United Nations cooperation in Northeast Asia.

This group serves as a platform for economic cooperation and promoting dialogue in areas of transport, energy, tourism, investment and environment.

According to Choi Hoon, director of the Greater Tumen Initiative Secretariat, UNDP, the tourism industry involves many economic and social activities and, therefore, of interest to employers and others that promote closer ties and commitments of cooperation between governments in Northeast Asia.

Experts say that Northeast Asia is one of the fastest growing destinations in the world and it is huge, the potential to establish tourism across borders.

Tourism is growing in this area of the world and particularly the Tumen River has great attractions of natural beauty and heritage.

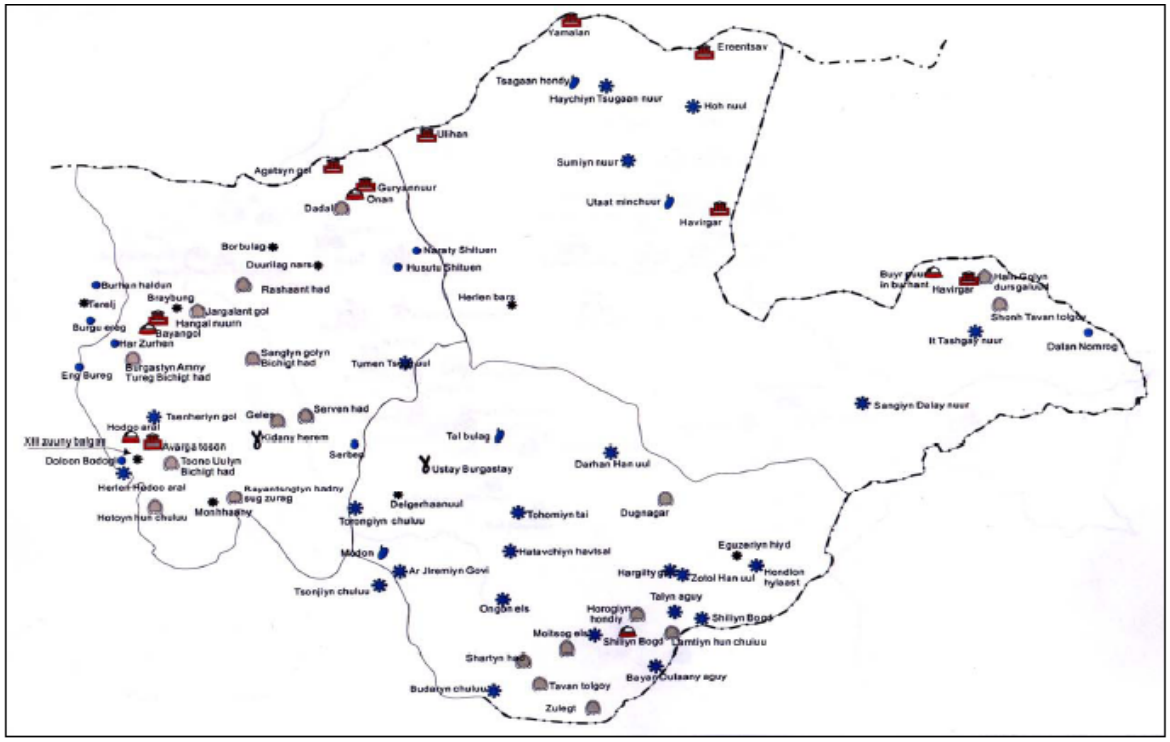
Statistics from the China Tourism Administration indicate that Asia-Pacific annually attracts about 170 million tourists and half of them are traveling to the north of Asia. The rate of visitors to the region increased 7.7 percent from 2000 to 2010.

Representatives of the agency said that China will assume the responsibility of eliminating regional barriers and obstacles to travel and “work with other countries to promote international tourism cooperation and make this area an attractive destination”.

The province of Jilin has developed 11 routes across the border in the last decade, promotes the program 'Self Drive" which since its introduction in 2011 attracted more than 30,000 local and foreign tourists.

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 illustrated in Figure 3.32, 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 Khentii, 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.



Source: Report of Facilitating Economic Cooperation in Eastern Part of Inner Mongolia Autonomous Region, PRC and Mongolia, by TERA International Group Inc.

Figure 3.17: Natural and Cultural Sites in the Eastern aimags of Mongolia

In Sukhbaatar aimag, there is the Shiliinbogd mountain, a famous symbol of local religion, located 180 km southwest of the aimag capital of Baruun Urt. There are a large number of volcanic traces around Shiliinbogd, as well as a number of small stone sculptures and artifacts. Also located near Shiliinbogd is the beautiful Ganga Lake, where visitors can enjoy bird watching, fishing, swimming and strolling on nearby sand dunes. The area also is home to a huge steppe named Mongolyn Dornod Tal, which abounds in wild animals.

In Dornod, there are many important tourism attractions. In the eastern part of the aimag, the area has attracted war veterans and their descendents from Japan to commemorate the battles that took place here in 1939 between Mongolian-Soviet forces lead by Zhukov against the Japanese army. This area is along the Khalkh Gol (River), where numerous monuments have been constructed. Most tourists to Halkgol (formerly called Sumber) soum are Japanese veterans (and/or their families) of the 1939 war and they visit 28 related monuments and historical sites nearby. Near the northeast border of the aimag is found the Hamar Davaa, which is a 50-meter high statue built in 1864 and marks an image of the Buddha with stone blocks on a hillside. It is one of the more unusual religious carvings in the area. The area near the PRC border also has many attractive natural features such as sand dunes and open grasslands. Buir Nuur, located in the northeast part of the aimag, is Mongolia's largest lake and is surrounded by grasslands and is up to 50 meters deep. Its northern shore borders the PRC and the lake is renowned for its fishing and varieties of water fowl. The area south of the lake is the huge Menengiin Tal steppe, one of the largest steppes in Central Asia.

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, Mandarinca 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.

Table 3.7: 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, photography, and visits to herdsmen's ger camps
Historic and archeological sites of the Mongols and other groups in Khentii, Dornod, and Sukhbaatar	Archeological Discovery Tours	Culture, research, education, and ecotourism
Culture of nomadic herdsmen and unique steppe landscape	Soft Adventure, Sightseeing Tours	Sightseeing and photography based on visits to herdsmen; 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 herdsmen's gers, photography

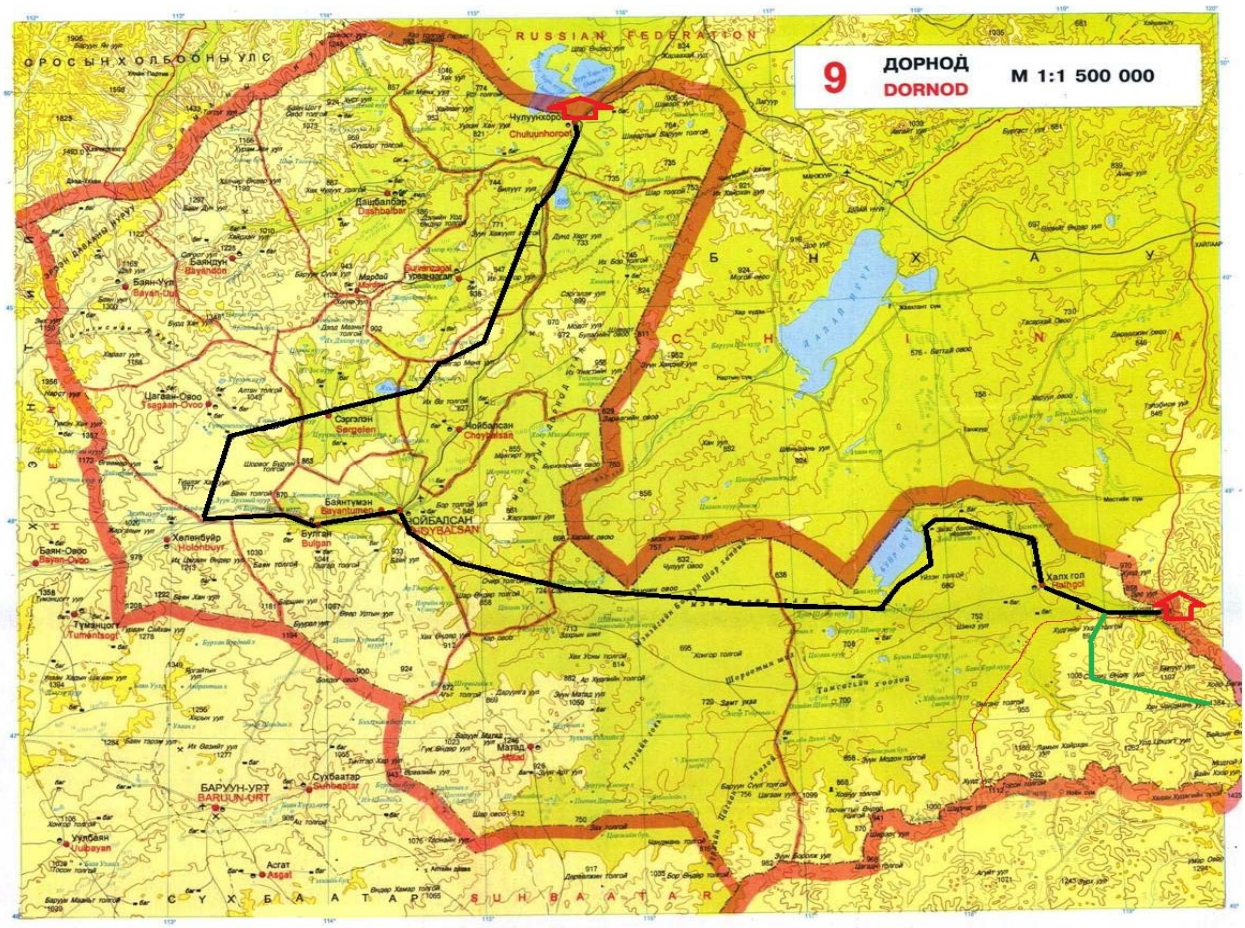
Source: *Marketing and Product Development*; UNDP; WTO Project RAS/00/088; Madrid 2002

UNDP Study surveys indicate that in regard to Mongolia as a tourist destination, PRC markets are looking for adventure tours as reflected in the higher degree of interest in 4WD Safari-type tours. Also of interest are steppe flora and fauna tours, lake resort facilities, and hunting tours.

European respondents to the surveys indicated a high level of interest in soft adventure sightseeing tours, which would combine nature and adventure with local culture. The interest in lake resort facilities, fishing and hunting tours was lower than in other proposed products.

As is reflected above, most of the tourism-related products or "packages" for ERM are significantly tied to the beauty of the unique nature and landscape of the region. The concept of ecotourism as explained earlier in this Report, fits in nicely with the needs of the ERM area. Ecotourism provides a way for the nature and uniqueness of the landscape to be appreciated in a sustainably beneficial way. The UNDP, through initiatives such as the TumenNET and Global Environmental Facility, have been in the forefront of advocating ecotourism activities for areas such as ERM. The idea has been embraced by local Mongolian organizations such as the Mongolian Nature and Environment Consortium and the Mongolian National Ecotourism Society.

Tourism Route to the Dornod aimag would be Sumber (Nomrog)-Arxan (PRC) BCP-Nomrog Preserve-Khalkh Gol soum-Ikh Burkhant 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 1000 km.



Source: Purevsuren Gombosuren, the Mongolian National Tourist Center

Figure 3.18: Possible tourism route on Dornod aimag

Nomrog Preserve: This reservation area that covers 311.2 thousand hectares of land in woody and steppe regions of Hinggan Mountain ranges along the state border was established in 1992 with purposes of protecting flora and fauna, as well as watersheds. The area is home for some scarce species of reindeers, snakes, moles, otters, brown bears, wild ducks, eagles, falcons, cranes and condors.

Weaknesses Related to Poor Infrastructure. According to the JICA Study, the ease of moving tourists to and from points of interest and to satisfy their basic needs is a fundamental prerequisite for tourism development. Unfortunately, Mongolia has significant deficiencies in this regard. These deficiencies include:

- Poor Access – this is considered to be one of the biggest constraints for tourism in Mongolia. Improvement in international air access in particular was cited as a key need in the sector, along with selective improvement in roads.
- Poor Public and Private Infrastructure – Inadequate infrastructure such as telecommunications and hotels that are not built for those seeking higher standards of comfort were listed as areas for selective upgrading.

Weaknesses Related to Product Development. It is pointed out that in today's international tourism market, tourist attractions must be packaged together with supporting services and other attractions as a product in order to offer maximum satisfaction to tourists.

Mongolia is hampered by the following problems in this respect:

- Limited Activity Choices - Although it is recognized that the core of the Mongolian experience is and will remain the unique combination of nature and nomads, availability of other activities can enhance the experience. According to the JICA Study in 1999, at present there is a minimal choice of evening activities, and few opportunities for cultural performance, festivals, or sporting events, except during the large summer festival of Naadam.

- Few Historic Monuments – Although Mongolia has a rich and interesting history, it has been pointed out that there exist few historic monuments of significant size in Mongolia. This has been explained as being mainly due to the nomadic tradition coupled with an unfortunate policy of the destruction of religious facilities in the past.
- Poor Presentation – There are insufficient interpretative panels or guides for explanation of Mongolian historical or cultural sites, thus reducing their attractiveness to tourists.
- Short Season – The severe climatic conditions in Mongolia allow ordinary tourists to stay only during the short summer season of two to three months.
- Weaknesses Related to Institutional Matters. According to the JICA Study, because of a lack of experience in operating in a market economy, there are certain institutional constraints hindering the tourism sector in Mongolia. These include the following:
- Lack of Awareness on the Importance of Tourism – The past orientation of the national economy had created a situation where the economic benefits of tourism where not given much attention. This lack of attention has changed somewhat in recent years, however.
- Inadequate Institutional Arrangements – Due to the past lack of attention to the tourism sector, insufficient regulatory and legal arrangements have been established to effectively support it.
- Poor Services and Lack of Professionalism in the Industry – In many instances the unfamiliarity with the demands of a market economy has been reflected in the poor levels of service in the tourism sector in Mongolia. This too is beginning to change as the attitudes left over from the old command structure of the economy are replaced by new market-oriented ones.
- Poor Marketing – Marketing is a relatively new concept in the public and private sectors in Mongolia. As a result, the tourism assets of the country have not been fully advertised to the international community. This issue has started to be addressed by the Mongolian Government as it has begun a “See Mongolia” campaign for 2003.
- Lack of Information – According to the JICA Study, vital information is missing for both visiting tourists and those involved in tourism preparation. The experience for tourists in Mongolia could be enhanced if interesting information about the sights and other experiences was provided. The work of planning for tourism by both the public and private sectors could be undertaken more effectively if appropriate planning information was collected and analyzed.

While the above constraints on tourism development are referring to Mongolia as a whole, they apply equally to ERM, perhaps even more so.

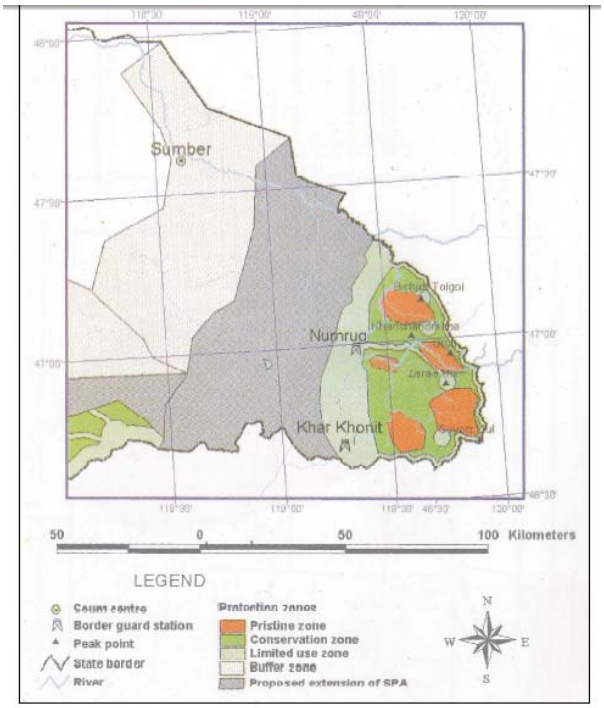
After careful consideration of the challenges posed by the construction of the proposed bridge, the Consultant concludes that the potential opportunities that would be generated by the bridge and associated facilities would revolve primarily around ecotourism. It is, therefore, recommended that the Nomrog bridge and associated facilities be used only in support of ecotourism. This recommendation is fully in conformity with Ministry of Nature and Environment (MNE’s) Nomrog SPA Management Plan (2001-2005) published jointly with the Global Environmental Facility and UNDP:

“Nomrog SPA is a place of great beauty and, in striking contrast to the rest of Eastern Mongolia, has abundant rivers, mountains, woods, thickets, and small pools or lakes. It has great potential as a site for field courses in ecology, or for camping expeditions for students or tourists”

“Many people would be interested in spending some leisure time in Nomrog. At present Nomrog’s isolation, and the lack of transport and accommodation facilities put off most tourists. However, with a little work on publicity, infrastructure and organization it should be possible to attract at least the visitors who are particularly interested in nature or some specific group of animals, particularly birds. On the open steppes to the west and north tourists can see herds of gazelle on the flat grassland plains but they tend to spend all their time sitting in vehicles or camping, because the landscape is not so interesting for walking. In contrast Nomrog presents a landscape of hills and wooded river valleys where animals and birds may be seen around the next bend in the river or over the next ridge on the mountainside. It is just the place for a camping trip of several days; there is abundant clean water, the land is varied, there is shelter from the sun and it is possible to see a wide range of species of animals and plants. Ecotourism can be a valuable source of income but only if a sustained flow of tourists can be maintained. If the Nomrog SPA gained a good reputation and a mention in the guide books it could attract increasing numbers of visitors. But what needs to be done? First, facilities have to be established. Gers would be sufficient at first and perhaps nothing more

would be needed for accommodation at the first stop after arrival by car. The main attraction of Nomrog would be riding or walking safaris into the interior, either on the high moors or along the river valleys. Paths would have to be constructed and camping sites prepared. The season would be short and summer rains could lead to cancellations, but for the adventurous tourist this would not matter"

Bridge is built outside the SPA. Under Mongolian laws, the Parliament designates the general boundaries of SPAs and the MNE is responsible for the internal zonation and specific boundaries. The Parliament's placement of the Kharuul Tolgoi at the border (with PRC) has been interpreted by the MNE as a straight line from Tumen Tolgoi to Kharuul Tolgoi, continuing in the north east direction until the border with the PRC is reached (Figure 3.20). As shown in the figure, the northern tip of the SPA is 47o20'08"N, somewhat north of the confluence of the Nomrog and Halh rivers. If the border indicated in Figure 3.19 is taken as correct, it is necessary to correct the text and maps included in the Nomrog SPA Management Plan (2001-2005). According to the GPS readings measured by us the new bridge was built outside the SPA (E119'28"24^{o} and N47'19"40^{o}).



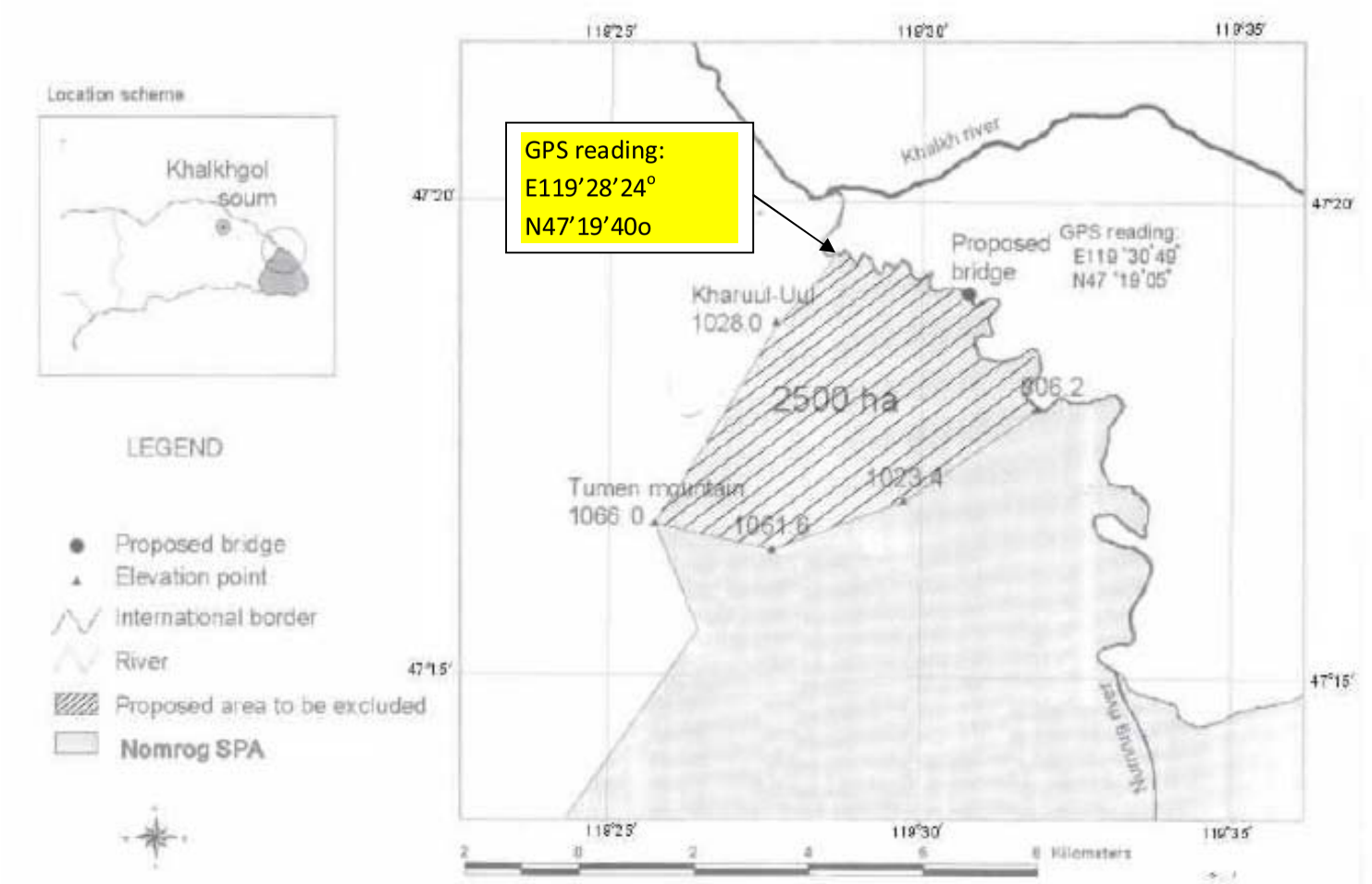
Source: Mongolian Ministry of Nature and Environment, 2002

Figure 3.19: Map of Nomrog SPA

The Mongolian Government is evaluating the above described interpretations and is expected to clarify the exact boundary of the SPA. Regardless of whether the bridge is inside or outside the SPA, however, the fact remains that the bridge is very near to an environmentally sensitive area. If it is inside, it is within the Limited Use Zone of the SPA and any bridge or connecting road construction in this zone is subject to licensing by the MNE. If it is outside, any infrastructure project under the Mongolian environmental laws must have an approved Environmental Impact Assessment (EIA) before commencement of construction.

Environmentalists have expressed significant concern that the bridge would ultimately result in the destruction of the attributes that make this area unique and worth protecting: wildlife, unspoiled grassland, and un-fragmented habitat. It is also stated that increased access to the area could result in greater incidences of poaching against endangered species.

There is also some lack of clarity regarding the issue of whether the Mongolian Government's Millennium Road initiative will utilize the bridge as their connection point with the PRC. As described in Volume IV of the Final Report, the alignment of the Millennium Road for the most part has been defined up to Halkgol (previously known as Sumber). After Halkgol it is not clear where the alignment will proceed to. The commercial traffic (large trucks and cargo vehicles) envisioned for this road would pose a serious threat to the environment of the area if the Millennium Road is aligned to pass through the Nomrog bridge.



Source: Dornod aimag, Nature and Environment department and Consultant

Figure 3.20: Map of the constructed and proposed locations of the Nomrog bridge

3.3.2. 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).

Source: Consultant

Figure 3.21: Railway network development corridors (segments)

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.

Source: Consultant

Figure 3.22: Nomrog river bridge (Sumber BCP) with 340 meter length

Source: Consultant

Figure 3.23: Nomrog river bridge (Sumber BCP)

Source: Consultant

Figure 3.24: Sumber BCP customs and immigration building (in Nomrog area)

Source: Consultant

Figure 3.25: Image of the Nomrog bridge from the front of the Sumber BCP

During the field trip (totally 2500 km) starting from Ulaanbaatar via Undurkhaan and Choibalsan to Sumber BCP (Nomrog) along the Road Corridor-1a I observed that following factors should be considered in implementation of the Corridor:

- There are no big geographical constraints and barriers in building raved road and railway line because this area is a plateau and very sparsely populated region (no resettlement issues).
- In road and rail way construction should consider appropriate measures to create favorable conditions for wild animals' movement.
- Sand movement would be a problem for maintaining roads and railways during the operation.
- Appropriate environmental protection measures should be planned and implemented during the construction and operational period.
- It is required to build small bridges on the rivers in the vicinity of the Nomrog area.

3.3.3. Results of the interviews

Interviews with the Ministry of Roads, Transport, Construction and Urban Development, Railway Authority, Customs Department, Railway operators, Chamber of Commerce and Industry, Trucking Association, International Organizations and individual researchers have been undertaken in April and May, 2012. Different categories of questionnaires were distributed more than 60 interviewers depending on the organizations nature and duties. Received only 35 filled questionnaires. Core questions for Stake holder's interviews were similar. Results of their answers can be summarized as follows:

- Majority of respondents said that they are familiar with GTI Transport Corridors, but they have quite good knowledge on the previous Tumen river project's Transport Corridors that have been considered several years ago.

- Many of the transport operators and freight forwarding companies are willing to use the both road and rail Corridors if they are open. They said that traffic along the transport corridors would be quite big.

- The Ministry of Roads, Transport, Construction and Urban Development, Railway Authority and Roads Department responded that they will support the corridors and confirmed that they have the same policy on future development of Rail and Road networks in order to expand relationships and cooperation with NEA.

- 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.

- If the Corridors are in operation, Mongolia would have a reliable gate to the ocean. Foreign trade transportation expenses would be reduced to some degree.

- The Eastern Mongolia railway connection from coal mine Tavan Tolgoi will start this year and be likely completed in 2015.

- In order to implement these corridors it is required to make negotiations on railway transportation with neighboring countries such as China and Russia.

- If the corridors are in operation, they will create favorable conditions to develop agriculture especially crop farming, meat and dairy farms in the Eastern region of Mongolia.

- It is better to construct the Eastern Mongolia Railway via Khuut rail station to Nomrog BCP. It is unnecessary to connect Choibalsan city to Nomrog area.

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:

- The Parliament of Mongolia's made an amendment to initial plans align the eastern parts of the Millennium Road along the 47°20'N latitude. The Newly constructed bridge on the

Nomrog River is the east most point of the Millennium Road that is located just outside of the Nomrog Special Protected Area.

- The Khalkgol (Sumber) - Arxan 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 Tavan Tolgoi (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 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. For example, any minerals extracted to the south of Baruun Urt would be shipped through the Trans-Mongolian rail line. Also any minerals extracted to the north of Choibalsan would be shipped through the existing rail line between Choibalsan and the Russian Federation.
- 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.
- Many of the transport operators and freight forwarding companies are willing to use the both road and rail Corridors if they are open. They said that traffic along the transport corridors would be quite big.
- The Ministry of Roads, Transport, Construction and Urban Development, Railway Authority and Roads Department responded that they will support the corridors and confirmed that they have the same policy on future development of Rail and Road networks in order to expand relationships and cooperation with NEA.
- 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.
- It is better to construct the Eastern Mongolia Railway section via Khuut rail station to Nomrog BCP. It is unnecessary to connect Choibalsan city to Nomrog area.
- In order to implement these corridors it is required to make negotiations on railway transportation with neighboring countries such as China and Russia.
- If the Corridors are in operation, Mongolia would have a reliable gate to the ocean. Foreign trade transportation expenses would be reduced to some degree. They will create favorable conditions to develop agriculture especially crop farming, meat and dairy farms in the Eastern region of Mongolia.

Source: Consultant

Figure 3.26: Trans-GTI corridors

4 Measures and Investment Programmes proposed to improve transport movements along the corridors

4.1. Constraints for traffic flows along the trans-GTI corridors

Table 4.1: Constraints along the trans-GTI corridors

Infrastructure	Constraint	Importance (How much it restricts the flow)	Timeframe (Reflects the Urgency)	Mitigation measures
Rail	- Missing link between Khuut and Nomrog -Difference in gauges and axle load requirements	Significant Moderate	Urgent (2016) During the preparation of Feasibility study, design and construction	Construction of the rail link Harmonization of technical specifications of rails between the neighboring countries
Road	Missing section between Choibalsan and Nomrog	Significant	Urgent (2016)	Construction of the road section
BCP	Nomrog BCP facilities have been built, but have not been put into operation	Significant	Urgent (2013)	Open Nomrog BCP
Transport regulation	Transit transportation agreement between Mongolia and PRC is not signed still	Moderate	Quite urgent	To continue negations and sign the agreement

4.2. Measures (regulations, international agreements, improved custom procedures…)

4.2.1. International Agreements and Conventions

International conventions related to transit transport are essential in facilitating the movement of goods, especially in border crossing situations. They reduce redundancies in formalities and thus the time required. Since 1992, UNESCAP has had an active role in demonstrating the benefits of accession to seven international transit conventions by the countries of the region. The main vehicle for UNESCAP in this role is Resolution 48/11 of the 48th Commission Session held in Beijing in April 1992. The seven international conventions covered by Resolution 48/11 are listed in Table 4.2 below, which also indicates the status of each country with respect to accession.

Table 4.2: Status of Mongolia's Accession or Being Party to International Conventions Listed in Commission Resolution 48/11 (March 2005)

Convention on Road Traffic (1968)	Convention on Road Signs and Signals (1968)	Customs Convention on the International Transport of Goods under Cover of TIR Carnets (1975)	Customs Convention on the Temporary Importation of Commercial Road Vehicles (1956)	Customs Convention on Containers (1972)	International Convention on the Harmonization of Frontier Control of Goods (1982)	Convention on the Contract for the International Carriage of Goods by Road (CMR) (1956)
x	x	x	o	o	o	o

Notes: (x) indicates that: - party/acceded. (o) - acceded after adoption of resolution 48/11.
Source: Consultant

Of the seven conventions, two are of particular relevance to rail transit. These are the Customs Convention on Containers, 1972, and the International Convention on the Harmonization of Frontier Control of Goods, 1982. Both of these conventions are of great potential benefit to signatory nations, since they codify rules for rapid customs inspection of containers at land borders. The principal feature of these rules is that they confine border customs formalities to a quick inspection of container seals and of documentation (only for the purpose of establishing that they are intact and complete). If adopted and put into effect by the countries of the region, they are likely to result in a marked reduction in border crossing delays and dwell time, which can only serve to benefit rail freight customers.

Efficient movement of goods and services is often impaired by institutional barriers such as complex border crossings, inadequate transit documentation, and bureaucratic procedures. Customs related delays and complexities are also a major reason for increased cost and time in international freight transportation. Efficient border crossing of freight is important to economic integration among countries in a region. These uncertainties become costly when introduced into the logistics system, especially in industries where deliveries have been planned to arrive on a just-in-time basis. Issues relating to the facilitation of the trade of goods and services have traditionally been incorporated in bilateral agreements between countries. As goods begin to move along international transport corridors the need for harmonization of laws and processes amongst a larger group of countries becomes clear. Slow progress is being made in the implementation of UNESCAP resolution 48/11 on road and rail transport modes in relation to facilitation measures, which recommended that countries in the region should consider the accession to seven international conventions in relation to transport facilitation. Along with the move towards accession of international conventions there has also been a move at the subregional level to develop trilateral and multilateral agreements on transport within the subregion as an interim measure. Countries in NEA are also parties to some of these agreements.

In this context the initiative of the countries of the Shanghai Cooperation Agreement (including China and the Russian Federation) to formulate a multilateral agreement on international road transport is of particular interest to NEA countries as it may later be logical to extend the geographical scope of application of this agreement.

Table 4.3: International conventions joined by Mongolia

№	Name of Agreement and Conventions	Year of approval	Year of Mongolia's joining	Implementation	Remarks
	I. Roads and Road Transport				
1	Convention on Road traffic	1968	1997	The Traffic safety law of Mongolia was amended in 2010 on the basis of the Convention	
2	Convention on Traffic signs and signals	1968	1997	In order to implement the Convention, the requirements of the International Convention have been reflected to the National Standards on road signs: MNS 4759:2003, MNS 4597:2003, Road lights: BNS 4980:2000	
3	Intergovernmental Agreement on Asian Highway network	2004	2005	Mongolia joined Routes: AH 3, AH 4 and AH 32	Need to complete constraction of the routes: AH 3, AH 4 AH 32
4	Customs Convention on the International Transport of Goods under Cover of TIR Carnets	1975	2004	According to Convention conditions supposed to use 100-150 permission books for transportation, but only 20-30 books are used annually.	Advocacy is needed.
5	Convention on the Contract for the International Carriage of Goods by Road (CMR)	1956	2002	Some provisions and documents spacified in the convention are reflected in the Civil law of Mongolia. So, it is partially used.	
6	Geneva Convention on customs inspection of goods	1982	2007	Some preparations are undertaken.	
	II .Railways				
7	International freight transportation agreement	1950	1950	In use	

№	Name of Agreement and Conventions	Year of approval	Year of Mongolia's joining	Implementation	Remarks
8	International passenger relations agreement	1950	1950	In use	
9	Regulation of wagon operation in International passenger transportation	1950	1950		
10	Intergovernmental agreement on Trans-Asian Railway network	2006	2007	In use	

Source: Consultant

4.2.2. Customs procedures improvement measures

Single electronic window (SEW)

The Single Electronic Window (SEW) is a facility that allows parties involved in trade and transport to lodge standardized information and documents with a single entry point to fulfill all import, export, and transit-related regulatory requirements. Today, this implies electronic transmission of documents from traders and customs brokers to Customs and to the different permit-issuing agencies. Furthermore, the issuance of the permit itself would be done electronically and the system would allow electronic sharing of information.

Experience from other countries indicates that Single Window systems generate significant economic benefits. These benefits are of two types, direct and indirect. The immediate and direct beneficiaries would be traders and customs brokers and government departments involved in trade facilitation. Indirect benefits are associated with the impact on trade and GDP. The direct benefits would all be in terms of time savings or productivity gains and it will be up to the organizations to turn them into monetary benefits. Customs would get more than productivity gains as they could expect the revenues they get from import duties and taxes to increase. Experience and studies have confirmed that reducing delays has a significant impact on trade.

Direct economic benefits occur in three forms: time savings of brokers and traders in preparation of Customs declarations, time savings and productivity gains of agencies delivering permits; time savings and productivity gains of Customs staff.

Currently the Single Electronic Window project is being implemented by ADB involving several central Asian Countries including Mongolia. This project was found to be highly economically justifiable and implementation was therefore recommended. Therefore, Sumber (Nomrog) BCP would be part of the Project.

Single Window projects need to be financially sustainable as well as economically justifiable. Sustainability implies that funding of Single Window is guaranteed in the future so that there is no deterioration in the supply of services.

The immediate beneficiaries of SEW would be the users of the system, but SEW would also generate externalities profiting all consumers. This means that there is a public good aspect to the service.

Electronic Documents. There is no digital electronic signature law or electronic documents law. The Mongolian SEW system proposed under the Implementation Master Plan provides two options of processing requests – one with, and one without, digital signatures. The Legal and International Liaison Working Group under the National Implementing Committee, should make concrete proposals for additions and amendments to the legislation to allow recognition of “electronic documents” which may be authenticated using electronic signatures which are not restricted to merely digital electronic signatures, which requires public-key cryptography and expensive associated infrastructure. There is a great opportunity to support the use of electronic documents for the Single Electronic Window system and at participating agencies well in advance of the system implementation and thereby ensure the projected economic benefits of the SEW are realized.

4.3. Investment programmes

4.3.1. Missing infrastructure links

Investment Programs are required to missing infrastructure links, namely:

- 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
- Feasibility study, detailed design and construction of paved road between Choibalsan city vicinity and Sumber (Nomrog) BCP.

Khuut-Nomrog rail segment

Feasibility study Rail line between Khuut and Sumber (Nomrog) BCP

GTI Project proposal No1:

Project title:	Feasibility Study for Construction of new Rail segment between Khuut and Nomrog (300 km)
Participating countries	Mongolia, China, Republic of China and Japan
Timeframe:	2013-2014
Estimated Budget:	USD 1,200, 000
Proposed funding source:	GTI member countries, UNDP

Background & Rationale:

Main constraints and problems limiting the use of the GTI transport corridors are inadequate development of the infrastructure, especially missing rail segment and paved road sections along the Corridors on the Mongolian territory. 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.

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.

Objective (s):

The objective of the construction of new Rail segment between Khuut and Nomrog (300 km) is to facilitate the transportation services in the Greater Tumen River region through the promotion and construction of missing links. The objective of the GTI Transport corridors study is to foster the development of a reliable, cost-effective and efficient integrated transport network in the GTI through planning and facilitating the activation and development of international transport corridors in the region.

Expected Outputs and Activities:

Expected project output is reports:

- Pre-Feasibility Study:
    - Inception report
    - Interim report
    - Final report with 10% of design.
- Draft report Feasibility study:
- Final report of Feasibility study with 30% of design.

It is expected that the project is carried out by a consulting firm who should undertake activities specified in the Draft Terms of Reference.

Please see following draft terms of Reference for the project.

Draft Terms of Reference
for the Railway Feasibility Study of the Khuut-Nomrog Line Segment

BACKGROUND

The objective of the construction of new Rail segment between Khuut and Nomrog (300 km) is to facilitate the transportation services in the Greater Tumen River region through the promotion and construction of missing links. The objective of the GTI Transport corridors study is to foster the development of a reliable, cost-effective and efficient integrated transport network in the GTI through planning and facilitating the activation and development of international transport corridors in the region.

In addition the development objectives of the Project are to facilitate investments in infrastructure to support mining related activities and downstream value-added processes, regardless of funding source, and to build local capacity to prepare and transact infrastructure projects in Mongolia.

Mining in Mongolia has become a priority sector of development within a short period of time as a result of the significantly rapid growth of the sector. It contributes around 30% of the GDP and over 70% of export earnings of the country.

Mongolia is facing to facilitate and enhance mining infrastructure development in the Mongolian Railway System. The Government of Mongolia has approved a “State Policy on Rail Transportation” in June, 2010 with the objective is to increase the railway carrying capacity and extend the national rail network on a unified basis.

Within the of the policy, new railway network routes that are capable of delivering surging coal outputs to potential foreign markets have been identified by the Government of Mongolia as well as priorities for their development.

Within the framework of this Project, the Government of Mongolia is planning to hire a consulting firm to develop the Feasibility Study of “Khuut-Nomrog” Rail Line.

Existing studies carried out in the field of railway of Mongolia are:

1. Pre-Feasibility Study: Mongolia China Railway Project, UNDP/Tumen Secretariat, UNOPS Contract NC-970134, Final report by SwedeRail, 1998
2. TA 7110-MON: Final Report, Regional Logistics Development Project, TERA International Group, 2010
3. Mongolia Rail Modernization Project, MCC-06-0092-Con-90/TO03, Main Report by TERA International Group, 2007
4. TA 6015, Facilitating Economic Cooperation in Eastern Part of Inner Mongolia Autonomous Region, PRC and Mongolia, Final Report by TERA International Group, 2003
5. State Great Hural (Parliament) of Mongolia, Resolution No: 32, 24 June, 2010, State Policy on Railway Transportation
6. A Study of Transport Infrastructure to the Asia-Pacific Regarding Coal Resources Development on Southern Mongolia (Tavan Tolgoi coalfield), NEDO, 2012
7. Current statistical information, identified problems, and key operational and monitoring issues in the mining industry from the Mineral Resources Authority of Mongolia.

The planned Khuut - Nomrog (KN) line is part of the National Rail Plan (Resolution 32) and represents Phase II of that plan (See map). This proposed 300 kilometer single track mainline would connect Eastern Mongolia with China, allowing access to three planned ports in China as well as to the heavily travelled China Railways freight corridor (a 300 MGT plus per year heavy haul mainline).

Source: Consultant

Figure 3.27: Phases and formerly licensed for construction of Railway Infrastructure segments

China Railways is also upgrading its standard gauge lines while the KN line is envisioned as Russian Broad Gauge (1520 MM). Hence gauge change at the border will be necessary.

One of the major objectives of this line is to offer an alternative to access China by rail in addition to the UBTZ mainline.

Further, the Government of Mongolia (GoM) has ambitious plans to develop the area between Khuut and Choibalsan into an energy production and steel manufacturing center. An oil refinery will be built in Matad and Mongolia's commodities would be made into steel rather only exporting the raw materials to China. The KN line would reduce the cost of transport to eastern and southern China and increase Mongolian commodity price competitiveness.

Underlying all plans for the KN line is the objective of providing Mongolia's vast mineral resources situated parallel to the planned railway lines with a cost efficient means of transport to their potential markets. The existing railway line from Borzya – the border with Russia – and Choibalsan is partially closed at this time and carrying only local traffic. Reopening that line is a lower priority at this time. As part of Phase I, three feeder railway line segments have been concessioned and are in design and procurement stage (see map above). They are shown as part of the Phase II National Plan. From Khuut to Sainshand is a "missing link" that has not yet been concessioned.

OBJECTIVE

The main objective of the assignment is to prepare the Feasibility study for the "Khuut-Nomrog" rail line.

SCOPE OF THE WORK

In order to achieve the overall objectives described above, the Consultant shall perform, as a minimum, the following tasks:

I . Pre-Feasibility Study (6 Months)

1. Map Corridors with 3 Alignment Alternatives to 5 Percent Concept Plan

Three alternative alignments will be prepared by the Consultant to map the Corridor between Khuut-Nomrog (KN) for a single track mainline, with enough room to expand to a double (two) track mainline if required at a later stage. This Corridor will lay the basis for selection of the Least Environmentally Damaging Preferred

Alternative (LEDPA) once Government of Mongolia (GoM) approval is obtained between Pre-feasibility and Feasibility Stage.

The Consultant shall obtain and apply CAD-based topographic maps for the Khuut Nomrog Corridor in order to identify topographic features. Typically, the straightest path between two points begins to establish a baseline alignment in order to lay out the a corridor for alternatives analysis schematically and conceptually. Given KN line is 380 km, the lateral corridor limits will be defined as this task starts. Typically for corridor planning purposes, a high level 10 kilometre corridor is laid out with 5 km on each side.

The width of the corridor is driven by natural topography and obstacles within the corridor with more or less distance from Right of Way conceptual centreline depending on:

- Natural features – mountains, valleys, streams, rivers, seasonal flood zones, etc.
- Animal migration routes.
- Existing infrastructure constraints - buildings, roads or other fixed facilities
- Towns along the route path – to either connect the proposed rail line, or avoid them to increase building aerial structure over and around existing populations

Once the baseline is mapped, natural, social and environmental features can be overlaid with the baseline topographical alignment considering shortest path versus vertical curvature (mountains, valleys, rivers, etc) and lay out corridor alignments using Micro Station 3D (Bentley) or a similar and compatible product.

International financial institutions such as World Bank guidelines shall be followed for Environmental Impact Assessment and applied during the course of this Task. Two forms of environmental impact assessment are possible. It will not be known until the corridor is laid out and the inventory of environmental and social resources prepared to determine whether a full environmental impact assessment or simply an environmental review will be prepared. Guidance on this issue will be provided by the GoM, Project Manager once the work is underway and consultant recommendations will be considered. Options are:

- Initial Environmental Examination (IEE)
- Environmental Impact Statement (EIS)

A Project Implementation Agency shall consider both options within the first month after Notice to Proceed (NTP) and exercise a full EIS or IEE to follow over a three month period in parallel with other Tasks at the Pre-feasibility Study stage. The Consultant shall price both options within this Task separately and distinctly.

Next, the Consultant shall prepare an inventory of locations in three dimensions that may present environmental and or social hazards or risks impacting placement of a new railway corridor. The inventory shall contain limits, type and description of these locations as well as an assessment of the importance of these features after discussions with GoM transport, environmental and National Development Initiatives to gain their perspective. Sites of environmental social, physical or religious importance shall be avoided -- if possible – when moving from Long List of possible alignments to three (3) possible alignments. These three alignments will be further reduced to select a single least Environmentally Damaging Preferred Alignment (LEDPA).

Once natural features are established, the Consultant will lay out overlay sheets for each of the following categories to be used as “layers” over the base map:

- Human/nomadic populations
- Wildlife/endangered and protected species native to Mongolia
- Polluted or hazardous material sites
- Aquifer regions
- Archeology – including known ancient populations and dinosaur remains
- Any sites considered hold or protected by the Government of Mongolia Locations with any other environmental impacts to be determined

Task deliverables will be a set or baseline CAD maps with overlays/layers as described above to use in the selection of three preferred alignments trading off shortest route path – based on natural topographical elements and the “built” environment – versus ideal environmental alignment. A hybrid alignment will consider opportunities – where possible, to mitigate environmental and social obstructions along the shortest path RoW versus high level estimates of the cost of mitigation to go around these obstacles with the third LEDPA alignment identified.

Included in this analysis will be a set of cost estimates at a high conceptual level, consistent with 5 percent design and mitigation recommended by the Consultant.

2. Assess Site Conditions in Mongolia: UBTZ, Khuut- Nomrog, Phase I and II Corridor

The Consultant, in parallel with the CAD based mapping Task, shall dispatch a team of experts to conduct a site inspection of the Khuut- Nomrog Corridor to fully acquaint himself with the features identified in Task 1. Unless prevented from doing so by insecurity or other reasons beyond his control, the Consultant shall inspect the entire length of the proposed line.

The Consultant shall also inspect the main UBTZ railway line and other lines in order to get a good feel of Mongolia's existing railway conditions on the existing, operating broad gauge railway. Additionally, the Consultant shall visit several of the largest mines in and around Eastern Mongolia which would feed south eastern flows to China Railways (CR). Line construction contractors Energy resources, MAK and Tavan Tolgoi shall also be visited to see both track construction now underway leading to the mines to be served.

As part of the site inspection, the Consultant shall investigate the availability of construction materials like stone ballast and gravel, and other factors that are likely to impact the technical feasibility and the cost of the envisaged railway upgrading works.

For all the site visits, digital (colour) photographs shall be taken as necessary to pictorially record salient observations.

3. Macro-Economic Analysis

The Consultant shall carry out a brief but comprehensive analysis of the macro-economic factors that are likely to affect the economic/commercial viability of the project.

The Consultant shall review the demographic and macro-economic developments in Mongolia in general and in Eastern Mongolia in particular. He shall also review recent trends and developments in Gross Domestic Product (GDP) for Eastern Mongolia in the primary economic sectors of mining, precious metals, rare earth minerals, construction materials, petroleum and manufacturing. He shall collect all key data pertaining to these economic activities.

The Consultant shall develop macro-economic forecasts at the GDP and sectoral levels basing on – among other things – forecasts by the Mongolian Government, forecasts by the Chinese Government and the Russian Government – as made available -- shall be integrated into this analysis. Eastern Mongolia is planning industrial parks and petroleum refineries as well as steel making activities.

Based on available published data and reports, a broad assessment of economic growth in Eastern Mongolia, three line segments are under construction by contractors Energy Resources, Tavan Tolgoi and MAK. The Aspire line feeding commodity to UBTZ and southeast to Khuut- Nomrog shall be studied. On the China side capacity and planned capacity improvements on the CR existing triple track mainline now carrying 300 MGT north to south with planned capacity improvements to 450 MGT. The opportunity for Mongolian bulk commodity export to Eastern China three Ports at Dalian, Dandong and Jinzhou shall be studied.

4. Determination of Existing & Future transportation Demand/Shipper Survey

The Consultant shall collect and analyze all the data necessary for him to make a reliable estimate of the existing and future transportation demand. Mongolian network flows are derived from Mongolian Railway Policy (Resolution 32), the consultant shall make two assumptions regarding linkage to a railway network for KN:

- Baseline rail connectivity will connect Nomrog at the China border and will connect with three Chinese ports in 5 years.

Based on these assumptions, the Consultant shall conduct an existing and prospective shipper survey. The survey shall contain all primary mineral and petroleum licensees in the country today to determine their plans and likely potential to ship mine and petroleum outputs and phasing plans. Assess conditions leading to growth over a ten year period to if a railway line exists to serve the mines.

Sample questions for market survey:

1. Describe phasing of Mining Output under high, medium and low delivered price of commodity scenario.

2. Describe factors that would lead to Mine Operator Investment
3. What other mine operators and other shippers would use the railway that you could share cost and operating plans if you were to build a railroad spur from mine to the mainline?
4. How could elimination of constraints to three Chinese ports affect your potential for PPP participation?
5. What factors do you believe would the Government be able to facilitate that would lead you to invest in a long term commitment in railway operations?
6. How does GoM policy affect you when you are licenses to operate a mine for eight years and have one year geological exploration to produce?
7. Have you done any independent feasibility studies on your markets within Mongolia, for export and to China?
8. How do you insulate your company from delivered cost of commodity price over the long term?
9. If capacity constraints exist where China Railways prefers to service its own originating freight flows first, what kind of partnership could GoM make to facilitate dispatching and harmonization from Origin to Destination. What kind of reassurance would you need from the Chinese side to pick up your wagons efficiently and reliably without delay?
10. Do you see Russia as a realistic trans-shipment route to Vladivostok?
11. Would you be interested in investing in portions of the mainline to achieve long term flows to destination if an appropriate cost versus revenue formula were derived through facilitation and negotiation with GoM? What other entities would you like to see involved? China" Russia?
12. What kinds of guarantees or subsidy would encourage your participation to participate in railways construction to markets and sharing of revenue between a GoM owned rail infrastructure and other operators?

The responses to the set of suggested possible questions above and those that arise during the course of the Consultants work shall be tabulated and be utilized for subsequent discussions with GoM and CR officials as PPP discussions evolve.

Further these responses will be used to build the O-D flow network assignments and modal splits accordingly.

Finally, these responses will be used in tandem with the Site Visits to prepare high level cost estimates to eliminate flow constraints.

The future transportation demand shall be projected for a period of 30 years under three scenarios namely "Low", "Medium" and "High" for the Khuut- Nomrog Line segment as well as all mainline corridors designated in Phase I and Phase II of Mongolia Railway Policy including UBTZ flows and the three line segments now under construction by ER, MAK and TT.

The Consultant shall develop probable modal split scenarios for the traffic taking into account the present and future modal attributes of road and rail transport in the project area.

Finally, the Consultant shall consider the ability and propensity of China Railways to actually service wagons and trains originating from Mongolia across the border to their destinations in Eastern China Ports and also on CR high traffic high density north-south mainlines to China industrial regions in Southern China.

5. Development of Operating Plan Criteria and Specification of Standards

The following railway design standards are to be integrated in the Khuut-Nomrog Design, Engineering, and Operating Standards and Criteria:

Development of Heavy Haul Track, Signal and Rolling Stock Standards

The new railway line between Khuut-Nomrog, for the separated Infrastructure Company alone, shall be designed and constructed to the following Track, Signal and Operating Requirements:

Track Design and Maintenance of Way Requirements Concrete Sleepers – pre-cast, pre-stressed concrete ties shall be used following the tie spacing of Class I AREMA based standards, built to 39 ton axle loads (35 MT) with precast fastener inserts and spacing of 20 inches on center.

- Ballast shoulder using good aggregate materials of granite or comparable stone with a 2:1 slope at the shoulder and ballast depth of 6 to 9 inches

- In permafrost regions sub-grade prepared and compacted with multiple layers and stabilized before track-structure placed
- Geo-tech fabric may be used in selected locations known to have subterranean water sources where pumping will eventually destroy the supporting structure.
- Adequate drainage throughout the mainline and in secondary tracks and classification yards Need to refer to ditching whether they are lined or not
- P65 or AREMA based 141 head hardened premium rail. Heat treated rail may be used on low traffic passing siding locations or yard spurs. High curvature locations must be built with premium track materials including head hardened rail
- Continuous Welded Rail (CWR) – with adequate rail laying records and a machine supplied to adjust rail back to RNT in the Spring or Autumn.
- Electric flash butt welding with termite welds between special work (switches) and lead and trailing track
- Elastic double shoulder fasteners specified to ~2500 pound toe load
- Double box anchored sleepers on elevated structure at transitions; For example, ballasted track or open deck bridge structures are used.
- Rail Bound Manganese Frogs (RBM) on all turnouts
- Sampson 5100 point relieved switch points to minimal lateral acceleration and point degradation on curve side of facing turnout move.

  Track Maintenance Equipment
  Concrete sleeper laying machine
  CWR train with mobile electric flash butt welder
  Dynamic Stabilizer
  Large Production Tamper
  Switch tamper
  Track Geometry Vehicle with ultrasonic testing and rail wear measurement
  Stub end tracks attached to certain sidings for storage of maintenance equipment
- Single point worn wheel contact by rail/wheel profile grinding before revenue service starts and to be maintained with ongoing preventive wheel/rail regime matched to the majority of Mongolian wagon fleet or considering foreign wagons if interchange is permitted with run-through trains.
- Bridges and Structures designed to Coopers E-80 loading
- Class IV Federal Railway Administration Standards for Design and Construct and Class III for life cycle maintenance practices with MRA inspectors authorized to regulate and enforce these standards.

Locomotives and Wagons

Diesel and Electric Traction locomotives will be studied later and a preferred locomotive choice will be made at the Feasibility Study Stage: AC Traction diesel electric locomotives with distributed power via wire or wireless technology.

- If electric traction locomotives are used, readily available and well maintained power source and delivery system throughout the corridor must be available in advance of revenue start-up operations.
- Power utilization strategy, return power for conservation.
- Locomotive reliability of 95 percent or better (to minimize spares and fleet productivity)
- Wagon reliability of 90 percent of better.

Preliminary Design, Operating and Engineering Criteria

- Maximum Vertical Grades not to exceed 6 percent in a maximum of only 5 percent of the line segment with 95% locations along alignment at maximum of 3 percent ruling grade; and similarly,
- Maximum Curvature – laterally of 3 degrees or less.

- Coopers E-80 bridge loading
- Single track railroad initially with provision for triple track main in each direction
- These provisions coupled with the possibility of electrical power having an impact on placement of poles, clearance package etc.
- 120 km/h design speed (max)
- Actual average line haul speed of 100 km/h with associated cant deficiency
- Right of Way (RoW) dynamic clearance envelope of 6 track main (corridor)
- Minimization of Tunnels
- Minimization of long span bridges
- Average train lengths to start at 120 wagons now running 60 car wagon max on existing UBTZ
- Passing sidings sized to initially accommodate 120 wagon trains, expandable later as traffic build by moving special work and siding length.
- Siding length of 2000 meters.
- GPS based wayside signaling expandable later to include either PTC or ETCS at a later date
- Minimization of grade crossings to achieve lowest construction cost per km

6. Concurrent Russia and China Team Trips

A consultant team shall be dispatched to China to visit facilities and meet with officials representing:

- Northeast China and Southeast China – including Ports, railways, barge transshipment points to southeast china from rail and planned and existing Ports.
- Russia Team Trip – in particular to meet with the Russian side of the UBTA joint venture together with Russian railway regional officials north of border at Vladivostok and Nakhodka as well as the border crossing at Naushki.

The purpose of these two parallel and concurrent trips is to gather information first hand on rail and port operations as well as mainline conditions railway conditions for both Eastern Mongolian transit routes – North and South – in Russia and China respectively. The Consultants shall prepare two separate reports concerning current conditions on both sides of the border, gauge change facilities and constraints, port facilities, operations and challenges, and planned investments on both major corridors. The China railways trip shall be dispatched to each of three ports planned for possible Mongolian and Chinese exports.

Both Trip Reports shall be prepared by the Consultant to develop flow and route assignments, constraints and needed border improvements to improve transit traffic originating from Mongolia to markets.

7. Assign Network: Commodity Flows by Route

Once the data set is obtained, the Consultant shall devise set of origin destination assignments including:

- Trip generation by mode
- Trip assignment
- Capture by route segment from mine spur to mainline to terminal/port or plant
- Railroad market share as a function of total transportation supply including at least truck and barge traffic (for some portion of the route)

A set of new projections shall be made by major commodity group including but not limited to:

Coking and steam and brown coal, iron ore, fluorspar, copper, gold, and oil -- both crude and petroleum products)

GoM plan to build a refinery at Matad for domestic consumption and to achieve the goal of partial energy independence from Russia.

For each of the market segments sensitivity studies are to be carried out to estimate the elasticity of the demand in regard to transport generalized costs, i.e. those main factors and parameters that ultimately will

influence the take-up of rail services on the 1520 mm gauge line by customers. In this context, particular attention is to be devoted to:

- elasticity of demand per clusters of products and types of logistic services (viz. wagon-loads, full train loads, combined transport).

Hazardous material transport in rail shall be considered.

Virtually 100% of Mongolia's petroleum products originate from Russia.

Updated and independently prepared OD flow matrices for the entire Eastern Mongolian Network shall be prepared for the short, medium and long term translating to a 5, 10, 15, 20, 25 and 30 year forecast of MGT by line from Origin to destination (excluding private branches and spurs).

8. Select Preferred Alignment w/Mitigation: 10 Percent Design

The LEDPA will be prepared which produces a hybrid of shortest path best topographically based alignment and mitigation around or through sensitive areas. The process is described in Task 1 and brought to the 10 percent design stage showing proposed mitigation, structures that may be required to avoid sensitive areas and provisions for natural habitat and populations to avoid destructive construction and ongoing habitat impacts including the nomads of Mongolia.

In addition, preliminary high level construction cost estimates will be prepared in this task for railway related infrastructure, track, locomotives and wagon workshops, facilities and yards. The costs of the LEDPA with and without mitigation shall be prepared in tabular form and described at a high level of detail in this Task.

A Power Point presentation shall be prepared to document the LEDPA, the methodology to arrive at the preferred alternative, capital costs – including land acquisition and utility clearing and placement and any power connectivity that will be necessary to build, operate and maintain the new railway line segment.

CAD based maps shall be used as a presentation tool showing each of the three possible alignments as well as the attributes that describe mitigation requirements.

10. Miner & Investor Workshop: Pre-Feasibility Results

A second investor and mining workshop presentation will be prepared in this Task and a Workshop organized to share pre-feasibility results and act as an ongoing catalyst for PPP investment and planning. The First Investor workshop was held at MRA headquarters on August 1st coupled with face to face meetings the second workshop day on August 2, 2012. These presentations of this Workshop are attached.

11. GoM and Workshop-Pre-Feasibility Results

The objective of this Task is to prepare a presentation to demonstrate to GoM officials how, why and where the LEDPA alignment was recommended for approval by GoM before the full feasibility study is conducted. Once approved this alignment shall not change and all subsequent plans shall be based on this LEDPA.

II. GoM Considers and Approves LEDPA Alignment (one month)

III. Start Feasibility Study (one year activity)

12. Legal/Institutional/Tariff Structure and Open Access Tasks

This Task shall entail a short though thorough collection, interpretation and analysis of the current situation with regard to legal and institutional challenges needed to promote reforms at GoM and Parliamentary level s. This Task will benchmark what a successful PPP initiative looks like and informs other country experience. The goal is to produce conditions tailored to Mongolia's needs, specifically:

- GoM: State Property Committee is likely to require a minimum 51 percent ownership of any major state owned asset in Mongolia. GoM currently favors the BTO model challenge will be for a successful BTO, how Mongolia will invest 51% of the large capital required to build any new railway and retain that position once the railway is built and transferred back to the state regardless of which contract operator is selected and/or continue to operate the infrastructure on a contract basis.
- GoM will wish to retain control over the infrastructure and the private sector, especially mining companies will want to ensure steady state access to the railway and train capacity guaranteed once operation starts GoM control over the Right of Way and dispatch control will be key in a public access situation to ensure equity and transparency throughout..

- GoM will desire a separate Railway Inspection capability that can ensure both safe operations and/or reduced derailments.
- Creation of a State Owned Infrastructure Company has been done in many countries commercialized into Operations, namely, Great Britain, Poland, Kazakhstan and elsewhere.
- Railroad enabling legislation will require a though analysis to accommodate future separation of Infrastructure as a State Infrastructure Company Owned Enterprise (SoE).
- Open access is also likely to require the creation of both enabling legalization and regulatory authority with regard to rate structure transparency.
- Interpretation of policy regarding Resolution 32 Mongolian Railway Policy is also likely to require reforms in order to facilitate two objectives
- Implementation of the State Plan on Phased Railway developing selective actual build out of lines that may on a short term basis enable PPP based construction of lines that produce short term revenue over the next five to ten years.

In order to both finance and construct longer term lines that may be less profitable or take longer for revenues to be phased.

13. Benchmark and Advise PPP Form

Working with the Infrastructure Together with the Independent Owners Representative the Consultant shall benchmark a series of Public Private Partnerships that can be adapted to Mongolian Railways.

Specifically, the Consultant shall consider three primary structures for the separate Infrastructure workshops and facilities -- infrastructure, track, communications and signal, structures and maintenance and repair facilities. Rolling Stock and locomotives will be owned and operated by the private sector. Open access to the Right of Way is possible with appropriate track access fees in place.

Build Operate Transfer – over a 30 year concession period, finance and build the railway line and transferred back to the State after the Concession period is completed. In this model, State of Good Repair (SOGR) or a pre-specified set of performance conditions to when the railway is returned to Government.

Private Sector private financing in exchange for open access by investors. Stocks will likely be established in advance and if multiple financiers, mining companies and suppliers contribute to the cost structure in exchange for access to the mainline. The BoT model would likely exclude the construction of spurs from mine to mainline, which would remain in private sector hands and access would be given only to those that co-invest in Construction and Maintenance. Shares would be issued, bonding would be possible and Government may have a minority stake. Control would be based directly on the number of shares that each BoT investors owns as would revenues. Typically, the State guarantees a baseline subsidy that is not required to be paid back and/or intangible assets to contribute and offset land and utility costs. At the conclusion of the concession period, the private operator and investor will have paid off the capital structure on a fully incrementally reinvestment basis and made its profit. Profits are distributed to shareholders on an ongoing basis.

The BoT is transferred to the State which owns the railroad into perpetuity and may at that time determine whether it wishes to contract out infrastructure operation and maintenance, renew the existing concession to the same operator, or bid private sector operations again through competitive tender.

Build Transfer Operate (BTO)– this model is currently favored within GoM in order to retain control of ownership and operations. Benchmarking shall be conducted by the Consultant and discussions held on an ongoing basis together with the Owners Representative who will facilitate and mediation between Government and the private sector.

The BTO form means that the railway is transferred to GoM once the line is fully constructed and GoM would retain ownership and control. GoM may not put in the actual 51 percent investment directly, though in some early stage capital (5-10% of the total). Perhaps these funds can be used to attract further investment like multilateral finance so that GoM share can reach somewhere between 30 to 40 percent with the remaining capital coming from the Private sector. GoM will want majority ownership and control sooner in this model – as soon as the railway is fully constructed and the private sector will have taken out its profits before the legal transfer over a 5-10 year period of construction.

Critical to assess this model is the degree and level of control – both ownership and operating – to achieve 51 ownership between direct and indirect asset contribution. BTO will require substantial Government resources, and possibly collateralized debt and bonding. GoM has a good bond rating and will be able to float bonds at a cheaper price than the Private sector and will have to collateralize that debt as a pegged long term commodity output price. Indexes to that market commodity price will have to be likely so no party fails causing possible default later. Examples of successful BTO examples documented as well as examples of railway BTO's that have failed and why. This set of Case studies and recommendations will form the basis in the next task for the Model Concession Agreements to be drafted and negotiated once PPP teams are selected.

Full State Ownership of Infrastructure – the State Property Committee within GoM has advocated for this form of design, construction and ownership. In this case the State Owned Enterprise (SoE)is completely financed and owned (100%) by the State and built by Contractors as any Construction contract would be advertised, bid and built. Through a combination of GoM investment, bond sales, and collateralized debt for loans, this model is easiest to begin actual construction and hardest to finance. The State must to raise this level of financial capacity internally. It is unlikely under this scenario that private sector capital could or would be protected because the private sector would want a significant degree of ownership and control. There are a number of examples of 100% SoE infrastructure finance and construction. Conditions are ripe generally in wealthy countries whose budget can afford such initiatives and need not engage in PPP.

14. Prepare Draft Railway Concession Agreement

Drafting of a Model Concession (BoT) or BTO agreement will be conducted by the Consultant in concert with Owner's representative facilitation on big the GoM and private investor side. The primary basis for this agreement, owns the form of PPP is determined, is to ensure transparency and independence by the Consultant. The Owner's Representative shall be an advocate for MRA and later the Infrastructure Holding Company (IHC).

A Mongolian attorney with specific and intimate knowledge in Mongolia's current enabling legislation as well as institutional and public reforms necessary will be required for this Task. The local legal expert will work closely with his counterpart the International Law Legal Expert to develop a PPP appropriate for Mongolia.

The agreement will be presented at the Ministry and Cabinet level to ensure consistency with agreed upon existing protocol , laws either ongoing or recommended reforms to ensure PPP participation is a win-win for both public and private sectors.

In addition to laws and structure, the draft concession agreement will, consider for either the BoT or BTO model:

- Full identification of the Parties Participating
- Guarantees the private sector will complete the project by bonding as appropriate
- Team and experience of all parties involved, their principals, their past 3 year complete financial audited by a reputable firm that follows established International Accounting Rules.
- Form of incorporation of all interested parties
- Experience in similar PPP ventures by the Firm(s) over the past ten years including audited Financial Statements and cash reserves in accordance with International Accounting Rules and Standards
- Bank rating for each Party
- Form and amount of collateral available
- Conditional enabling structural reforms needed in Government to form a separated SoE Infrastructure Holding Company
- Asset value disclosure and liquidity
- Global experience presented separately from local Mongolian experience
- Statements on availability and commitment by Principal Parties over the Concession or BTO period for which the Contracts will be executed.
- Contract duration
- Clauses regarding subsidy level and payback (if any)

- Performance guarantee as part of conditions of contract.
- Definition of SOGR
- Construction Standards
- Maintenance Performance Requirements over the life of the Contract – return railway back to Government at the end of the Concession period in a State of Good repair pr pay penalties equivalent to the cost of achieving SOGR as determined by Contract Thresholds of Design Standards for safely operating a Railway (geometry and components) to FRA Class IV requirement. SOGR shall be base on a set of objective criteria set forth in Contract.
- Penalties in the event maintenance is not conducted on a regular pre-specified preventive basis as set forward by a schedule for track geometry, track component replacement based on useful life and deterioration over time.
- Railway infrastructure renewal and replacement shall be performed on a regular basis on a pre-established schedule based on design engineering, deterioration and weather conditions in the field.
- GoM shall have access to all maintenance and repair records for infrastructure and be supplied weekly and monthly inspection records. GoM shall be able to audit quarterly the accounting and records system showing where, when and how infrastructure sections, geometry and components were repaired.
- GoM shall conduct quarterly financial audits and Operator shall keep one set of books transparently in accordance with Mongolian Laws and International Standards.
- GoM or the Contractor Operator shall have access to a state of the art Track Geometry car to maintain and ensure good track geometry (alignment, gauge, cross level, surface, twist).
- GoM or Contractor shall use an optically based rail wear measurement system to measure rail, apply condemnation limits based on immediate replacement, programmed replacement or monitoring.
- Clauses to ensure that in the event condition specified at the end of the contract (BoT only) penalties and cost repayment for third party Contractor rehabilitation required.
- Annual and quarterly performance statistics for compliance with Performance requirements including Operations and Maintenance on an ongoing basis. submittals to GoM of performance
- Clause to ensure outside Inspectors from MRA will conduct twice weekly, monthly and quarterly inspections to gain access to the Property and inspect conditions in the field to ensure safety and ongoing reliability without derailment or delays.

15. Harmonize Tariffs and Phasing: Mine and Coal Concessions

A plan be prepared by the Consultant to identify mine output for each major licensed existing and potential Mine Operator or Licensee to collect mine output with one of more site on a shared branch line, determine over a ten year period what level of production and, over a 30 year forecast, determine MGT for each mine operator to mode output from site to branch line to mainline line haul to Port or market.

Railway infrastructure supply (track, sidings, mainline capacity, efficient crossing transfers, and wagon pickup time) by China Railways (CR) and the entire move to destination shall be identified including total cycle time.

A workshop shall be held between mine operators, investors, and railway officials with CR participation. Representatives of each of three future China Port Operators [participating. In addition, China's National Development Plan Ministry shall be invited to the workshop to lay out the Consultant plan, staging and required investment on both sides of the border in order to achieve desired capacity over a five and ten year forecast.

Minutes of this Workshop and Planning Session shall be recorded by the Consultant, and before the Workshop is over the on Day 2, the Consultant shall prepare a proposed (draft) investment strategy for each major participant to agree upon. Actual investments and allocation of cost structure as well as tariff sharing shall not be part of this Task. Rather a roadmap of key steps to achieve desired heavy haul outputs, line haul capacity and Port/destination goals shall be executed by the Parties with facilitation by the Consultant.

In the event the Parties are not able to reach a broad consensus, meetings shall continue on a weekly basis by telephone throughout this Feasibility Study.

The Operating Plan shall be presented and major elements discussed over this two day long Workshop. Such elements as:

- Locomotives and Wagons to be utilized
- Power sharing arrangements for locomotives
- Train driver cross training possibilities to achieve run through objectives
- Border transfer trans-shipment places and time to load trains and re-load if two gauges are used.
- Commitment to pick up wagons on China side
- Foreign wagon servicing and repair
- Planned Port Capacity and loading/unloading time
- Rate sharing for trans-shipments and originating freight
- Back haul line out commitments
- Dispatching priority
- Parts inventory/commitment and maintaining a payback and reimbursement system for originating cars from Mongolia on CR.

16. Develop Rate Structure

Many railways worldwide have developed a rate structure that shares both full incremental life cycle costs (capital and operating and maintenance plus profit) when the railways concession and mine concession are separate. Because the mining concessions precede new railway concessions, a rate structure must be derived based on a full incremental life cycle and deterioration based costing model so that the portion of revenue that is not re-invested in the railway is equitably split between the two concessions.

When multiple operators are involved without a single monopoly carrier on that line, the Consultant shall use the results of the Benchmarking Task, coupled with a user fee model to allocate cost determine fair return on investment and allocate revenues in advance of actual construction. EU440/441 Is one model and there are others in the world that have worked well.

Key to the rate structure cost allocation is to ensure that sufficient capital exists to reinvest in a very capital intensive business to achieve and maintain State of Good Repair over the life of the concession or under the Build Operate Transfer form of partnership.

The EXCEL based Spreadsheet model form shall be assembled, modified and adjusted for the Mongolian situation on the Khuut- Nomrog line and compared against other rate structures in place in Mongolia. Revenue and profitability shall be devised where cost, revenue and profits are based on a fully captured total cost and Return on Investment model that ensures a fair return on investment for investors. This model shall be developed, calibrated and tested, based in the Operating Plan set of Infrastructure assets required over a 30 year operating period. Criteria are established in the Operating and Maintenance Criteria section. Spreadsheet Outputs for each input (from Operating Plan) and output (cost and Internal return on Investment) shall be documented and annotated so each Spreadsheet Tab correlates with a documentation section on the Technical Memorandum to be prepared for this Task.

Should the BTO model be determined, rolling stock, locomotives and track and signal maintenance equipment shall be factored into the cost and RoI model with discounted cash flows and return on investment (RoI) over a thirty year period.

International cost per delivered ton kilometer shall be benchmarked to fit Mongolia requirements. Transport cost per ton kilometer ranges depending upon local conditions and efficiency of operations per ton-kilometer and data supporting the actual numbers to be used and applied herein shall be supported and documented therein. Transport cost per ton-km will drop as a variable or marginal cost item driven by traffic levels.

Documentation of the proposed rate structure, tied to its basis as variable and fixed cost components shall be derived by the Consultant. The model shall become the universal standard for rate structure cost basis coupling Return on Investment for future mine and rail concession structures throughout Mongolia. In addition, negotiation may be applied in the future for negotiations with Russian Railways and China Railways so a separate Technical Memorandum documenting inputs, outputs, and methodology and model structure shall be prepared and be made available in parallel with the EXCEL based spreadsheet output to calculate each scenario by commodity and “what if” scenario.

Coal transport elsewhere shall be part of the benchmarking exercise in Task 12.

17. Simulate Train Performance: 6 Scenarios

An Operating Plan will developed by the consultant whose objective will be to translate the vision of building traffic volume from mine to market while making best of infrastructure, locomotives and wagons over a 30 year period. This planning window is independent of the form of PPP. The Consultant shall be guided by the operating criteria established by the International Heavy Haul Association as follows:

- Regularly operates or is contemplating the operation of unit or combined trains of at least 5,000 [metric tons];
- Hauls or is contemplating the hauling of revenue freight of at least 20 million gross [metric tons] per year over a given line haul segment comprising at least 150 km in length;
- Regularly operates or is contemplating the operation of equipment with axle loadings of 25 [metric tons] or more.

Heavy Haul criteria will be met at the initial construction stage though feeder lines may take some time. Single track capacity with adequate siding length to accommodate 120 wagons and a GPS radio based signaling system can carry 75 MGT per year or more with a siding length of 2000 m.

Introducing true heavy haul railroading on the Western vertical corridor will stimulate other heavy haul Mongolia rail lines to follow suite. GoM has made a decision to incrementally upgrade existing lines while building new ones to heavy haul standards.

The Consultant shall apply Heavy haul design and steady state operating principals to the KN line by applying the following guidelines:

Railroad Rout length: 300 km

Network flows will be determined based on outputs from demand modeling task and route assignment tasks:

Train Performance Simulation Base Case

- Passing Siding Length: 2000 meters
- No track circuits on the new KN Mainline and all new construction
- Radio based GPS train control – eliminates track circuit based capacity constraint
- A.C. Traction 4400 HP with distributed power; or,
- Electric Traction Equivalent
- Coupler Type: AAR Knuckle Type (F Type bottom shelf)
- Maximum Operating Speed 100 km/h
- Average Train Speed in 50-80 km/h line speed
- 10,000 metric tons per train
- 120 Wagons Per Train Maximum
- 3% Maximum Ruling Grade for 95% Line Haul
- 3 degrees Maximum Lateral Curvature; 5% curves ≤ 4 degrees
- Turnout size on mainline number 20.

Given some trains may originate on the existing mainline in Mongolia – UTBZ where sidings are 1200 meters, KN is only 300 km of a long haul trip to China ports and south on China Railways (CR), train lengths may have to be cut across the border to allow northbound train meets. The Operating Plan will consider whether it will be necessary to cut trains at the border to enable run through passage to destination without placing northbound empties or backhaul at a lower dispatching priority. These details will be worked through when the work starts. Building to a higher standard offers future upgrading flexibility on connecting lines, keeping the current standard at the design stage reduces the potential for increasing productivity for network flows.

Further, locomotives must be compatible with train control systems on the rest of Mongolian Railways so GPS radio based signaling would work only on KN for now. Dual can signaling is standard on a number of railways worldwide and should be considered at this planning stage, rather than more conventional Computer Based Train control (CTC). ETCS (European train control is not intended for heavy haul freight, is

expensive, and designed for high speed passenger trains and therefore should not be considered for any lines in Mongolia.

Tonnage per line segment – including KN and lines defined in network shall be applied to three high, medium and low traffic scenarios for each year from Year 0 to Year30 .The Consultant shall base the output sand schedule of increasing tonnage from mine to phase traffic increases based on current and future demand, The Consultant shall devise a base set of tonnage assignments without significant feeder/transit traffic from the north and west.

Once traffic flows are established, the Consultant will simulate actual train operations between Khuut and Nomrog using Track Charts for the LEDPA alignment selected in Phase I.

Using the train performance calculations, the Consultant will lay out ideal passing siding locations unconstrained by track circuits based on where train meets require. Passing siding placement will not be uniform but based on where train meets are calculated.

Outputs of this deliverable shall include a schedule over the 30 year forecast period of cycle times, turns and required train sets including preventative maintenance slots of track maintenance work windows.

Fleet sizing will be based upon six (6) possible options for each tonnage threshold per year. The consultant shall prepare an additional matrix for electric traction power rather than diesel as shown below:

Gauge, Axle Load, Productivity, EAUC/IRR/RoI

Gauge (MM)/Axle Load (MT)	Diesel Locos Required	Wagons Required	MT/ Train	Cycle s/year	Train sets + spares	MoW Crews+ Equip	Shop Crews+ Equip	EAUC/IRR/ROI Costs
1435/25								
1435/32.5								
1435/35								
1520/25								
1520/32.5								
1520/35								

Note: Prepare based on incrementally increasing traffic over a 30 year projection period.

When the train simulation is complete, the outputs shown in the table above will be used to run the CAPEX based Internal Return on Investment analysis described in the next task. This then will form the basis for economic evaluation of gauge and axle load questions to build the new railroad.

The Operating Plan shall assume that a single track railroad be built. The Consultant shall recommend which capacity improvements shall be added when traffic exceeds the capacity of a single track mainline. Once demand grows, capacity (track) can be added:

- Axle load increases
- Double tracking
- Signal improvements over and above the baseline
- Trains lengths exceeding 120 wagons per train
- Bridge rehabilitation

Finally, the Operating Plan and Train Performance Calculations (TPC) shall identify which additional line segments in the Eastern Mongolian network shall be built out phased to maximize throughput China Railways and internally within the country, given the advent of several planned industrial parks and the Matad oil refinery plan

18. Full Cost Recovery Model for Heavy Haul Investment and Pricing Decisions

The Consultant shall develop an incremental/life cycle costing model which considers:

- Capital cost including half life locomotive rehabilitation cycle

- Operating and maintenance cost based on component useful life of track and signal components given each traffic threshold
- Facilities capital and operating cost
- Maintaining Infrastructure to pre-defined levels with programmed maintenance
- Cost of establishing independent regulation and safety critical inspection regularly for al railway trades (track, loco, signal, wagon, structure, communications, etc)
- Depreciation, land and interest costs
- Soft costs – transactional
- Staffing/labor/crew and maintainer costs
- Others
- Revenue – tariff cost per ton kilometer
- Commodity price per ton from mine
- Track access fees

will develop a model, using outputs of the KN Train Simulation as inputs this Task. As MRA embraces Mongolian Third Neighbor Policy while at the same time lowering unit cost per km of commodity transport, applying Return on Investment analytics to questions of gauge and axle load will support policy decision with analytically derived facts.

Using Train Performance outputs like fleet size, type of equipment used, labor and cycle times, it will be possible to establish costs, revenues and return on investment.

The Consultant will be responsible for documenting of this model and delivering it in EXCEL format to PIU and Railway officials for future "what if" scenarios as needed.

Upon completion of this task, the Consultant shall recommend one of six gauge and axle load combinations to deliver:

- Internal Rate of Return/Return on Investment Analysis/Lowest annualized equivalent operating cost for each traffic level
- Highest productivity heavy haul railroading by planning for the highest number of cycles with the least amount of equipment and labor from origin to destination and return.
- Lowest unit cost per ton-kilometer for all commodity groups
- Lowest cost per ton kilometer for coal alone
- Highest locomotive and wagon utilization
- Capitalized maintenance equipment shall represent part of the cost structure

Because the current GoM plan is to implement a separated State Infrastructure (SIC) Holding Company when the full feasibility study starts (see project schedule), only Infrastructure costs will be borne by the state, but overall cost and revenue structure shall be projected by year though the State will go to an open access model where the mainline may have any number of operators who themselves supply their own wagons and locomotives. Costs shall be clearly organized by Infrastructure, Rolling Stock, Yards, Facilities and Workshops so and designated as State Infrastructure Company Cost elements or private sector cost components. Allocation of tariffs and tariff structure shall be addressed by the Consultant in a separate task as described.

- Criteria for these recommendations will be based on achieving the highest return on investment gauge and axle load standard at the lowest life cycle, full replacement cost.

The Consultant shall deliver three Task outputs:

- Fully documented cost and RoI model on EXCLE spreadsheet form that can be used later to apply analytical cost and profitability results for the Infrastructure Holding Company as policies and later analysis is required after the feasibility study is complete., In effect, this EXCEL spreadsheet model will become a tool for future applications to be applied by GoM analysts;,

- Recommendations, documented by Train Performance Calculations and Costing Model output for GoM to select gauge and axle load for the KN line segment based on the matrix of options presented in the Table above. If standard gauge is adopted, the rational for that choice and how it will complement rather than detract from Mongolian Railway Policy and National Military policy shall be addressed explicitly.
- "What if" analysis like: If the Khuut-Nomrog line is built to a higher than 25 MT axle load standard – demonstrate savings in cost per ton-km and increases in turns. Resulting in fewer train sets, less spares and decreased fuel, operating and crew costs.
- Training to GoM designated staff in how to run "what if" scenarios in the future.

19. Devise Full Incremental Cost , Revenue and Cost Model

IV.GoM Approval for Preferred Gauge/Axle Load

20. Complete 30% Design

Once GoM approves the preferred alignment, design and engineering of the actual preferred alignment can start from 10 percent completed in the pre-feasibility stage to 30 percent by the end of this Study.

Train simulations will be conducted in the Tasks that follows based on preliminary track geometry laid out at this stage including kilometer post limits for:

- Tangent to Spiral (TS)
- Spiral to Curve (SC)
- Curve to Spiral (CS)
- Spiral to Tangent (ST)
- Switch locations (limits)
- Changes in design vertical gradient
- Tunnel limits
- Aerial structure limits
- At grade or embankment limits
- Vertical gradient
- Track centerline
- Trestles over aquifer district
- Walls (embankment and tunnel)

The Consultant shall begin the feasibility study work immediately following GoM`s authorization to proceed from 10 percent design to lay the basis for detailed design-bid at 30 percent design. Completion of 30 percent design means a performance based design package can be assembled as [art of a larger package for contractors to bid, estimate and ultimately, complete the design process after the work is transferred from Consultant to PPP construction firm.

Included is the laying out of workshop locations and concept plan for locomotive and shop floor servicing including heavy repair and light servicing of roiling stock. However, 30 to 100 design will be done by the successful PPP bidder guided by the State Infrastructure Holding Company (SIC) actual facilities designs will the responsibility of the State Holding Company.

21. Eastern Mongolia Master Rail Plan

The success of a railway network is determined by total tonnage transported over the network as a system rather than any line segment. GoM officials plan to develop the Northern Section of this mainline in concert with mine and petroleum producers. A primary national goal is to develop the oil field near Matad in Eastern Mongolia being extracted by Petro China Company. This crude oil would be refined locally to produce gasoline and diesel fuel for domestic consumption. In addition, mining output (primarily coke and steam/brown coal mines from Energy Resources and TT can flow across the KN line segment, to the border where a gauge change transfer station will have to be constructed. At that point, CR will pick up cargo to three Chinese ports or south along the main CR heavy rail corridor to southeast China, if the coal is meant

for power plants and steel refineries to the south, CR is already capacity constrained on this route to pick up its own freight, not Mongolian originating freight that its own build commodities are transshipped to barge, flow south and are re-loaded to rail where they then reach the final destination.

A short though intensive Task shall be conducted by the Consultant which will represent the culmination of all other tasks to identify line segment construction start and finish, recommend segments that have not yet been studied at the feasibility study stage, and identify possible PPP participants for these line segments that are unfunded.

The scope of these Tasks shall include all of the Rail National Plan Phase I and II lines from Russia to China, bounded by UBTZ and extending southeast to Sekhe including:

1. UBTZ from the Russian-Mongolian border to Zamyn-Uud to Erenhot – following the China Team trip, the Consultant shall integrate findings at the border to determine likelihood and probability of efficient transshipment top move freight south and east. The Consultant shall identify how travel times could be improved at this gauge change and transfer location.
2. Tavan Tolgoi to Sainshand - – two construction contractors are working on building these two segments. The Consultant shall prepare the construction status and staging for each of these line segments to the border at Gants Mod as well as how to connect to China given the missing and misaligned terminus of lines on the Mongolian side and the Russian side as described below. Without this missing link and a gauge change/transfer station south of or north of the Mongolia, China border, and commodities will have to be trucked, making the new construction useless in the short run. This must be avoided.
3. Tavan Tolgoi – Gashuun Sukhait – the line segment now under construction by energy Resources. There is a missing link to complete the line segment to the border with China. The Consultant will recommend a strategy to complete this link.
4. Nariin Sukhait to Sekhe – Consultant shall identify status of railway line segment build-out. We understand the mine operator – Hunnu -- had plans to build out this corridor, lost faith in GoM and decided instead to build a road to connect at the border. If a sound rail plan to get commodity to market, the mining operator would be interested in participating at a later date with GoM support and financial participation.
5. Sainshand to Khuut – the Consultant shall speak with mine operators and other possible shippers as well as the State Property Committee and MRA to determine current status and plans for construction.
6. Choibalsan – Ereentsav – Borzya at the Russian Border – is also an option to move freight eastbound to China Ports. If this segment were financed, designed and built, it could provide an alternative corridor to complement Khuut-Nomrog. This line segment exists today.
7. Khuut to Choibalsan – is a missing link that need to be connected in order to one day facilitate possible Eastern Mongolia line flows north and east to Vladivostok.
8. Build a connection between ER's southern terminus and CR's northern terminus at Gants Mod to complete the journey to China. At present, CR is constructing a line some distance to the west of the ER line and the Right of Way is not aligned. The Consultant shall come up with a strategy to connect the path, build the missing line segment and change gauge either on the Mongolian or Chinese side to facilitate transshipment southeast to China. Design and a plan shall be discussed and codified so this connection enables route flows.. If this link is built along with the three line segments now under construction, it means originating traffic is likely to flow directly south to Erenhot at Sainshand, Gants Mod to connect with CR and possibly later Sekhe for western to eastbound flows on CR. This scenario would bypass both Eastern Mongolia gateways to China at Bichigt and Nomrog.
9. Given current capacity constraints on UBTZ, we understand an injection of USD250 million is targeted by the joint venture for loco, rolling stock and capacity improvement. Some locomotives have already been received that were built in the Ukraine. The Consultant shall verify the plan versus the reality including track capacity improvement from 25 MGT maximum to 35 MGT total. The Consultant will investigate this plan and document where and when infrastructure improvements will be made. The UBTZ now has four regional dispatch and control centers and centralized traffic control plans should be documented if any.

The Consultants traffic forecasts will be prepared with high, medium and low forecasts and mapped as a function of staged construction plans over the next ten years. An ADB sponsored Transport Master Plan shall also be reviewed for consistency, though this plan shall consider rail only based on independent feasibility study research conducted for this study.

Maps and flows shall be prepared by route and commodity and presented in the Draft Final Report over a ten year period. Constraints, institutional barriers and opportunities shall be ranked by line segment, including the UBTZ, as well as high level estimates of capital costs to alleviate these constraints.

22. Draft Feasibility Study

A draft feasibility study report shall be prepared one month from the date of project completion as well as a presentation with study highlights, key recommendations, basis for a concession agreement, institutional reforms and progress on the GoM side. The Consultant shall also identify in recommendations and rationale for selecting the type of PPP that will produce a win-win for both the private and public sector as well a roadmap to complete the negotiations for a successful PPP considering the GoM interest in Build-Own-Transfer.

In addition, the consultant shall indicate what forms of intangible and tangible assets the GoM could put into the deal and what the valuation would be when considering the need to raise leveraged financing from a variety of investment sources including Mongolian capital, multi-lateral bank capital, private finance and the ways that land will be guaranteed, e.g. Sovereign debt, collateralization and bonding among others. While BTO is currently favored by GoM in order to retain a 51% share of Infrastructure with possible multiple open access freight operators, Build-Own-Transfer is also under consideration and the pros and cons of each PPP model best tailored to the Mongolian situation shall be considered.

23. Final Feasibility Study

The Consultant shall prepare a Final Feasibility Study Report two weeks after inputs are received from the National Holding Company and other participating Stakeholders as designated by the Chairman of the Working Group. As part of this input, the comments provided at the Workshop Representation to be held at the Draft Final Report Stage shall be incorporated and integrated therein.

The Workshop presentation – prepared in Power Point - shall be updated to reflect these comments for presentation to interested PPP participants. The Workshop shall contain a set of High level recommendations and model structure for PPP agreements in also integrate feedback and current status of the work performed and ongoing to select participants and invite negotiations so that a signed contract can be executed within 45 days of Final Report completion.

This feasibility study will produce bankable results and transparency with all recommendations, valuations and future cash flows and revenues fully documented and supportable based on evidence from PPP railway line construction projects worldwide.

Additional Requirements

- Hire and procure an Independent Railways Consultant to serve as Owner's Representative to the State Infrastructure Holding Company as shown on the overall Program Schedule and CPM chart.

Staff Plan

Role	Level of Effort
Team Leader*	18 months
International Attorney*	6 months
Local Consultant*	18 months
Local Attorney*	12 months
Senior Financial/Economics Analyst*	15 months
Senior Railway Design Engineer*	18 months
Transport Planning and Demand Expert	6 months
Senior Investment Banker/Credit Analyst*	6 months
Senior Environmental and Social Planner/Analyst	3 months
CAD Operator	9 months
Cost Estimator	3 months
Geotechnical engineer	3 months
Structural Engineer	3 months
Railway Maintenance of Way Engineer/Planning Expert*	6 months
Locomotive and Wagon Expert*	2 months
Senior Signal Engineer *	4 months

Note: those positions designated with a asterix cannot be substituted once the contract is awarded and must pledge they will be available to the project for its duration as needed.

Staff Role and Responsibility

Team Leader – shall have at least 15 years in railway finance, operations planning, economics, engineering, planning, and/or design. S/he shall have a Master's Degree or higher in Transportation Planning and Demand Analysis, Environmental or Engineering or Systems Analysts Supply chain experience is required from mine to port or terminal. S/he must have ten years of progressive experience working with railway privatization, commercialization, PPP and/or separation of Infrastructure from railway operations. S/he should have demonstrated experience working with multilateral banks and the application of World Bank guidelines. Working with the Investment sector to conduct due diligence for railway projects is a must. S/he must also be familiar with implementing heavy haul projects worldwide.

International Attorney – should have a minimum of 10 years worldwide creating Concession and agreements in freight railway public private partnerships (PPP) .The attorney shall be recognized by a bar association in the West. Specifically, the legal expert should have at five years of experience with high density heavy haul PPP ventures from mine to market/port. The legal expert should also have broad range of experience drafting and customizing national transport laws from state owned companies with railway infrastructure investment and joint stock company creation applying PPP objectives. Tariff structure and railway open access experience is a plus. Drafting passenger Public Service Obligation by the State (PSO) is a plus.

Local Attorney – shall have 10 years experience broad ranging experience with Mongolian Railway Policy, Railway Laws in Mongolia, tariff and pricing requirements. The local lawyer shall have at least 20 years experience from when land in Mongolia was offered to the people and became public. Land ownership and eminent domain experience as well as working with Mongolian Parliament are a plus. Most important, the local lawyer shall be familiar with the current laws and institutional transport and mining policy.

Local Consultant – will be fluent in Mongolian and English, able to translate documents back and forth at a level that can be presented formally in English. The Local Consultant shall also have access to native Chinese and Russian speakers who can interpret meetings and translate written documents for the Team. Local consultant shall have a Master's Degree in transport economics, engineering and/pr planning and shall be available at 100 percent level of effort for the duration of this study. The local consultant shall have at least experience in multi-modal transport planning, engineering finance and/or operations.

Senior Finance/Economics Analyst – should have strong PPP experience privatizing railway infrastructure and strong capability to conceive of and put together both the equity and debt portion of a PPP deal involving both public and private sectors. Experience in the former CIS countries privatizing railway infrastructure is a plus along with a deep understanding of the economics and financial structure behind heavy haul coal railways. Port and mine PPP experience a plus. Must have 10 years experience in railway return on investment analysis and structuring 5 year business plans as well as CAPEX/Fully incremental cost recovery modeling in the railway sector worldwide.

Senior Railway Design Engineer – shall have at least ten years experience with AREMA based railway engineering experience coupled with a deep understanding of Russian railway engineering of infrastructure, specifically both Russian and Chinese railway engineering and design experience. The ideal candidate can also speak Russian and Chinese as a plus and has designed freight based new railway lines using CAD based programs. Candidate must be able to lead a ten years of railway engineering experience in track, signal and train control, facilities and structures areas.

Transport Planning and Demand Expert – shall have ten years experience putting together macro-economic multi modal forecasts and assignments of route flows using gravity based demand models including price, service and reliability based flow models. Experience in bulk commodity delivered price versus cost of transport will be specifically utilized and required by the candidate. CV should indicate where, when and how candidate delivered commodity based flow models of railway transport in the past and to what client(s) in the past 5 years.

Senior Investment Banker/Credit Analyst – with at least 10 years experience putting together local, state, multilateral and private sector capital is required. Candidate should have PPP investment experience working directly with the banking community and or multilateral investment side to successfully design and execute transportation based PPP deals. Candidate must have strong experience in both BTO and BoT deals, with all other forms of PPP initiatives a plus. Candidate should provide references, contacts, phone numbers and email of at least three PPP deals they have designed and executed in the transport sector globally in the past 10 years.

Senior Environmental and Social Planner/Analyst – should have ten years experience in the application of environmental and social reviews and environmental impacts assessment following World Bank guidelines and procedures. A plus is to have worked with populations that are nomadic and flora and fauna that is endangered. Strong writing and presentation skills are a plus. Candidate may be asked to present railway alignment plans to get feedback from local constituents.

CAD Operator – must have 3-5 years experience working on railway design and engineering alternatives alignments projects. The candidate must have access to and experienced in AREMA based rail alignments, track geometry standards for heavy haul railways, switch and special work design, sub grade issues and challenges, and dynamic clearance envelopes. A plus would be to have basic knowledge of the types of signaling system and track alignments and standards used on Russian and Chinese railways.

Cost Estimator – should have experience using the estimating standards and books applied to large railway construction projects in the former CIS and in Mongolia specifically with 10 years experience in railway and road projects. Experience with infrastructure, rolling stock, facilities highly desirable.

Geotechnical Engineer – 5-10 years experience in Mongolia understanding local rock formations and geology highly desirable. Understanding and experience working with railway track construction with structures on permafrost conditions in unstable soils and substrate highly desirable. A Bachelor's or Master's degree a related geotechnical engineering field is required.

Structural Engineer – who has at least 10 years experience designing and retrofitting railway bridge structures is key. Experience designing facilities in cold/permafrost conditions also required. Experience in Mongolia or similar permafrost environments desirable. The structural engineer must have at least ten years experience in railway structural engineering from a degreed international school of engineering. This degree can be augmented or replaced by similar training and experience in a railway technical school.

Railway Maintenance of Way Engineer/Planning Expert – shall have at least 10 years experience applying railway track component deterioration and costing analytics in the freight heavy haul railway operating environment. A Master`s Degree in Civil, Mechanical, Systems or Planning is required. Experience can be augmented or replaced by hands on railway working as a railway consultant or railway staff. MoW engineer/planner must have an intimate understanding of AREMA based track standard for application in heavy haul railroading, track condition assessment, track geometry degradation and track component failure and rehabilitation required. Deep understanding of railway track production methods and machines as well as automated track inspection methods required in a heavy haul operating environment.

Locomotive and Wagon Expert – at least 15 years experience in locomotive mechanical, parts and rehabilitation experience on the shop floor and understanding of state of the art AC traction and electric locomotives required. Understanding of how to lay out a shop floor and plan for maximum scheduled and programmed rehabilitation and servicing in a high productivity, heavy haul railway operating environment will be invaluable to this assignment.

Senior Signal Engineer – shall be familiar with and understand the design of each of the major signal and train control systems available and utilized in heavy haul railways today – including but not limited to radio control trains using GPS, Positive Train Control (PTC), Computerized Train Control (CTC) and others. Understanding of European Train Control a plus. Signal and Train Control expert shall have 15 years of experience working with heavy hauls freight railways and a Master's Degree in Electrical or Mechanical Engineering with an emphasis in solid state circuit design. Experience at a railway technical institute can be used to supplement or replace the degree requirement.

REPORTING REQUIREMENTS

The reporting requirements and deliverables are outlined below:

Deliverables and Payment Schedule			
	Description of Deliverables	Period of Performance C = Commencement	Payment *
A	Pre-Feasibility Study	C+6 months	45%
1	Inception Report, including a work plan and schedule	C + 1 month	10%
2	Interim Report	C + 3 months	10%
3	Draft Pre-Feasibility study	C + 5 months	10%
4	Final Pre-Feasibility study with 10% of design	C + 6 months	15%
B	Feasibility Study	C+18 months	55%
1	Draft report of the Feasibility Study	C+15 months	35%
2	Final report of Feasibility Study with 30% of Design	C+18 months	20%

* - % of contract value

The Consultant shall submit the report and deliverables to MRT for formal approval and acceptance. MRT will accept each deliverable and report only after reviewing it and confirming that it is of adequate quality and/or quantity to implement the task to which it relates. Deliverables and reports will be considered final only after being accepted by the Steering Committee that will be set up for the Project.

The Consultant should submit three hard copies of all reports, and an electronic copy in appropriate digital format on CDs or DVDs. The Consultant shall use Microsoft Office 2007 or newer version to elaborate the deliverables and data (Word, Excel, PowerPoint, MS-Project, etc.) and AutoCAD 2007 or a later version for drawings where applicable. Presentations should be prepared with PowerPoint. All files, materials, and documents generated for and during this contract shall become the property of MRT.

The Consultant shall maintain orderly working files and a comprehensive, computerized log for correspondence, minutes of meetings and conferences, submittal data, submittal registers, inspection and progress reports, invoices, contract documents including amendments, and all other correspondence. These documents will be maintained in a system which is comparable with software used by MRT. During the course of the outreach program implementation, the Consultant shall maintain all its documents in good order and in a reference library format in office space in Ulaanbaatar for use by MRT and the Steering Committee, as needed. From time to time, MRT may ask the Consultant to show documents to interested parties. Documents of a sensitive nature should be stored separately in the reference library. Prior to completion of the period of contract, the Consultant shall pack and deliver to MRT the entire contents of the document library in good order and properly indexed and marked. In addition, the Consultant shall provide MRT all electronic files of any and all project documents stored in a media acceptable to MINIS including a comprehensive, well-organized electronic index of all those documents. The copyright and ownership of all Project materials will remain with MRT.

Choibalsan – Nomrog road section

Please see above project proposal and draft Terms of Reference.

GTI Project proposal No 2:

Project title:	Feasibility Study and Preliminary design for Construction of new Road section between Choibalsan and Nomrog (380 km)
Participating countries	Mongolia, China, Republic of China and Japan
Timeframe:	2013-2014
Estimated Budget:	USD 300, 000
Proposed funding source:	GTI member countries, UNDP

Background & Rationale:

Main constraints and problems limiting the use of the GTI transport corridors are inadequate development of the infrastructure, especially missing paved road sections along the Corridors on the Mongolian territory. 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 border traffic between China and Mongolia would be increased enormously along the Rail Corridor.

Tourism is growing in this area of the world and particularly the Tumen River has great attractions of natural beauty and heritage.

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.

Objective (s):

The objective of the construction of new Road section between Choibalsan and Nomrog (380 km) is to facilitate the transportation services in the Greater Tumen River region through the promotion and construction of missing links. The objective of the GTI Transport corridors study is to foster the development of a reliable, cost-effective and efficient integrated transport network in the GTI through planning and facilitating the activation and development of international transport corridors in the region.

Expected Outputs and Activities:

Expected project outputs are reports:

- Pre-Feasibility Study:
    - Inception report
    - Interim report
    - Final report with 10% of design.
- Draft report Feasibility study:
- Final report of Feasibility study with 30% of design.

It is expected that the project is carried out by a consulting firm who should do activities specified in the Draft Terms of References.

Please see following draft Terms of Reference for the project.

DRAFT TERMS OF REFERENCE

FOR CONSULTING SERVICES OF FEASIBILITY STUDY OF ROAD SECTION BETWEEN CHOIBALSAN AND NOMROG

1. Introduction

The Ministry of Roads and Transportation (MRT), Mongolia is implementing a number of highway projects which involve feasibility study, design, and construction of the sections of highways. For this purpose, consulting companies are selected on the basis of International Competitive Bidding (ICB) basis. The feasibility study and preliminary design of the road section are carried out as per the technical specification.

The main responsibilities of the consultants include preparation of feasibility study and preliminary design. The scope of work consists of feasibility study with preliminary design of construction of the road including bridges, structures and other works incidental to construction of the road in accordance with the technical specifications and road standards prescribed by the Ministry.

2. Objectives

The main objectives of the proposed Project are first to facilitate regional and border trade, and promote tourism in the project area. Then the project should also contribute to poverty reduction and promote economic growth in the Project area. These objectives will be met indirectly through reduction in vehicle operating costs and savings in travel time.

3. Outputs of the project

The proposed Project consists of two main components:

- Construction of a 2 lane paved road between Choibalsan and Nomrog;
- Construction of 2 local bridges.

Alignment:

The total length of the Choibalsan to Nomrog is 380 km. Consultant should choice one from 3 possible alignments. The sparsely populated area has very few interchanges and crossroads. Three alternative alignments will be prepared by the Consultant to map the Corridor between Choibalsan-Nomrog (CHN) for two lane paved road, with enough room to expand to 4 lane if required at a later stage. All alignments should pass through Sumber soum. This Corridor will lay the basis for selection of the Least Environmentally Damaging Preferred Alternative (LEDPA) once Government of Mongolia (GoM) approval is obtained between Pre-feasibility and Feasibility Stage.

The Consultant shall obtain and apply CAD-based topographic maps for the Choibalsan Nomrog section in order to identify topographic features. Typically, the straightest path between two points begins to establish a baseline alignment in order to lay out the alignment for alternatives analysis schematically and conceptually.

The width of the alignment is driven by natural topography and obstacles within the corridor with more or less distance from Right of Way conceptual centreline depending on:

- Natural features – mountains, valleys, streams, rivers, seasonal flood zones, etc.
- Animal migration routes.
- Existing infrastructure constraints - buildings, roads or other fixed facilities
- Towns along the route path – to either connect the proposed rail line, or avoid them to increase building aerial structure over and around existing populations

Once the baseline is mapped, natural, social and environmental features can be overlaid with the baseline topographical alignment considering shortest path versus vertical curvature (mountains, valleys, rivers, etc) and lay out corridor alignments using Micro Station 3D (Bentley) or a similar and compatible product.

Bridges:

River crossing bridges in 2 locations are needed to be newly built: on the small rivers: Degee and Altan gol with 20 meters length each.

4. Scope of work

4.1. Briefly review current macroeconomic state of the country, structure of road vehicle fleet, features of climatic conditions and strategy and policy of road transport development.

4.2. Assess socio economic importance and impacts of the project.

5. Necessity of implementation of the Project and its expected results and benefits

5.1. Define necessity of implementation of the project in conjunction of development policy and real traffic demand;

5.2. Benefits to the national economy and population should be evaluated on calculations and estimations comparing both options of doing and not doing.

6. Engineering study

6.1. Conduct geotechnical and hydrological survey along the alignment and investigate and determine road construction materials availability;

6.2. The Consultant shall collect and analyze all the data necessary for him to make a reliable estimate of the existing and future transportation demand. Further these responses will be used to build the O-D flow network assignments and modal splits accordingly.

The future transportation demand shall be projected for a period of 20 years under three scenarios namely "Low", "Medium" and "High" for the section.

The Consultant shall develop probable modal split scenarios for the traffic taking into account the present and future modal attributes of road and rail transport in the project area.

For each of the market segments sensitivity studies are to be carried out to estimate the elasticity of the demand in regard to GDP and population growths.

7. Environmental impact assessment

International financial organizations' guidelines shall be followed for Environmental Impact Assessment and applied during the course of this Task. Two forms of environmental impact assessment are possible. It will not be known until the corridor is laid out and the inventory of environmental and social resources prepared to determine whether a full environmental impact assessment or simply an environmental review will be prepared. Guidance on this issue will be provided by the GoM, Project Manager once the work is underway and consultant recommendations will be considered. Options are:

- Initial Environmental Examination (IEE)
- Environmental Impact Statement (EIS)

A Project Implementation Agency shall consider both options within the first month after Notice to Proceed (NTP) and exercise a full EIS or IEE to follow over a three month period in parallel with other Tasks at the Pre-feasibility Study stage. The Consultant shall price both options within this Task separately and distinctly.

Next, the Consultant shall prepare an inventory of locations in three dimensions that may present environmental and or social hazards or risks impacting placement of a new railway corridor. The inventory shall contain limits, type and description of these locations as well as an assessment of the importance of these features after discussions with GoM transport, environmental and National Development Initiatives to gain their perspective. Sites of environmental social, physical or religious importance shall be avoided -- if possible – when moving from Long List of possible alignments to three (3) possible alignments. These three alignments will be further reduced to select a single least Environmentally Damaging Preferred Alignment (LEDPA).

Once natural features are established, the Consultant will lay out overlay sheets for each of the following categories to be used as "layers" over the base map:

- Human/nomadic populations
- Wildlife/endangered and protected species native to Mongolia
- Polluted or hazardous material sites

- Aquifer regions
- Archeology – including known ancient populations and dinosaur remains
- Any sites considered hold or protected by the Government of Mongolia Locations with any other environmental impacts to be determined

Consultant should define environmental protection and mitigation measures to be taken both during the construction and operational periods and estimate costs for the purposes.

8. Bill of quantities and cost estimation

Consultant shall determine BOQ for road and bridge constructions. Then consultant shall make cost estimates of the Project. Cost estimate shall include total construction cost, contingency cost and taxes. In undertaking cost estimation consultant shall use applicable rates, norms and standards for road and bridge construction in Mongolia. In total cost estimate environmental mitigation cost and road maintenance cost must be included. Also price increase shall be considered.

9. Economic and financial analysis

The overall economic evaluation of the proposed road project should be based on the traditional indicators, namely the Economic rate of Return (ERR) and the Net Present Value (NPV),

Vehicle operating costs required for the economic analysis shall be estimated using the HDM-4 software. In order to update the required inputs on vehicle operating cost components like cost of fuel8 lubricant, cost of new vehicle and vehicle utilization, etc., the consultant should carry out survey among road users.

10. Risks

Consultant should define potential risks of the Project implementation and after construction periods and determine merits for mitigation.

11. Reporting requirements and deliverables:

The consultant should prepare and submit the following reports and Deliverables to the Ministry:

- Inception report, including work plan and schedule within 30 calendar days after contract signing;
- Draft report including draft Feasibility study with 10% of design within 3 months after signing the contract;
- Final report including Final feasibility study with 30% of design within 6 months after signing the contract.

12. Consultants Qualifications

Qualifications of International and local consultants will be determined by the Project Implementation Agency.

4.3.2. Capacity improvements of existing infrastructure

Upgrading Choibalsan – Ereentsav rail segment

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. 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 the future the wooden sleepers should be replaced with concrete ones. Also it is needed to upgrade this rail line by electrifying and installing a modern signalization system.

5 Recommendations for National Action Plans and GTI strategy

5.1. National Action Plans

It is required to include some projects and measures in the National Action Plans (please see Table 5.1)

Table 5.1: Framework for National Action Plan

Corridor 1a and 1b, Mongolia				
Measures, Programs or Projects	Estimated Cost (USD)	Implementing Agency	Time Frame	Rationale
1.Rail line segment between Choibalsan and Nomrog (300 km): - Feasibility study - Design and construction supervision -Construction	1,2 million 2 million 900 million	Railway Department, Ministry of Roads and Transport, Mongolia	Jan.2013- Jul. 2014 Aug.2014-Apr.2016 2014-2016	Main constraints and problems limiting the use of the GTI transport corridors are inadequate development of the infrastructure, especially missing rail segment and paved road sections along the Corridors on the Mongolian territory. 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.
2.Road section between Choibalsan and Nomrog (380 km) -Feasibility study and preliminary design -Detailed design and construction supervision -Construction	300 thousand TBD TBD	Road Department, Ministry of Roads and Transport, Mongolia	January- July, 2013 Jan.-May, 2014 May 2014 –Sep, 2015	Main constraints and problems limiting the use of the GTI transport corridors are inadequate development of the infrastructure, especially missing paved road sections along the Corridors on the Mongolian territory. 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 border traffic between China and Mongolia would be increased enormously along the Rail Corridor. Tourism is growing in this area of the world and particularly the Tumen River has great attractions of natural beauty and heritage.

Corridor 1a and 1b, Mongolia				
Measures, Programs or Projects	Estimated Cost (USD)	Implementing Agency	Time Frame	Rationale
				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.
3.Reconstruction of rail segment between Choibalsan and Ereentsav: -feasibility study and design -reconstruction	100 thousand 200 million	UBTZ	2013-2014 2013-2016	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 Zabaykalsk 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 the future the wooden sleepers should be replaced with concrete ones. Also it is needed to upgrade this rail line by electrifying and installing a modern signalization system.

Corridor 1a and 1b, Mongolia				
Measures, Programs or Projects	Estimated Cost (USD)	Implementing Agency	Time Frame	Rationale
4.Master plan for Tourism development in project area	200 thousand	Ministry of Nature, green development and tourism	2013	Tourism is growing in this area of the world and particularly the Tumen River has great attractions of natural beauty and heritage. According to the JICA Study, the ease of moving tourists to and from points of interest and to satisfy their basic needs is a fundamental prerequisite for tourism development. Unfortunately, Mongolia has significant deficiencies in this regard. These deficiencies include: • Poor Access – this is considered to be one of the biggest constraints for tourism in Mongolia. Improvement in international air access in particular was cited as a key need in the sector, along with selective improvement in roads. • Poor Public and Private Infrastructure – Inadequate infrastructure such as telecommunications and hotels that are not built for those seeking higher standards of comfort were listed as areas for selective upgrading.
5.Completion of road construction between Undurkhaan and Choibalsan		Road Department, Ministry of Roads and Transport, Mongolia	2013-2016	This section of the road is included in the Millennium Road Project of Mongolia. It is being built in accordance with the Medium term plan of Mongolia
6.Construction of rail segment between Tavan Tolgoi and Choibalsan (via Khuut)		Ministry of Roads and Transport	2013-2016	This segment of the rail road is included in the State policy on rail network development of Mongolia. It is being built in accordance with the State Policy on Railway Transportation of Mongolia as Phase I.

5.2. GTI Transport Strategy

Recommendations for GTI Transport Strategy

In order to realize the Trans-GTR Transport Corridors it is required to include the GTI Transport Strategy following Infrastructure development measures:

- Conduct Feasibility Study for construction of the Rail line segment between Khuut-Nomrog, Mongolia
- Conduct feasibility study of road section between Choibalsan and Nomrog
- Support necessary study for up-grading the Rail segment between Choibalsan and Ereentsav
- Harmonize technical specifications and standards on rail construction and operation between the countries supporting GTI program.

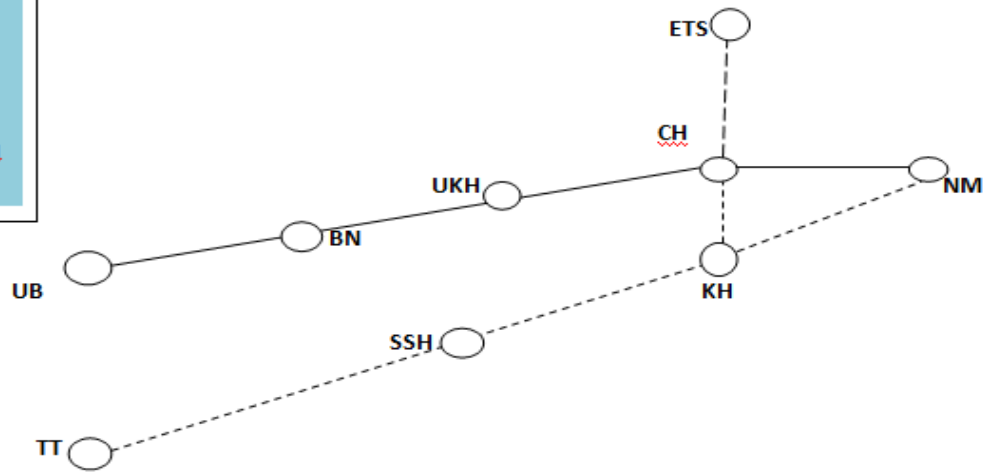
ANNEXES

Table A1: Freight and Passenger flows of GTI Corridors on Mongolia's side, 2010

Road **2010**

UB- Ulaanbaatar
BN- Baganuur
UKH-U ndurkhaan
CH-Choibalsan
ETS- Ereentsav
KH- Khuut
NM- Nomrog
SSH- Sainshand
TT-Tavantolgoi

	UB- BN	BN-UKH	UKH- CH	CH-NM
Cars/day	1182	433	153	104
Bus/day	709	259	92	63
Trucks/day	473	172	61	42

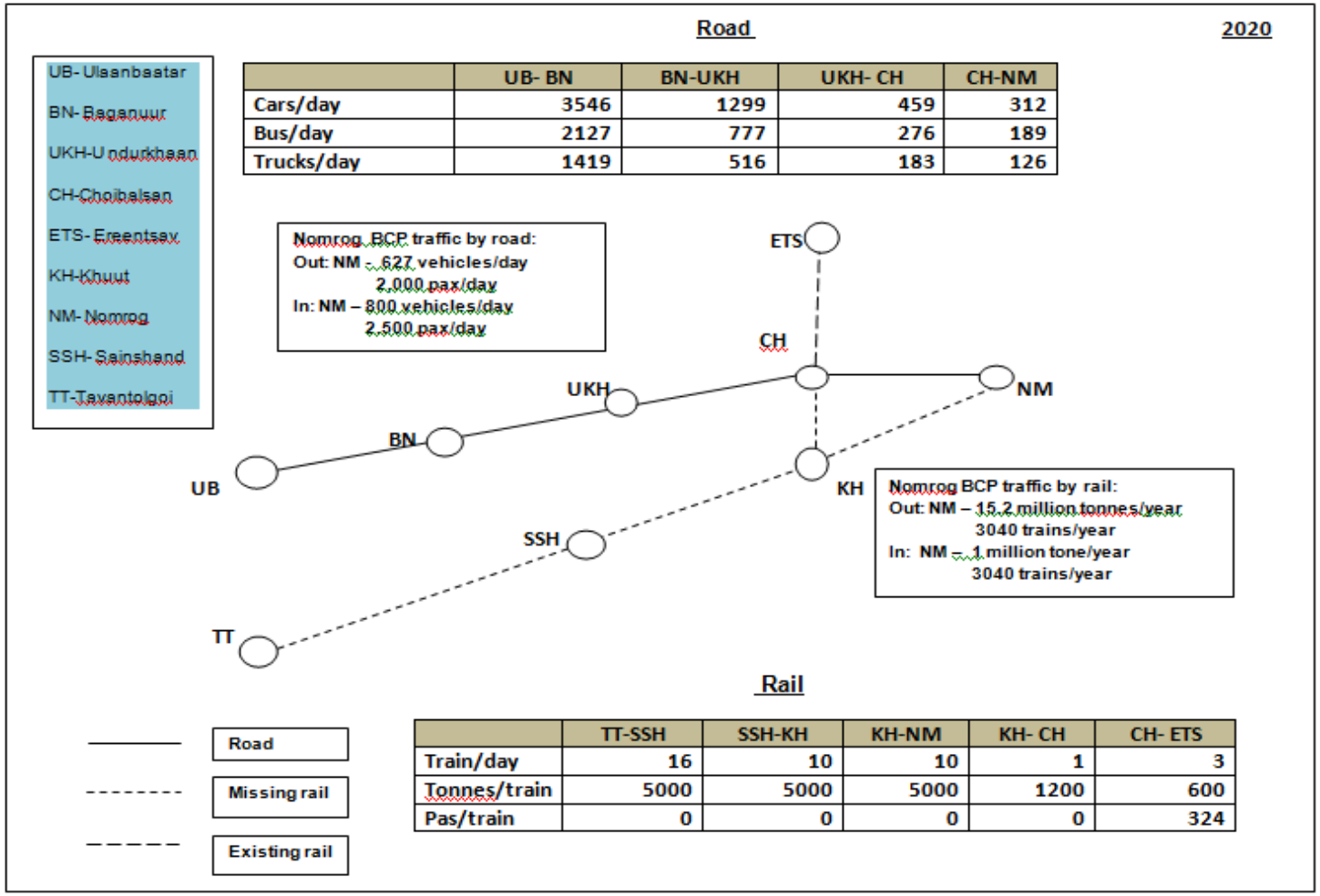


Rail

Road
Missing rail
Existing rail

	TT-SSH	SSH-KH	KH-NM	KH- CH	CH- ETS
Train/day	0	0	0	0	2.3
Tonnes/train	0	0	0	0	600
Pas/train	0	0	0	0	108

Table A2: Freight and Passenger flows forecasts for GTI Corridors on Mongolia's side, 2020



	UB- BN	BN-UKH	UKH- CH	CH-NM
Cars/day	3546	1299	459	312
Bus/day	2127	777	276	189
Trucks/day	1419	516	183	126

	TT-SSH	SSH-KH	KH-NM	KH- CH	CH- ETS
Train/day	16	10	10	1	3
Tonnes/train	5000	5000	5000	1200	600
Pas/train	0	0	0	0	324