Enhancing Northeast Asia and Mongolia Economic Cooperation through Developing Transport Corridors

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Abstract: Transport corridor development issues in Northeast Asia (NEA) are key to establishing integrated relations in the region, which is rich in mineral resources. As for Mongolia, its transportation network has strategic significance for reducing its isolation in the world and also within the own borders. Improving transport access to seaports or gateway is one of the key factors to enhancing Mongolia's foreign trade competitiveness. Also other NEA countries will benefit from the transportation corridor development in the region.

Keywords: transport, corridors, railway, roads, traffic demand.

1. INTRODUCTION

NEA cooperation. As is well known, Northeast Asia is a home to the 3 of the world's major powers, 2 of the 5 permanent members of the UN Security Council and 2 of the largest economies of the world. It is also a home to one of the world's hottest flash points. The situation in the sub-region remains fragile, although it is relatively stable, on the whole thanks to efforts of the countries of the sub-region.

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

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

Mongolia's foreign trade is mainly carried with NEA countries (see Table 1.). Mongolia believes that the development of multilateral cooperation in NEA is of special significance for the economic development, strengthening cooperation and mutual confidence among the countries of the sub-region. Main objective of the survey is to examine potential Transport Corridors in the region to seaports and gateways for Mongolia.

Table 1. Mongolia's foreign trade, mln US$

	Export				Import			
Years	**2011**	**2012**	**2013**	**2014**	**2011**	**2012**	**2013**	**2014**
Total	**4817.5**	**4384.7**	**4269.1**	**5774.3**	**6598.4**	**6738.4**	**6357.8**	**5236.7**
NEA	**4488.7**	**4077.7**	**3730.6**	**5111.4**	**2880.6**	**2847.3**	**2774.8**	**2488.9**

PRC	**4439.9**	**4059.7**	**3706.3**	**5073.4**	**2032.9**	**1873.5**	**1822.6**	**1767.9**
S. Korea	**37.9**	**12.3**	**13.0**	**13.5**	**356.7**	**467.8**	**507.4**	**352.6**
Japan	**11.0**	**5.6**	**10.5**	**24.5**	**490.2**	**501.6**	**444.2**	**367.8**
Russia	**96.3**	**79.6**	**61.8**	**61.6**	**1624.7**	**1847.4**	**1561.9**	**1549.3**
NEA, %	**93.0**	**93.0**	**87.0**	**88.5**	**44.0**	**42.2**	**43.6**	**47.5**

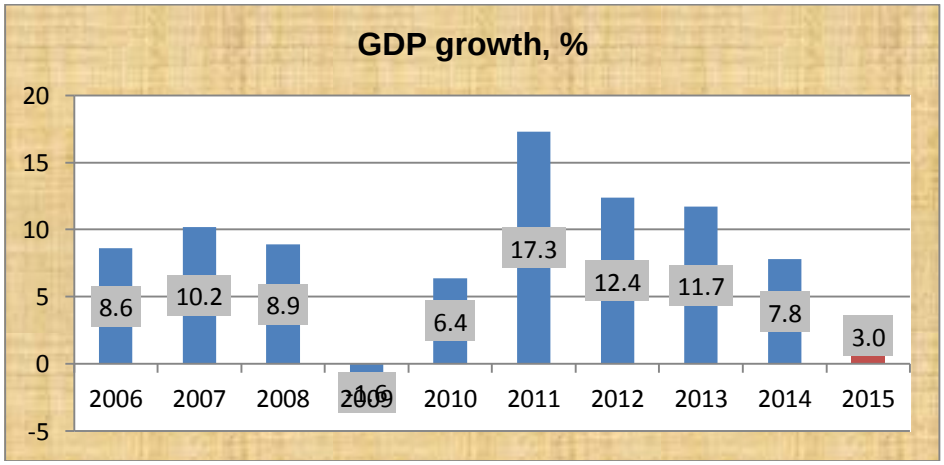
Source: National Statistical Yearbooks, Mongolia

1.1 Mongolia's Macroeconomic Review

The economy of Mongolia did return to solid growth in 2011. Growth for 2011 has reached 17.3%, up from 6.4 % in 2010 (Figure 1), and is being spurred by the development of large copper, coal and gold mining projects. High GDP (Gross Domestic Product) forecasts were based on (i) continued strong flows of foreign direct investment, which had more than doubled between 2010 and 2011; (ii) continued rapid expansion of the mining sector, especially coal; (iii) public investment being raised; and (iv) strong consumer demand due to the disbursements of cash to the citizens ahead of the 2012 elections. In 2014, economic growth was 7.8% even though foreign direct invest to the country was dropped to some extent.

Economic Features:

- Agriculture (primarily herding) was the traditional basis of Mongolian economy and is still important, contributing c. 14% of GDP and providing c. 30% of national employment (2014)
- The mining sector is booming and services and industry have overtaken agriculture: services now account for 50% of GDP and industry (mostly mining) for 36% (2014)
- Exports are the major driver of the economy, e.g. in 2014, the value of goods exports (US$ 5.7bn) is equal to c. 46% of nominal GDP and over 80% of exports are minerals and resources with major exports being copper, gold, coal and greasy cashmere wool.



Source: National Statistical Yearbooks
Figure 1. GDP growth, Mongolia

As a large, landlocked country bordering two giant neighbours – Russia and China, Mongolia depends on its land and air transport systems to get goods and services to market.

Indeed, the key new driver of the economy, mining, depends greatly on an adequate transport structure to get bulk cargos to processing facilities and potential markets.
The transportation challenges faced by Mongolia are considerable. Their impact on the economy as a whole is thus significant. Transportation costs alone account around 18% of the country's average world price for exports and 11% if its imports.
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. . However, Mongolia would face fiscal difficulties due to lower growrh in coal demand in China in nearest future.

Table 2: Foreign trade of Mongolia over the last 13 years, in million US$

Year	Exports				Imports				Trade balance
	Russia	PRC	Others	Total	Russia	PRC	Others	Total	
2002	48.09	220.5	255.57	524	237.63	167.7	313.64	690.74	-166.78
2003	41.2	287	287.7	615.9	265.4	196.3	339.3	801	-185.1
2004	20.6	413.9	435.2	869.7	341.9	257.2	422	1,021.1	-151.4
2005	27.9	514.2	523.5	1,064.9	417.9	307.3	459.3	1,184.3	-119.4
2006	45.1	1.050.2	447.5	1,542.8	547.8	365	422.2	1,435.0	107.8
2007	58.5	1,411.4	477.3	1,947.2	745	568.9	753.9	2,061.8	-114.6
2008	86.3	1,635.9	812.3	2,534.5	1,242.3	898.7	1,103.5	3,244.5	-101
2009	68.2	1,393.9	423.3	1,885.4	772.8	538.6	826.3	2,137.7	-252.3
2010	82.7	2,466.3	359.5	2,908.5	1,096.7	970.9	1,132.4	3,200.0	-291.5
2011	95.9	4,400.7	283.9	4,780.5	1,595.9	2,007.6	2,923.1	6,526.9	-1,746
2012	79.6	4,059.7	245.4	4,384.7	1,847.4	1,861.6	3,029.3	6,738.3	-2,353.6
2013	61.8	3,706.3	469.6	4,232.7	1,561.9	1,822.6	2970.2	6,354.7	-2,082.0
2014	61.6	5,073.4	639.3	5,774.3	1,549.3	1,767.9	1919.5	5,236.7	537.6

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

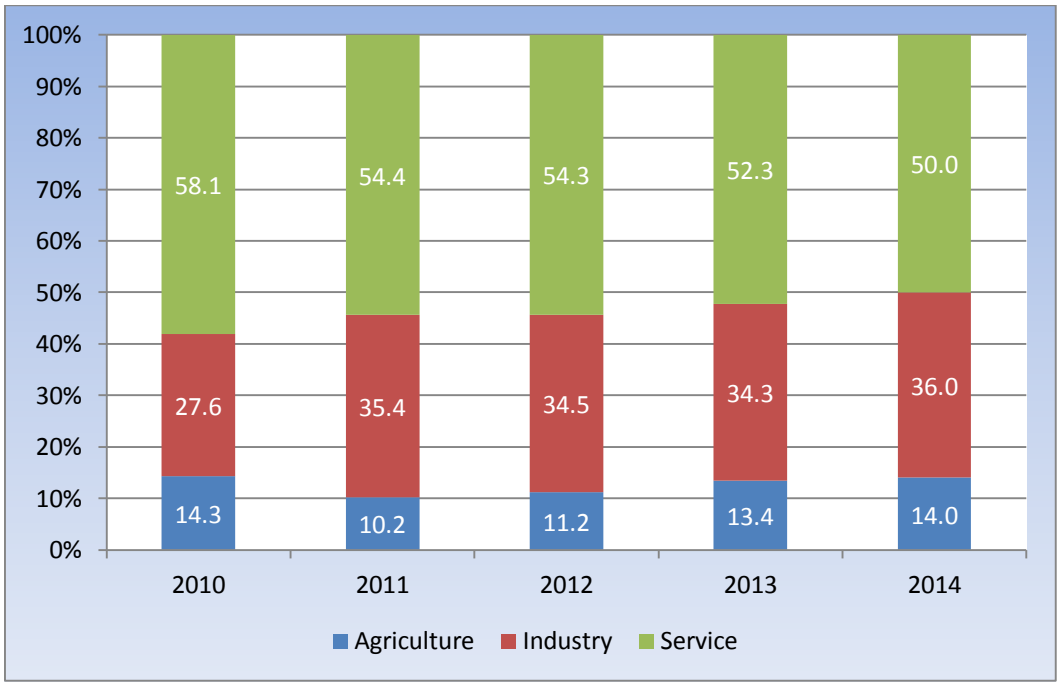


Figure 2. Share of GDP by sectors, Mongolia
Source: National Statistical Yearbooks, Mongolia

At US$ 11 billion, Mongolia's external trade grew 2.8 times in last 5 years (see Table 2). Amount of export is 10% higher than the amount of import. 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 2014, 87.8% of Mongolia's total export went to PRC and 33.7% of the total import came from the same country. Shares of GDP are shown on the Figure 2.

2. INFRASTRUCTURE CAPACITY REVIEW

2.1. Transport sector of Mongolia

The transport sector in Mongolia is divided over four modes – railway, roads, air, and inland waterway. As can be seen in Table 3 in freight transport, the railway is the dominant mode both in terms of tone-kilometers. With the historic significance of mining industries in Mongolia, the railway has been the primary mode of transport for the heavy and bulk freight. Given the poor condition of the roads, the high cost of air transport, and the limited range of the waterways, the railway has had little competition in freight transport from other modes. As shown in Table 3, the majority of freight traffic (tkm) in Mongolia is handled by the railway (approximately 63%) in 2014.
The rail share is very high compared to other developing countries, where highways carry the majority of the freight traffic in terms of tones (e.g. in PRC highways carry 76.5% of freight traffic whereas railways only carry 13.1%). This can mainly be attributed to the bad conditions of the highways in Mongolia.

Table 3. Transport performance indicators (freight transportation)

	Sub-sectors	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Freight carried, thous.tons											
1	Road	8081.7	9189.7	9207.1	9255.7	10563.8	12610.2	25635,3	32898.9	28747.5	37600
2	Rail	15586.3	14779.8	14072.6	14646.9	14164.5	16804.0	18447.7	20426.4	21035.5	20900
3	Civil aviation	2.0	2.2	1.9	1.8	1.4	1.6	2.9	4.0	4.1	4.9
4	Water	0.5	-	-	-	-	-	-	-	-	
	Total	23670.5	23971.4	23281.6	23904.4	24736.7	29415.9	44086.0	53329.3	49754.4	58600
Freight turnover, mln.ton kms											
1	Road	311.0	458.3	661.9	782.1	1160.7	1834.0	4910.3	4461.0	4314.0	7274
2	Rail	9947.7	9225.6	8360.7	8261.4	7817.0	10286.7	11418.7	12176.4	12076.5	12416.3
3	Civil aviation	8.3	8.9	7.7	7.9	3.7	4.2	7.7	9.7	9.6	9.4
4	Water	0.1	-	-	-	-	-	-		-	-
	Total	10267.1	9692.7	9030.2	9051.4	8981.3	12124.8	16336.7	16647.1	16400.2	19699.6

Source: Mongolian Statistical Yearbooks

Road network. Mongolia's road network overall (including both state and local roads) totals approximately 49,250 kilometres, connecting 21 major cities and towns and 160 smaller villages (soums and baghs) (Figure 2). 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 12,615 km of state roads and 36,635 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 5,732 kilometres 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".

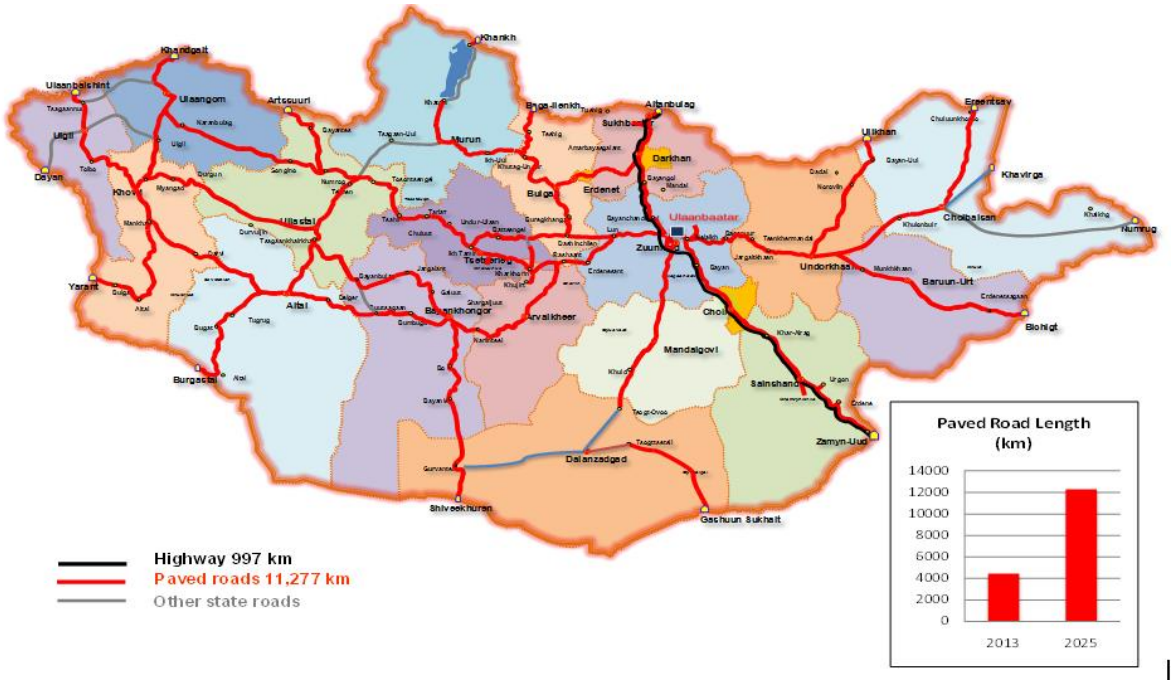


Figure 3. Road Network Development Plan up to 2025
Sourse: MRT and Consultant

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 4. 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.

In 2010 The State Great Khural (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 –Tavantolgoi-Tsagaan suvarga-Zuunbayan 400 km;

- Sainshand-Baruun Urt -350 km;
- Baruun Urt-Khuut – 140 km;
- Khuut-Choibalsan – 150 km.

The rail lines will have broader gauge of 1520 mm with axle load of 25 tons per axle (Figure 4).

Figure 4. Railway network development plan of Mongolia

China, Russia, and Mongolia approved the mid-term development roadmap for tripartite cooperation between them. Some cooperative memos and agreements were signed by the three nations' ministries, including a memorandum on compiling and building a planning outline of a China-Russia-Mongolia economic corridor, a framework agreement on creating favorable conditions to boost China-Russia-Mongolia trade cooperation, and a framework agreement on the development of China-Russia-Mongolia frontier port cooperation. Analysts say that such cooperation would effectively promote the building of the China-Russia-Mongolia economic corridor and boost the regional economic cooperation and development of the entire Eurasian continent.

Development will boost the building of the China-Russia-Mongolia economic corridor and promote practical cooperation projects including railways, roads, energy resources, logistics, transportation and agriculture.

It is necessary to develop 3 vertical transit corridors for Mongolia including rail and road routes (Steppe routes) that would be connected with Modern Silk Route (Figure 5).

Figure 5. Proposed 3 transit corridors

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 Khural (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 and one potential project that have great impact on future traffic:

1/ Tavan Tolgoi (TT) coal mine project. In 2020, volume of the unprocessed products of the mine would be 67.7 million tons. This mine has 6 operational sites:

- West Tsanhi (owned by Erdenes Tavantolgoi): 15.0 million tons per year;
- East Tsankhi (Erdenes Tavantolgoi): 15.0 million tons per year;
- Ukhaa khudag (Energy resources): 15.2 million tons per year;
- "Small" Tavantolgoi (Tavantolgoi LC): 8.0 million tons per year;
- West Naran (Energy Resources): 10.0 million tons per year;
- Tsant Uul (Hunnu):4.5 million tons per year.

2/ Nariin Sukhait (NS) coal mine project. In 2020, volume of the unprocessed products of the mine would be 30.5 million tons. This mine has 3 operational sites:

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

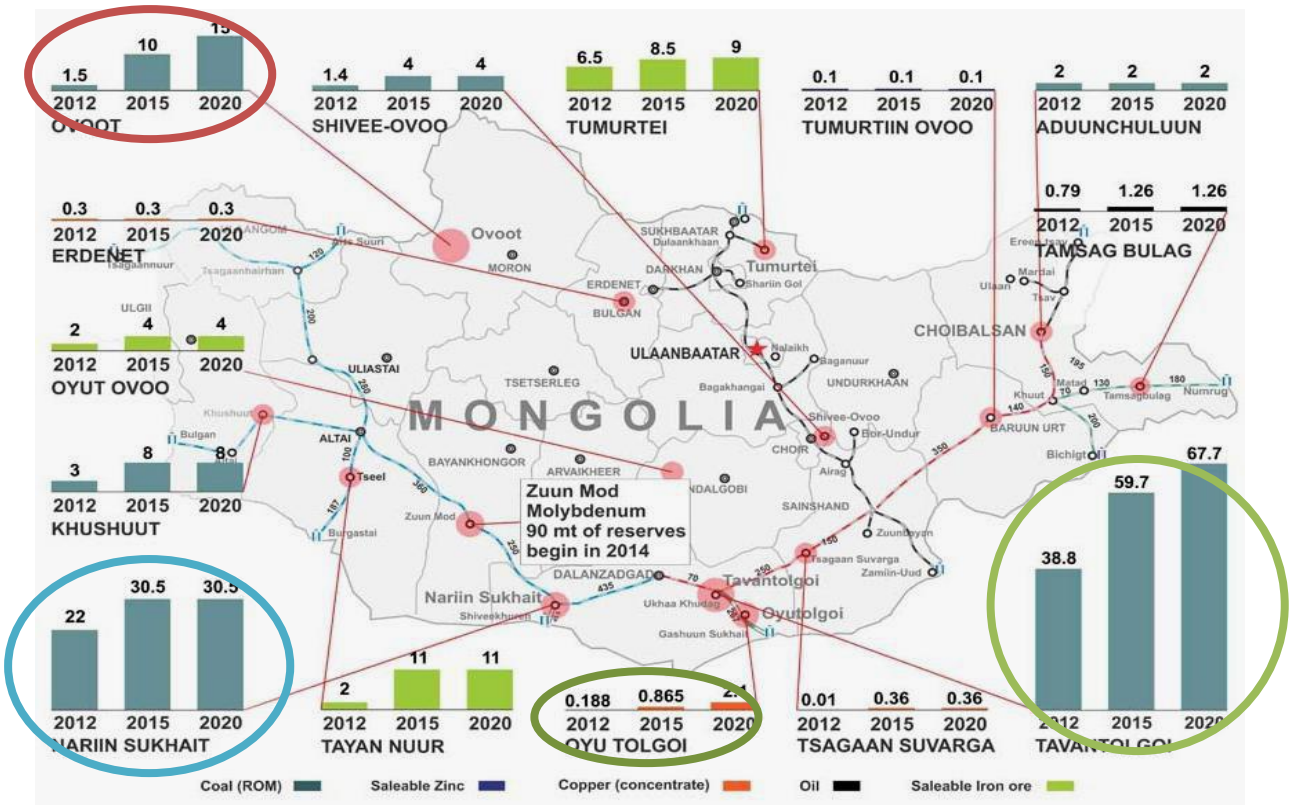


Figure 6. Important Mines in Mongolia
Source: Pre-Feasibility study, consulting company-Boston group, 2011 and consultant

3/ Oyu Tolgoi (OT) copper mine project. Expected production volume is 2.1 million tons of copper concentrate.

On the basis of the washing and crashing outcomes of each mine, it is expected that in 2020 total coal exploration would reach up to 98.2 million tons 66.8 million tons of which will be transported by rail.
Exploration of Tavantolgoi mine will reach 46.5 million tons per year, of which:

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

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

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

4/ Potential project- Ovoot coal mine project

-12-20 mln tons of coking coal

Figure 7: Northern railway project- 547 km long

3.2 . Rail Traffic and Transport demand forecasting

Rail traffic is connected mainly with minerals transportation in Mongolia. Therefore, potential mining projects should be considered in order to forecast transportation demand for the Corridor. The Mines of principal interest are indicated in the map in the Figure 6. Significant copper deposits are found at Oyu Tolgoi and Tsagaan Suvarga. The coal deposits at Tavantolgoi and Nariin Sukhait are known to be particular significant. Tavan Tolgoi strategic coal deposit covering totally 80 thousand 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.

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 tonnes of coking coal from a total of 4.5 billion tonnes of reserves and could produce as much as 20 million tonnes per year. The mine is situated 400 km from the nearest railway, which poses a logistical problem.

Approximately 100 km south of Tavan Tolgoi are the Tsagaan 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 tonnes. 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.

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 Tavantolgoi (Figure 8)

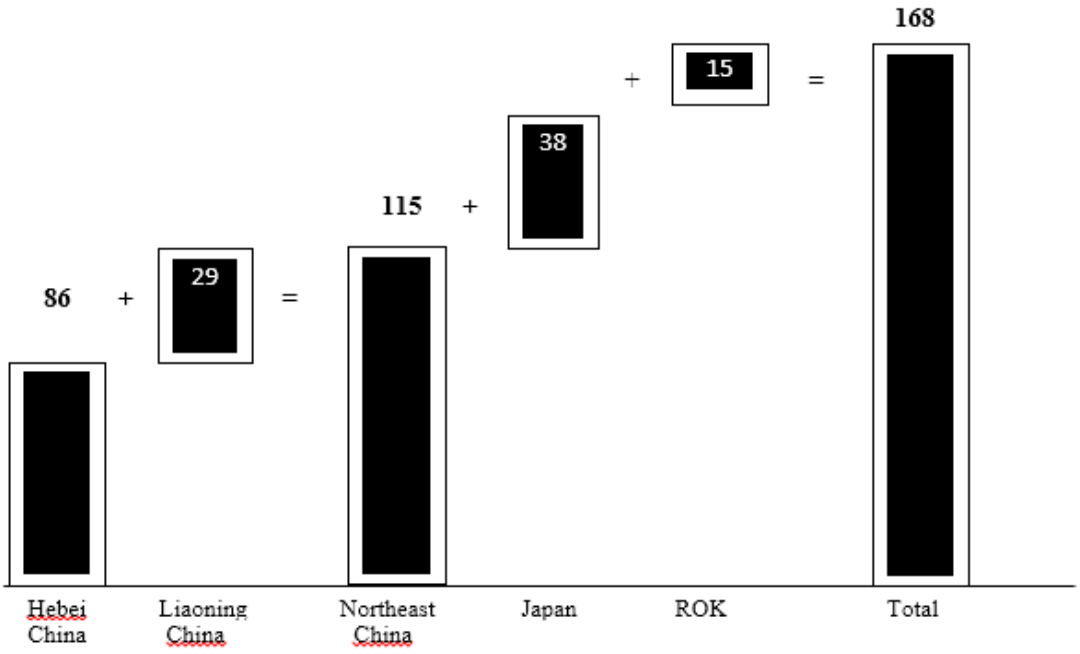


Figure 8. Demand for coal in Northeast Asia, million tonnes per year, 2020

Estimates of coal transportation by rail

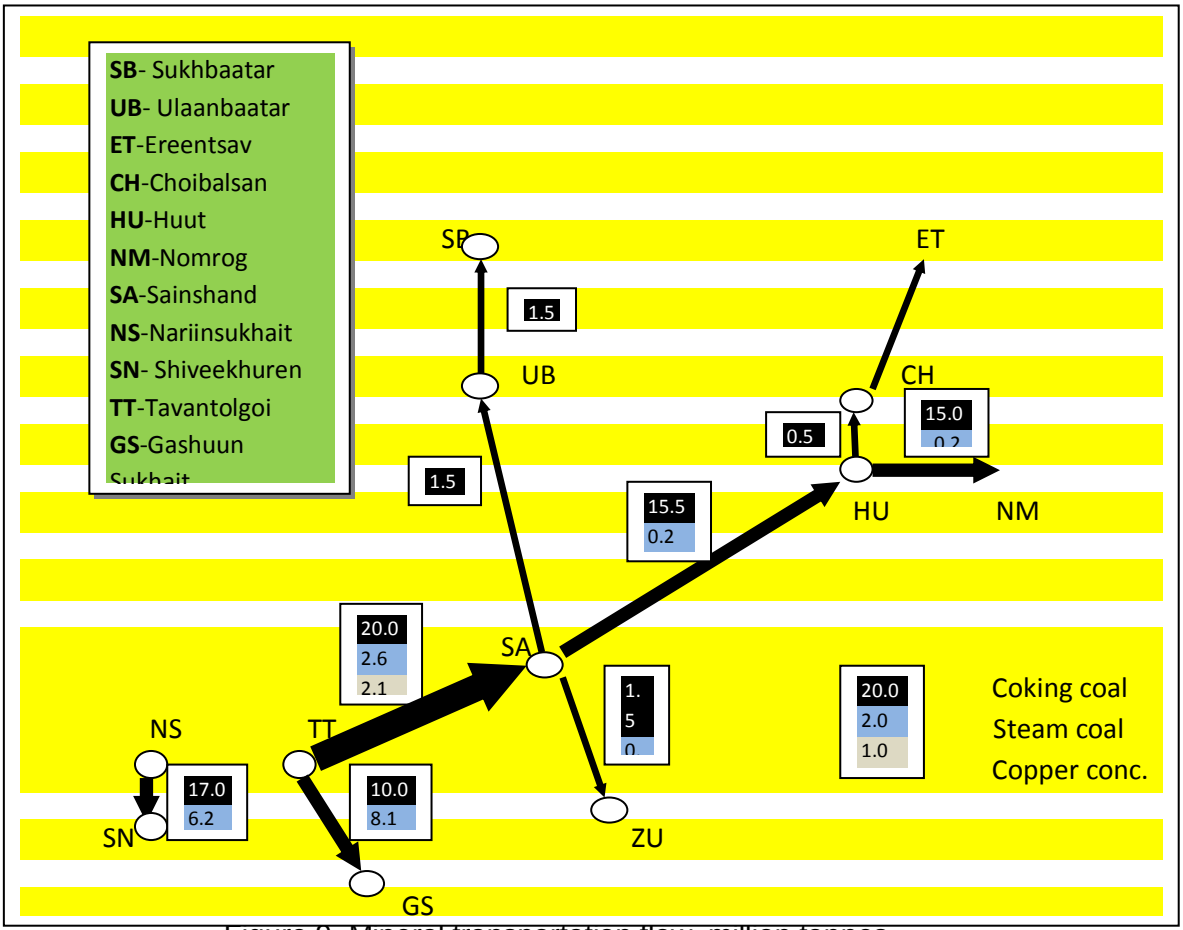


Figure 9. Mineral transportation flow, million tonnes

Sources of Data are Pre-Feasibility study of the New Railway project, Mongolia, 2011

As mentioned earlier that approximate volume of coal to be transported by rail in 2020 would be 66 million tonnes. This volume of coal will be distributed to following routes (Figure 8):

Per year- 23.2 million tonnes from Nariin Sukhait to Shivee Khuren;
Per year- 18.1 million tonnes from Tavantolgoi to Gashuun Sukhait;
Per year- 24.7 million tonnes from Tolgoi to Sainshand;
Per year- 15.7 million tonnes from Sainshand to Khuut;
Per year- 15.2 million tonnes from Khuut to Sumber BCP (Nomrog);
Per year- 0.5 million tonnes from Khuut to Choibalsan.

According to our estimates, **15.2 million tonnes 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 tonnes (70%) per year
ROK: 2.3 million tonnes (15%) per year
Japan: 2.3 million tonnes (15%) per year.

Above share is very rough and it will depend on transportation costs, market prices and so on.
Figures 10 and 11 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.

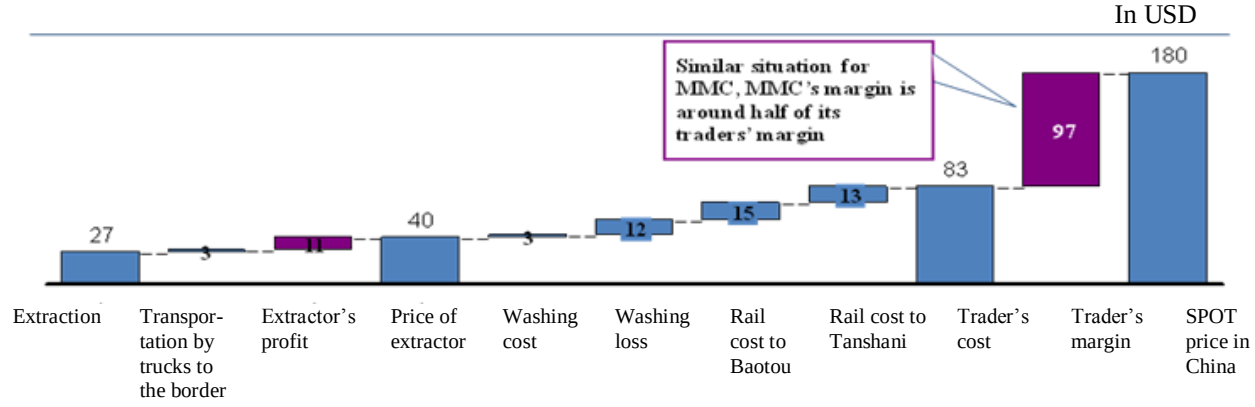
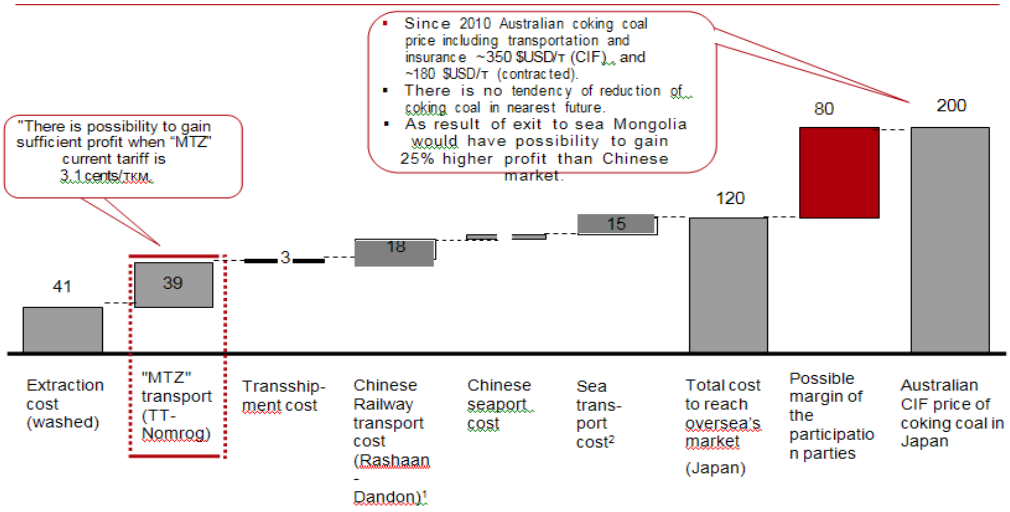


Figure 10. Margin from Mongolian coking coal export to China
Source: Pre-Feasibility study, consulting company-Boston group, 2011

In USD



Source: Consulting company-Boston group, 2011
Figure 11. Possible profit margin from Mongolian coking coal export

4. ROAD AND RAIL TRANSPORT CORRIDORS

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

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

10 potential railway routes for shipping coal from Tavantolgoi mine to reach seaports have been exhamened (Figure 13).

Figure 12. Coal transport corridors to seaports

5. 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 (Figures 12-13):

- Khuut-Bichigt (BCP) further to Chinese seaports is shortest railway route suitable for Mongolia's coal transportation. A market study that aims to develop detailed traffic forecasts by different commodities and origin-destination (O-D) pairs between PRC and Mongolia, as well as other international destinations should be undertaken.

- The Khalkgol (Sumber) - Rashaan BCPs connection through the Nomrog Bridge seems to be one of 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 Eastern Area of Mongolia, it will be very difficult to attract private sector investors without building the basic transportation and other required infrastructure. With the exception of some mega-projects, such as the Tavantolgoi (coal mine with proven reserves of 6 billion tons of coking coal) and Oyu Tolgoi (copper and gold mine) Project, it is very unlikely

that mining companies will assist in the required transportation infrastructure investment in the Eastern region of Mongolia.

- 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. 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.

- Investment Programs are required to missing infrastructure links, namely:
    - Construction of railways Choibalsan- Khuut - Bichgt; and construction of raved road between Baruun Urt and Bichigt;
    - Upgrading Rail section between Choibalsan and Ereentsav including replacement of existing wooden sleepers with concrete ones, introducing modern signalization system and electrification, and
    - Conduct feasibility studies, design and construction Railway section between Khuut and Sumber (Nomrog) BCP;

Source: Final report of the GTI transport corridors

Figure 13. Major bottlenecks along the trans-GTI corridors

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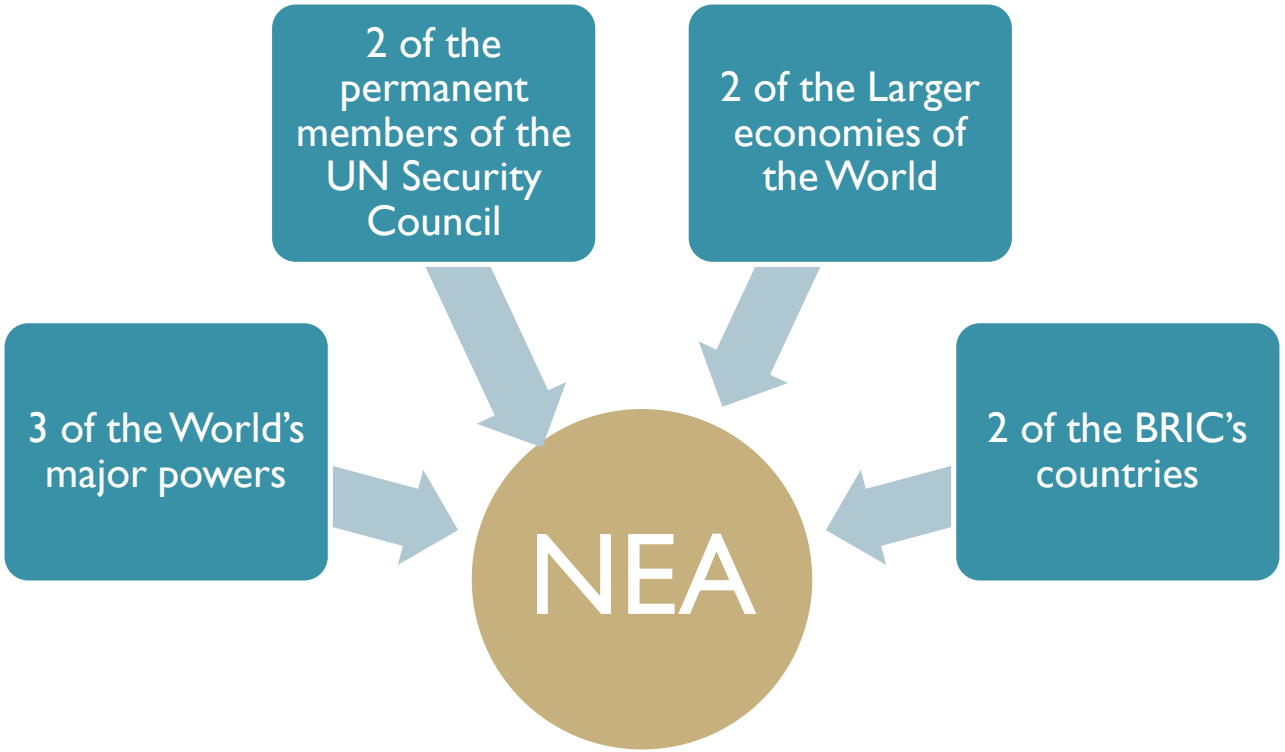
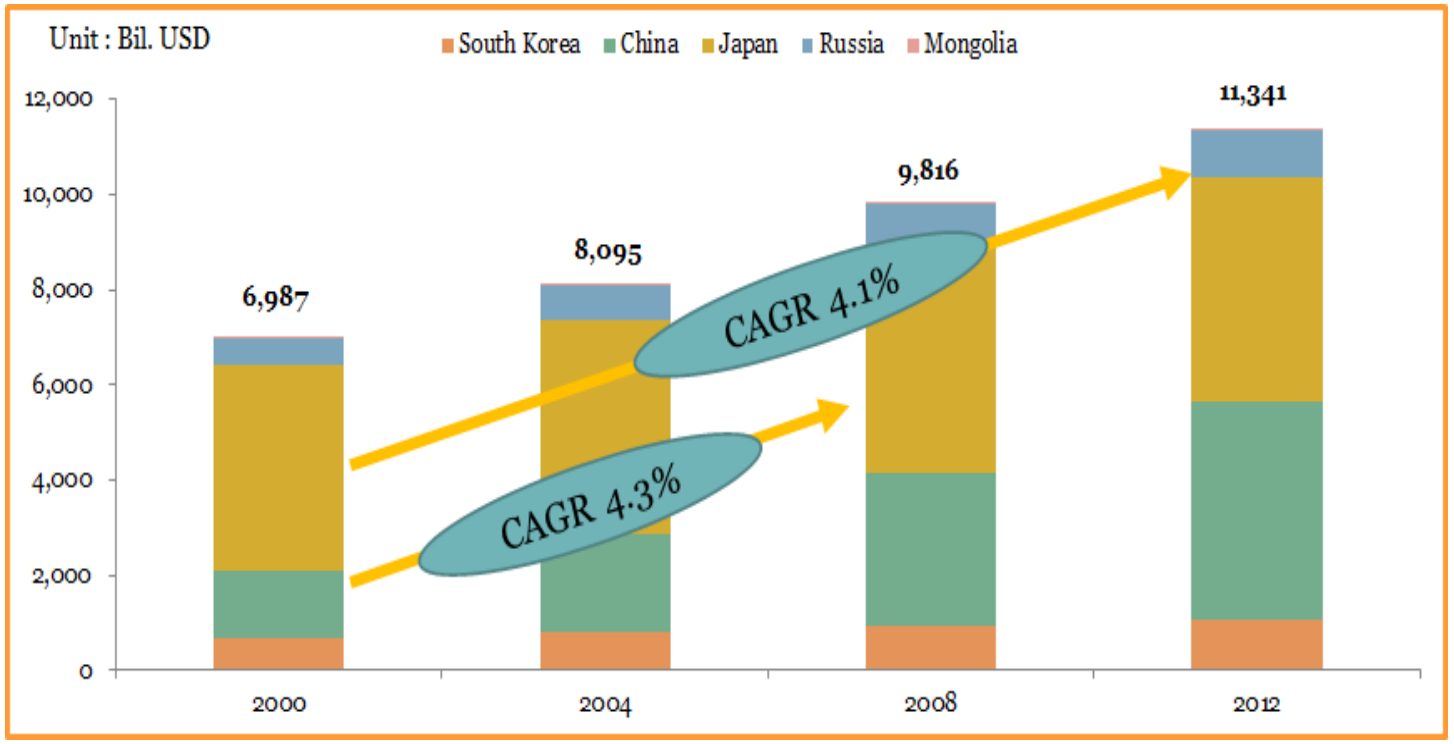
Northeast Asia



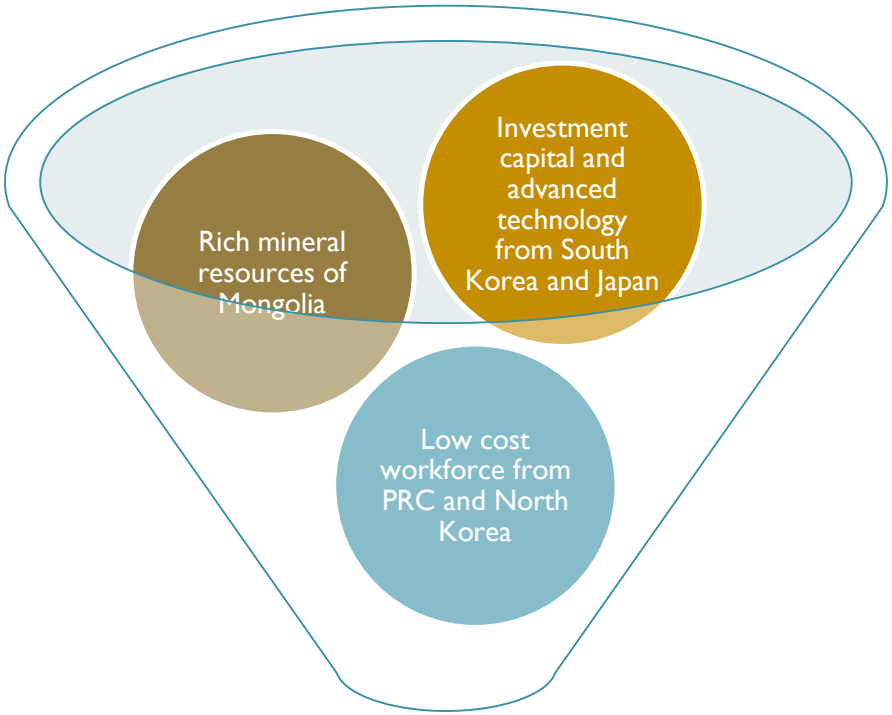
Compound annual GDP growth rate of five Northeast Asian nations



Between 2000 and 2012, the compound annual GDP growth rate of five Northeast Asian nations (China, Russia, ROK, Japan, and Mongolia) was 4.1%, 1.5 times higher than that of the world (2.6%)

Source: Global Insight, 2013.7.15.

NEA and Mongolia cooperation

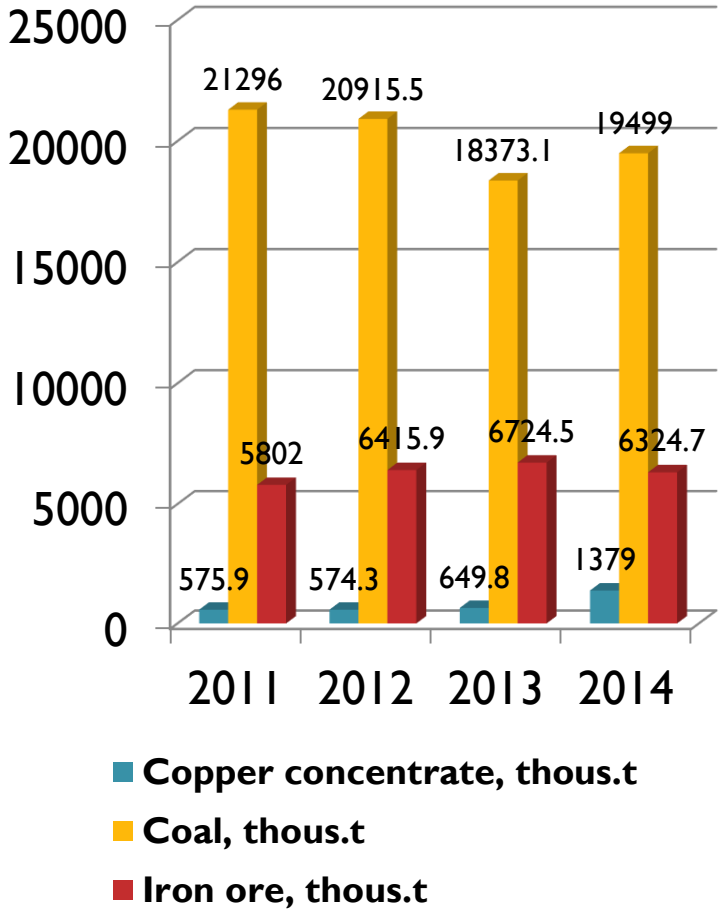


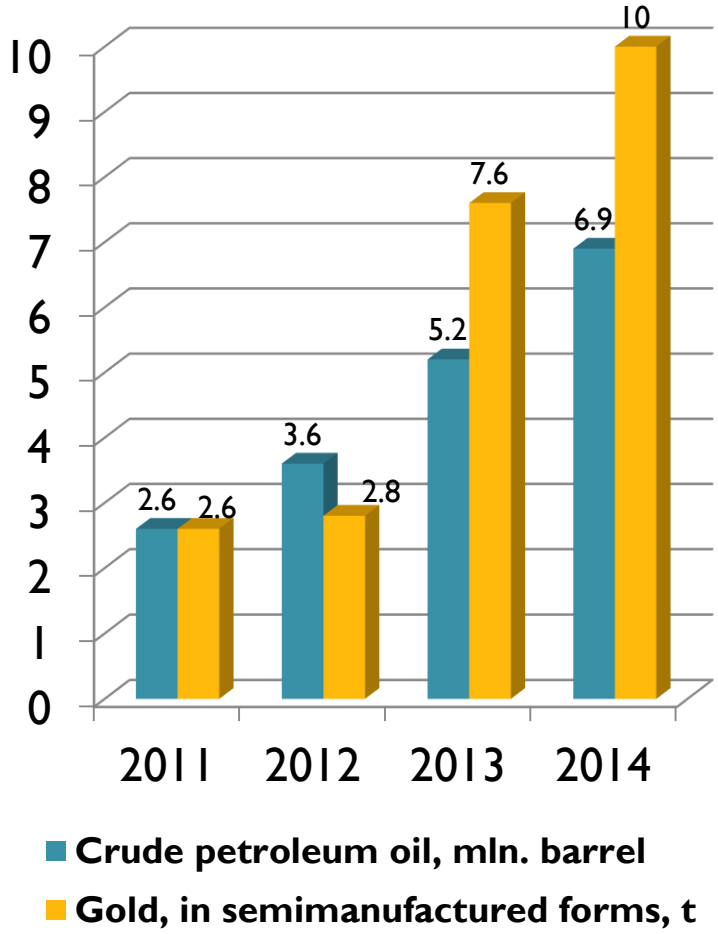
Efficient Cooperation

Mongolia's export and import by countries, mln.USD

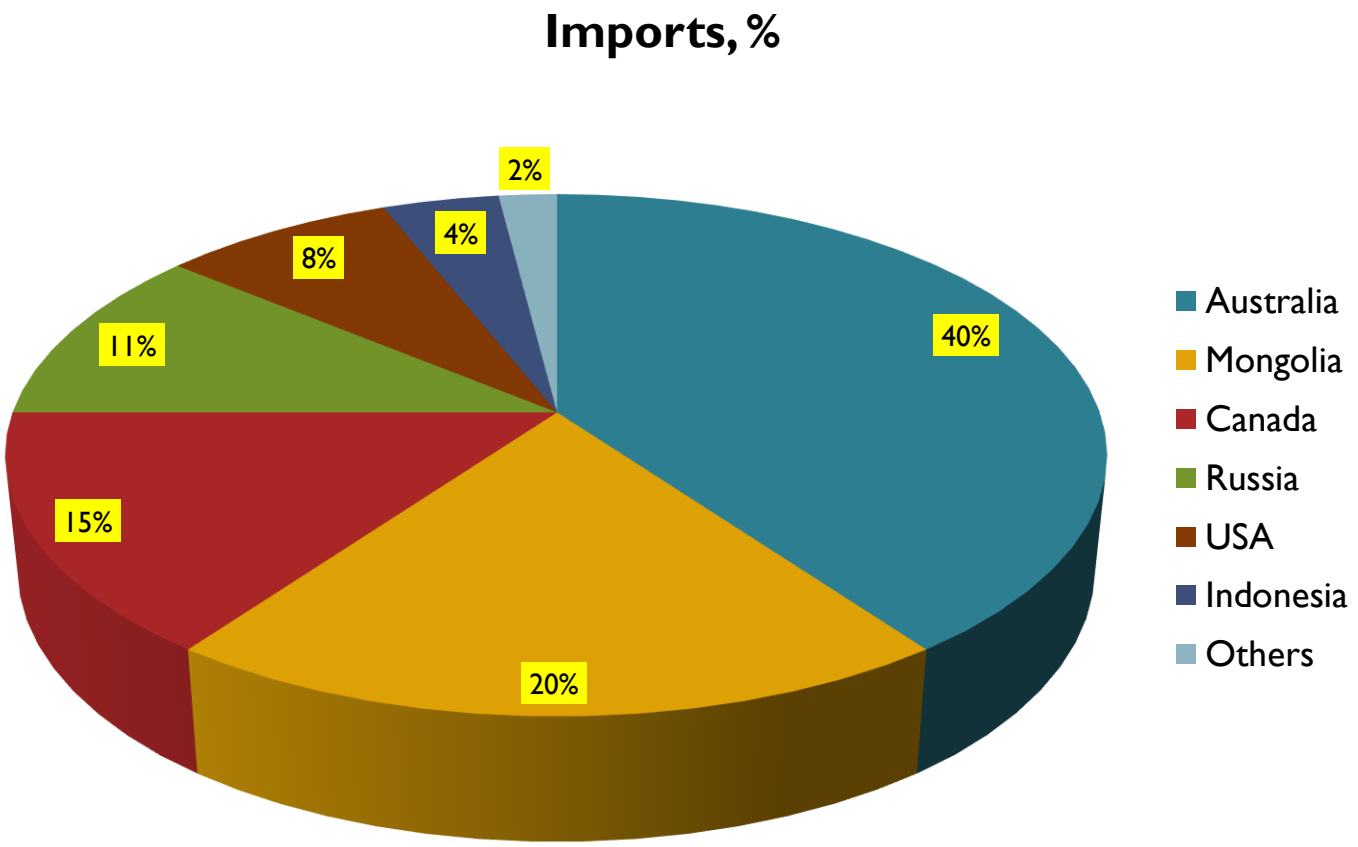
	Export				Import			
Years	2011	2012	2013	2014	2011	2012	2013	2014
Total	4817.5	4384.7	4269.1	5774.3	6598.4	6738.4	6357.8	5236.7
NEA	4488.7	4077.7	3730.6	5111.4	2880.6	2847.3	2774.8	2488.9
PRC	4439.9	4059.7	3706.3	5073.4	2032.9	1873.5	1822.6	1767.9
South Korea	37.9	12.3	13.0	13.5	356.7	467.8	507.4	352.6
Japan	11.0	5.6	10.5	24.5	490.2	501.6	444.2	367.8
Russia	96.3	79.6	61.8	61.6	1624.7	1847.4	1561.9	1549.3
NEA, %	93.0	93.0	87.0	88.5	44.0	42.2	43.6	47.5

Mongolia's exports of Mineral products

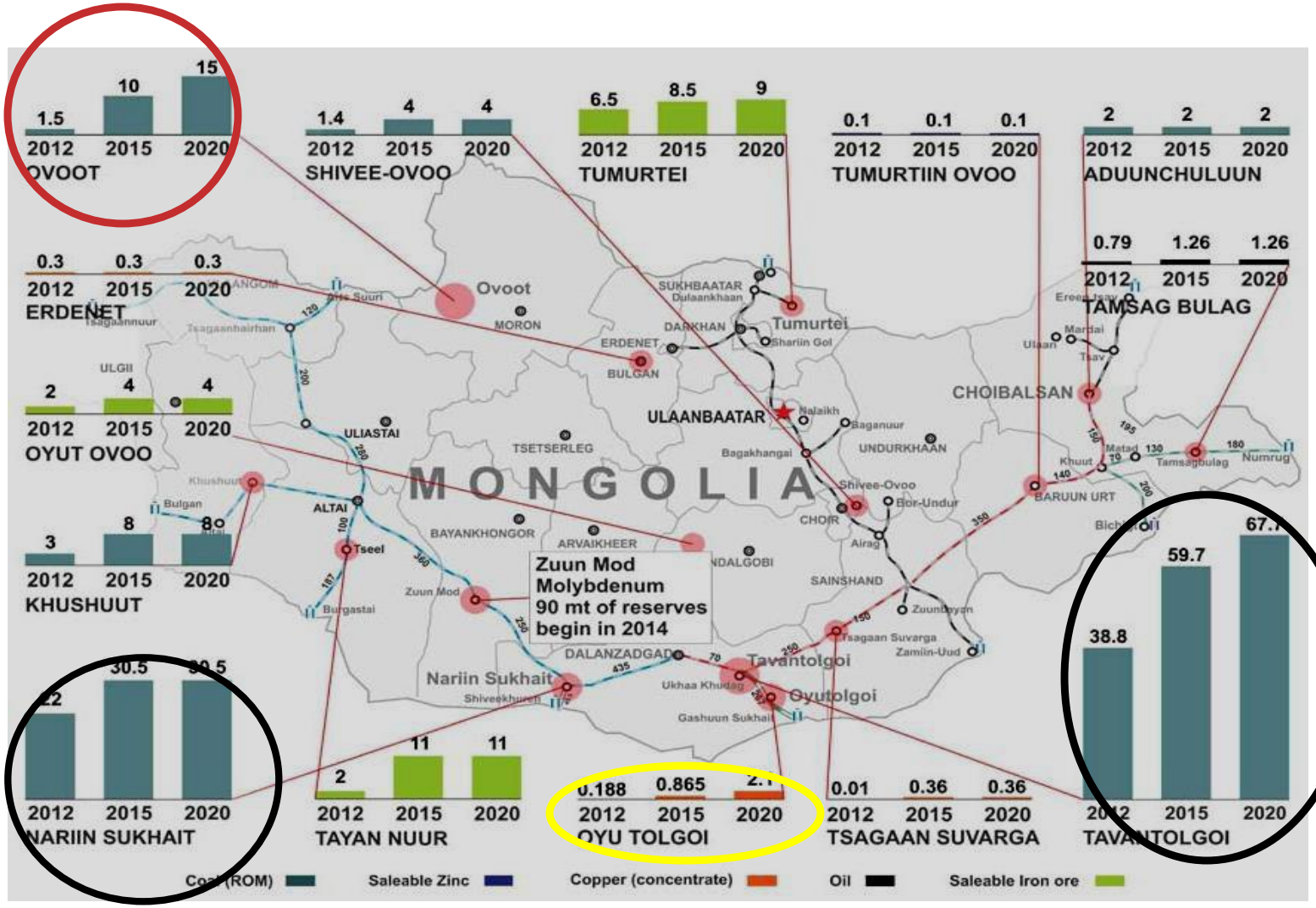




China's import of coking coal in 2013 (75.4 mln tones), by countries

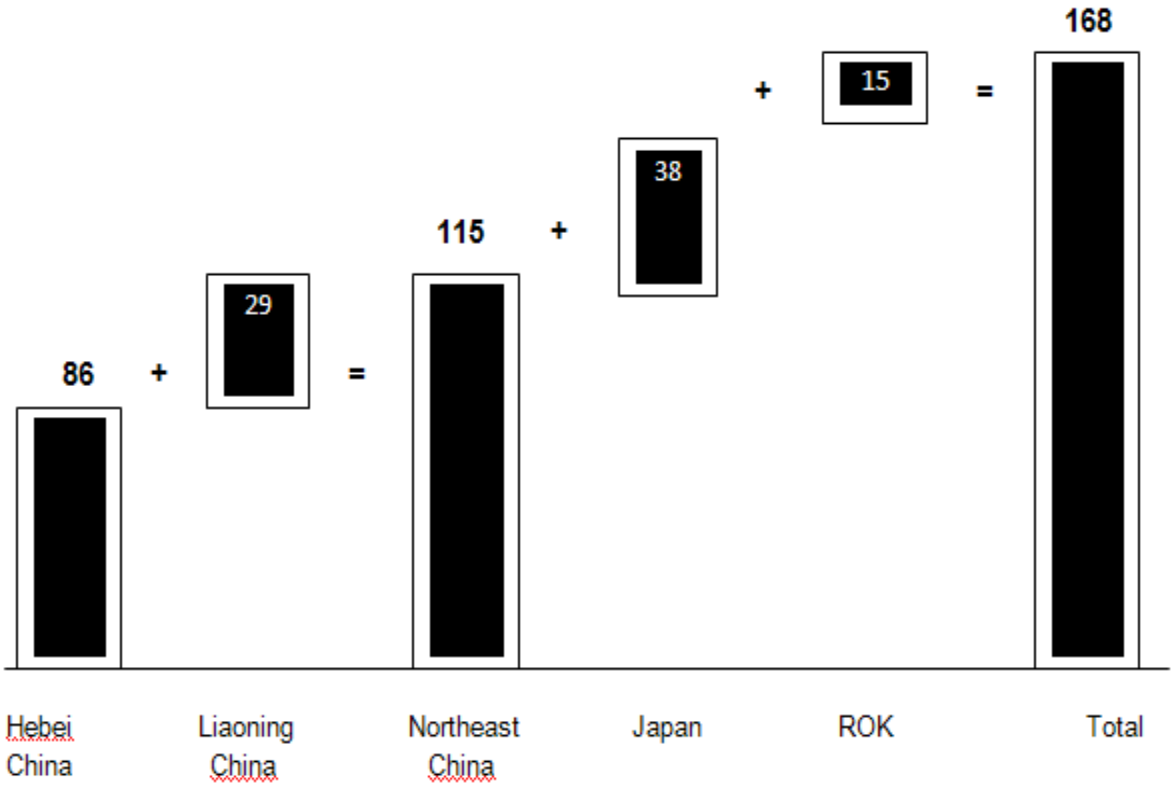


Major mineral deposits in Mongolia

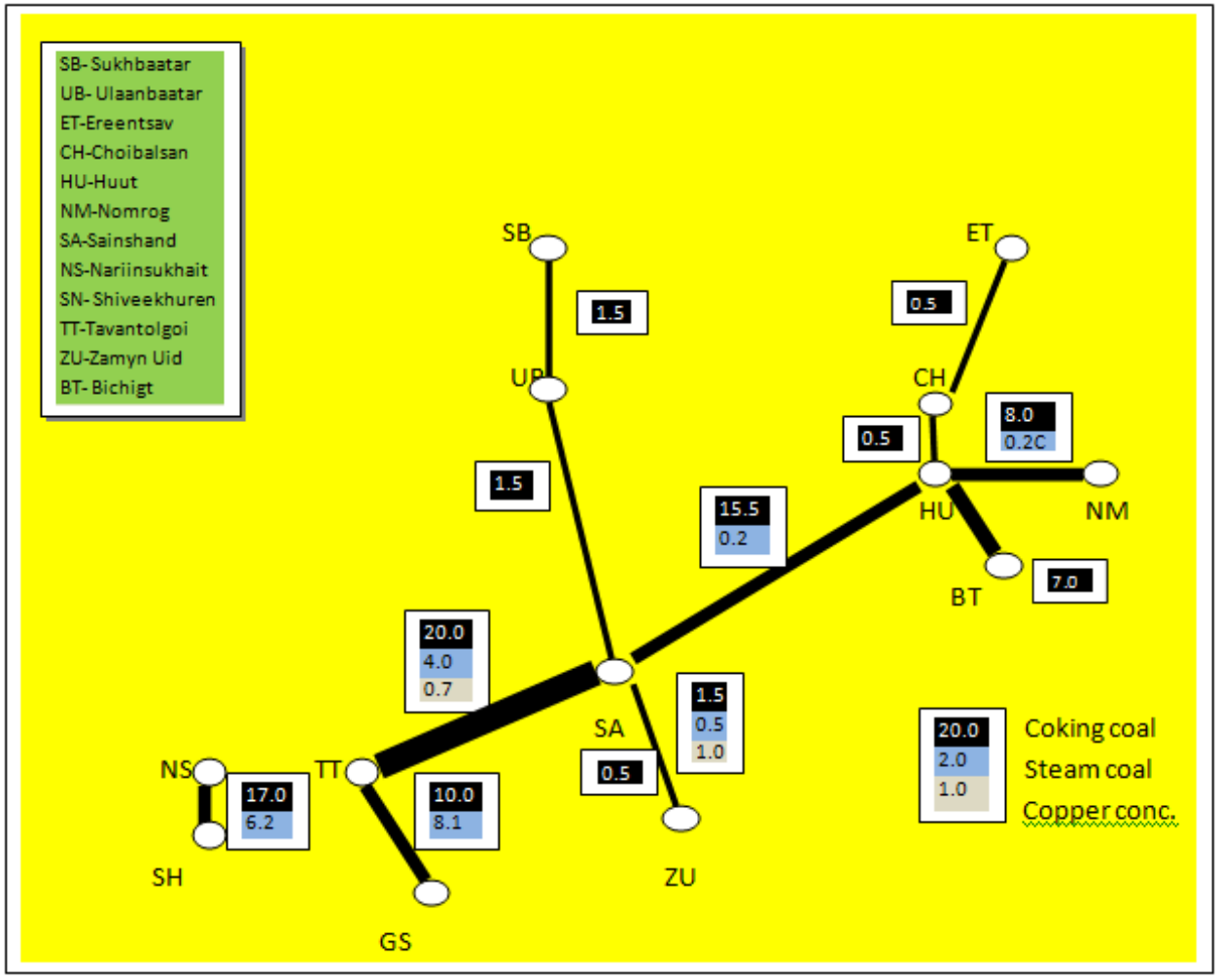


Tavantolgoi coal mine

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



Mineral transportation flow, million tons



Coal transportation estimates from Khuut to NEA region

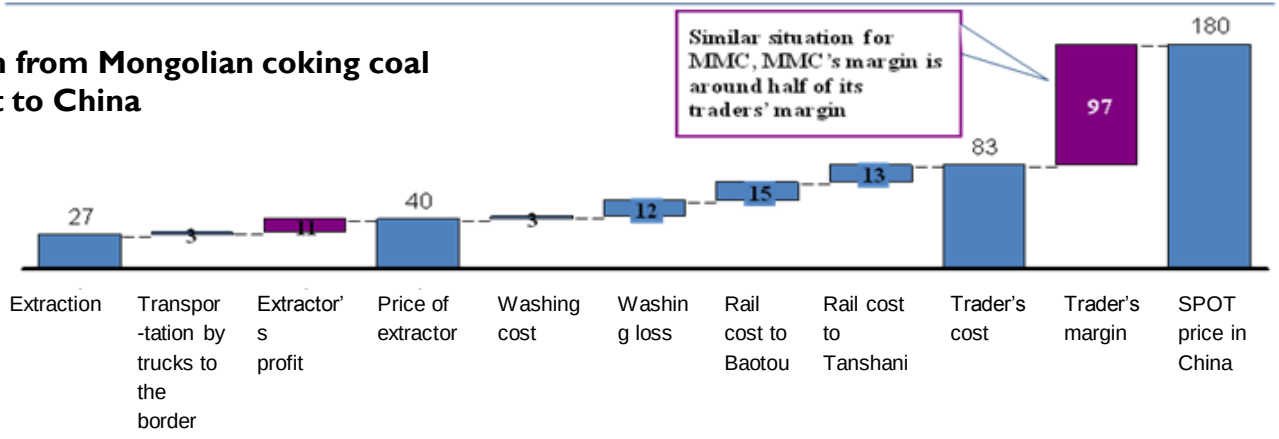
According to our estimates, **15.5 million tones coal** would be delivered mainly to Chinese market. However, some shares of the coal would be exported to Republic of Korea (ROK) and Japan as well.

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:

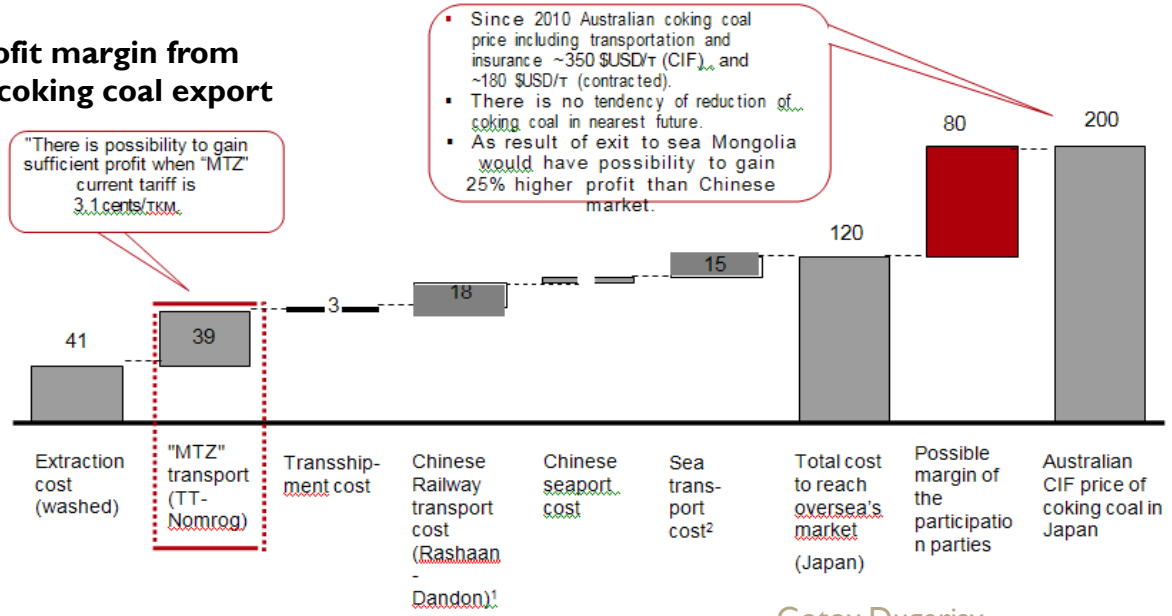
Eastern China: 10.7 million tones (70%) per year
ROK: 2.4 million tones (15%) per year
Japan: 2.4 million tones (15%) per year.

Margin from the Coal export, USD

Margin from Mongolian coking coal export to China

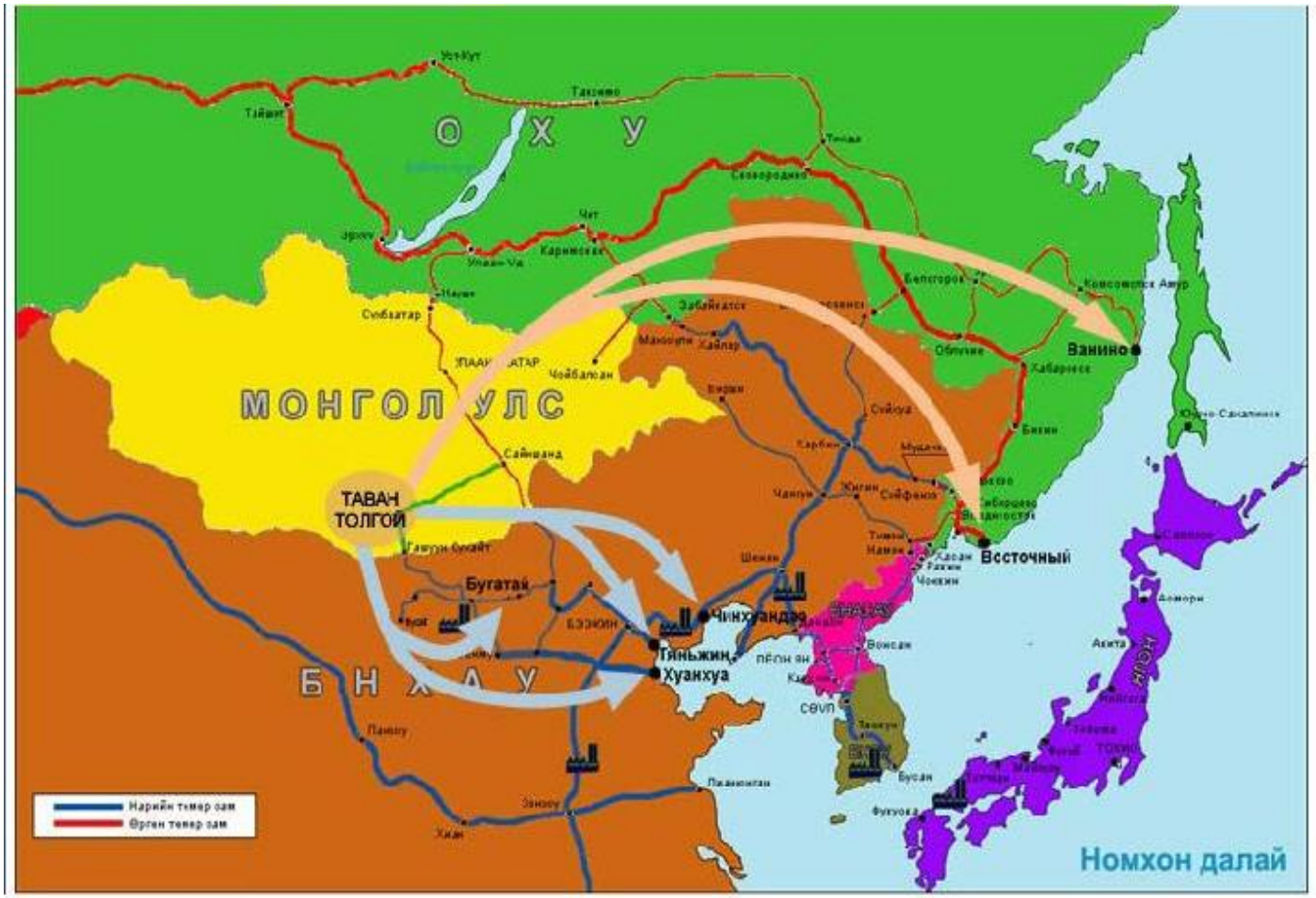


Possible profit margin from Mongolian coking coal export



Proposing 3 transit corridors

Potential corridors for coal transportation from the Tavantolgoi mine to sea ports



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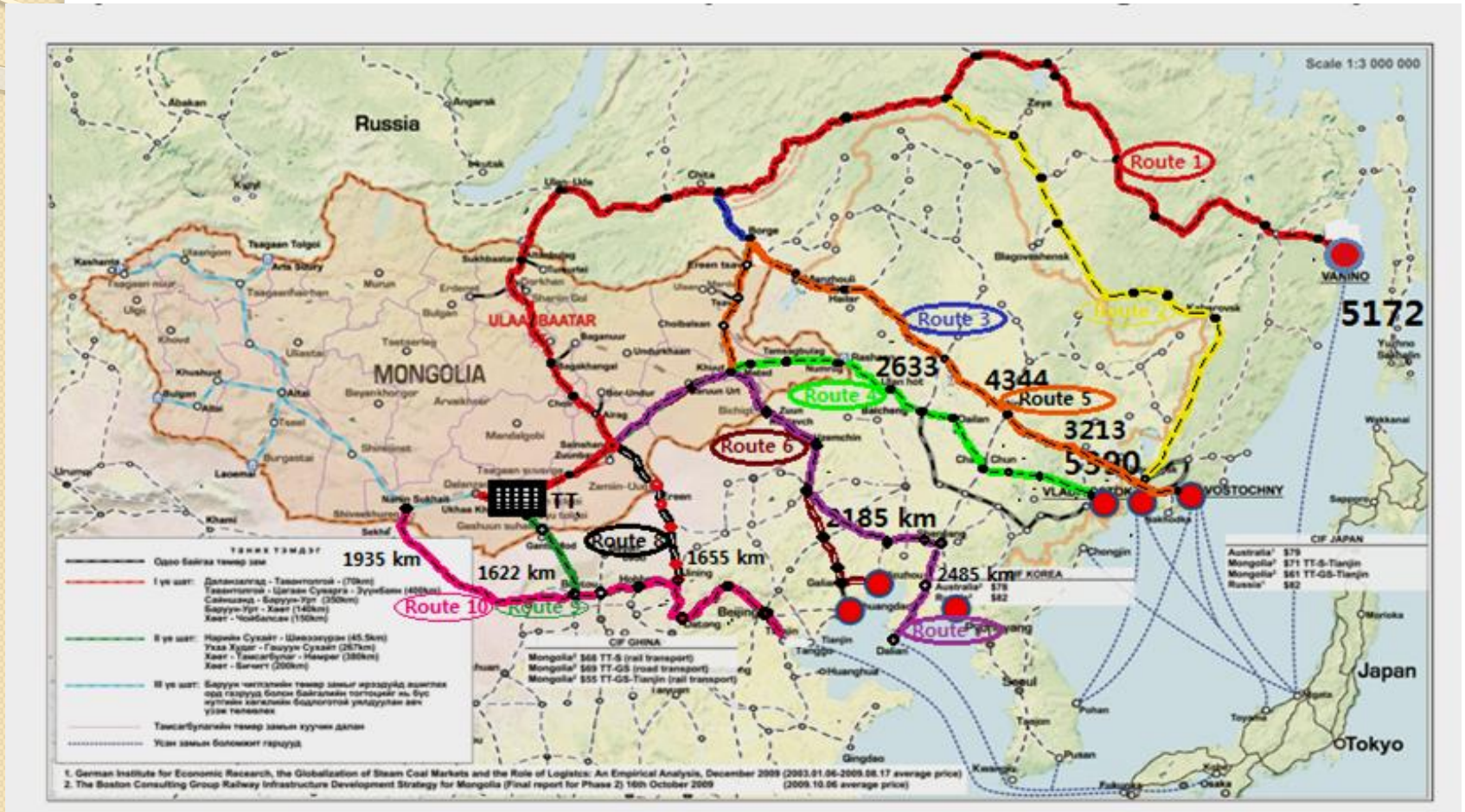
10 alternative routes for coal transportation from Mongolia to seaports



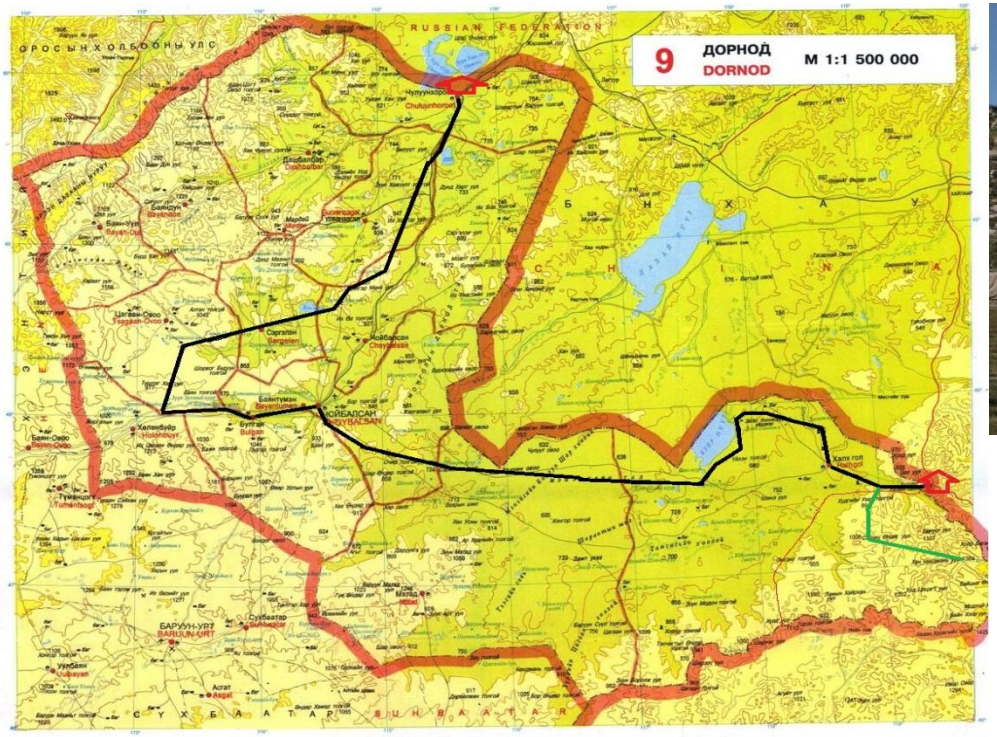
Northern railway

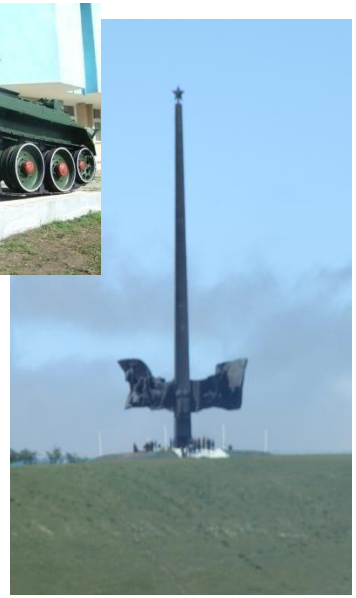
- Mongolia's parliament has approved the country's new national railway policy, which includes the extension of the northern rail line from Erdenet to Ovoot and on to the Russian border at Arts Suuri.
- The link will be a new major rail connection between Russia, Mongolia and China, via the trans-Mongolian railway.
- The Mongolian Government has been empowered to negotiate a concession agreement for the 547 km stretch of track between Erdenet and Ovoot - the first stage of the Northern Railway's line.

Northern railway-547 km
(12-20 mln. tones of coking coal per year)

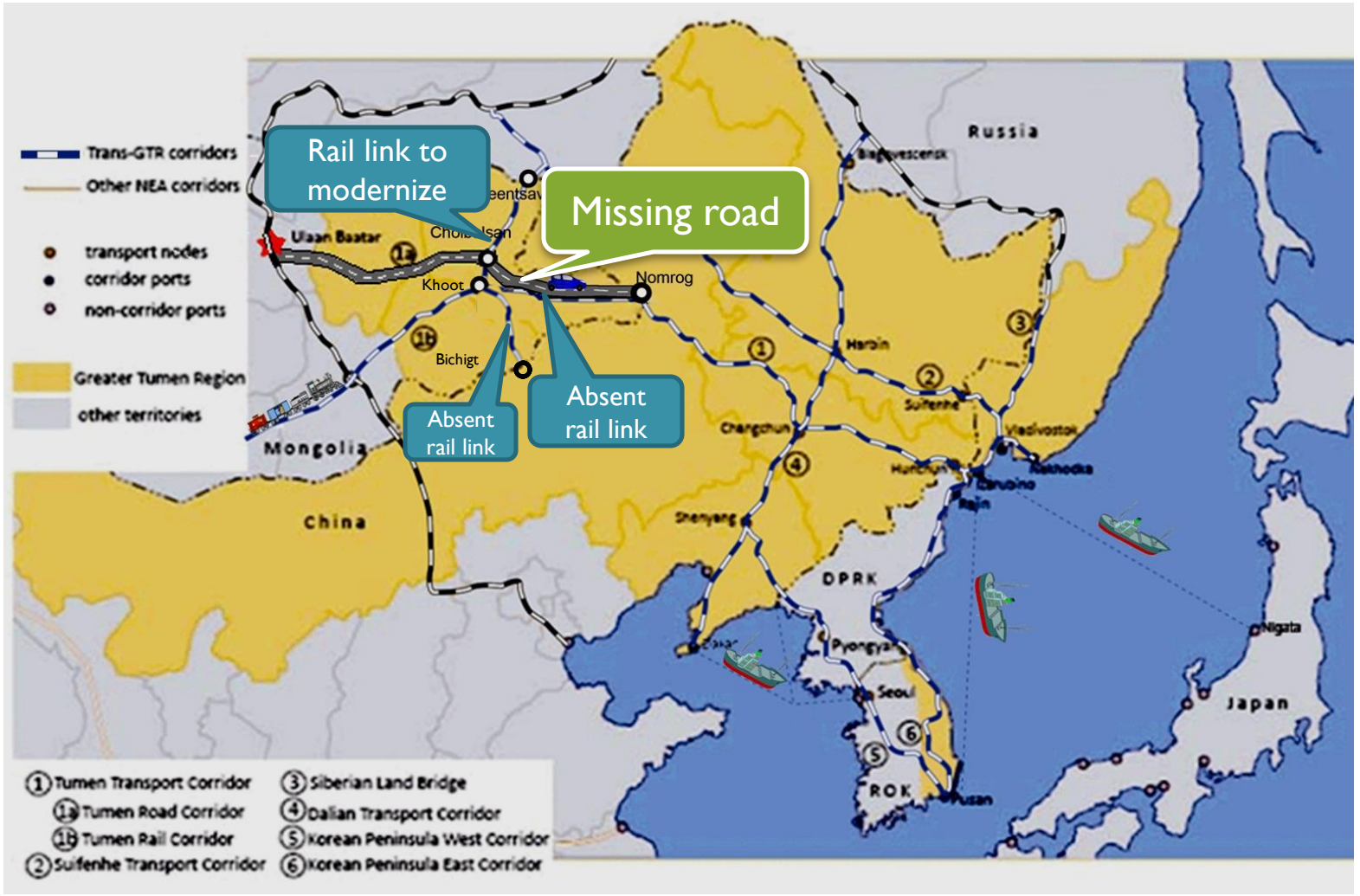
Coal transport corridors

Map of Tourism Route





Trans-GTI corridors



GTI corridors

Conclusions and recommendations:

- 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. Also, there are ecological issues in the Eastern region of Mongolia.

- Investment Programs are required to missing infrastructure links, namely:
  - Construction of **Railway section Choibalsan-Khuut-Bichigt BCP-** US$900 mln (Feasibility study and FEED are ready);
  - Upgrading **Rail section** between **Choibalsan and Ereentsav** including replacement of existing wooden sleepers with concrete ones, introducing modern signalization system.
  - Feasibility study, detailed design and construction of **paved road** between Baruun-Urt and Bichigt BCP (project proposal by ADB);
  - Construction of **railway** (547 km) between **Ovoot and Erdenet** (FS is ready) - US$1,367.5 (Aspire Mining-Concession).
  - Construction of **Railway section** between **Khuut and Sumber (Nomrog) BCP** –US$945 mln;

- If the constraints were lift up, traffic would be increased to great extent. Particularly, 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:
  - From the Southern region: 4.8 mln tones per year
  - From the Northern region: 3.0 mln tones per year
  - From the Eastern region: 2.2 mln tones per year

Total: 10 mln. tones per year.

Thank You!