



AN ECONOMIC IMPACT ASSESSMENT OF THE IRON ORE SECTOR IN MONGOLIA

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Mongolia's iron ore sector is high cost, small size, and low quality that impedes the competitiveness and is unattractive to investors



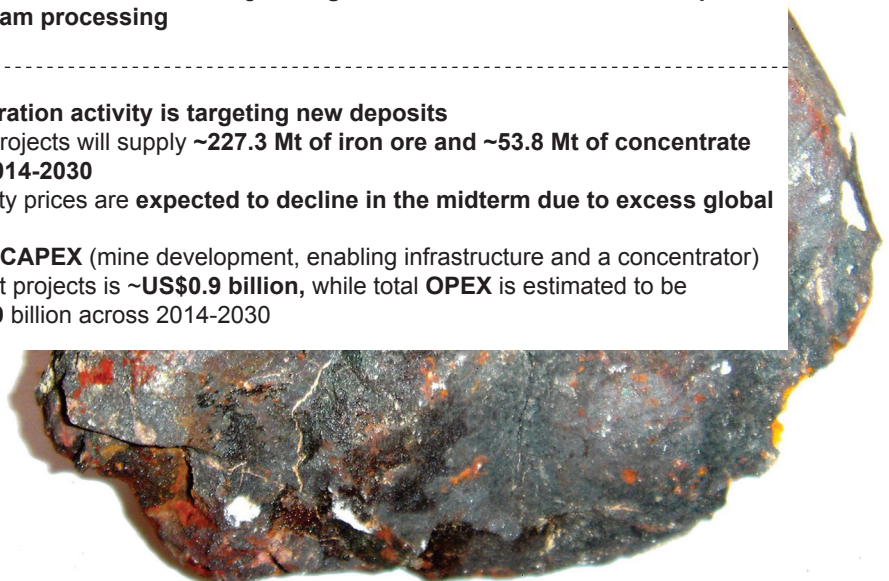
Iron ore sector overview and outlook

Current situation

- Nine small scale magnetite iron ore projects exist in Mongolia with an estimated total resource of **1,250 Mt (Fe content between 25% - 52%)**
- Six of these projects are currently operational and exporting **low grade ore (3.74 Mtpa) and concentrate (3 Mtpa) to China**
- Additional production in the future is limited due to lack of investment funding
- Domestic demand is small although **Mongolian authorities seek to develop downstream processing**

Future outlook

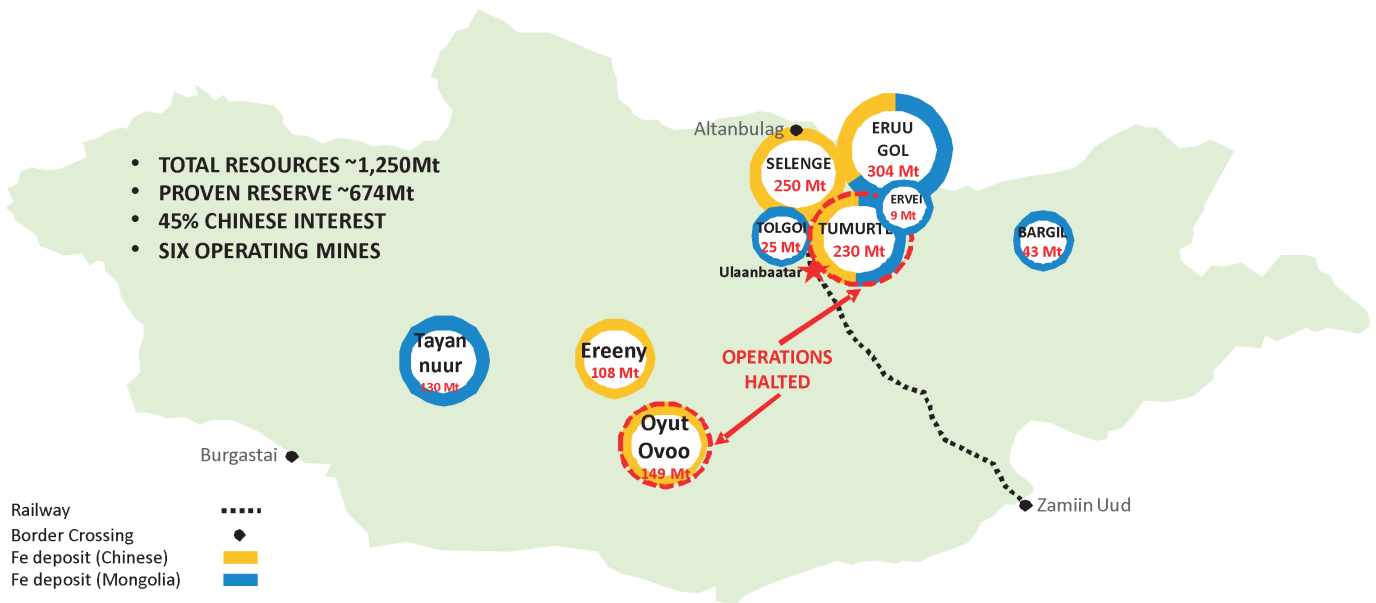
- **No exploration activity is targeting new deposits**
- Existing projects will supply **~227.3 Mt of iron ore and ~53.8 Mt of concentrate during 2014-2030**
- Commodity prices are **expected to decline in the midterm due to excess global supply**
- Required **CAPEX** (mine development, enabling infrastructure and a concentrator) for current projects is **~US\$0.9 billion**, while total **OPEX** is estimated to be **~US\$17.9 billion** across 2014-2030



Source: Publicly available documents

Nine small scale magnetite iron ore projects exist in Mongolia with estimated total resources of 1,250 Mt (Fe content of 25% - 52%)

Iron ore production in Mongolia

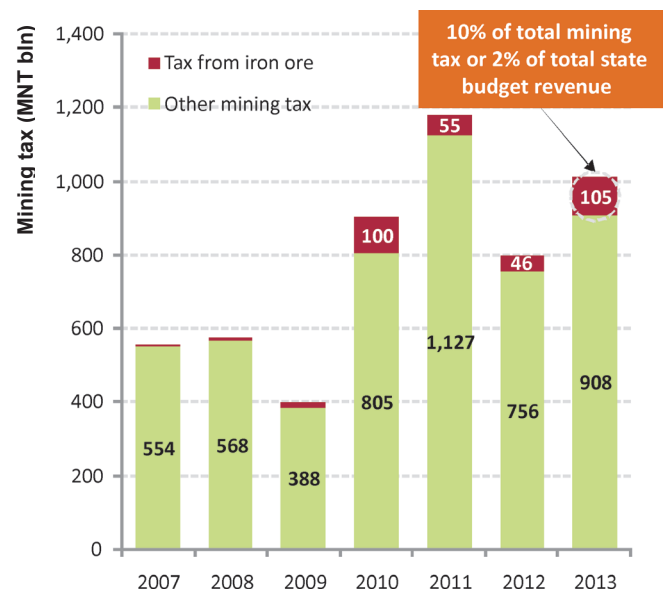
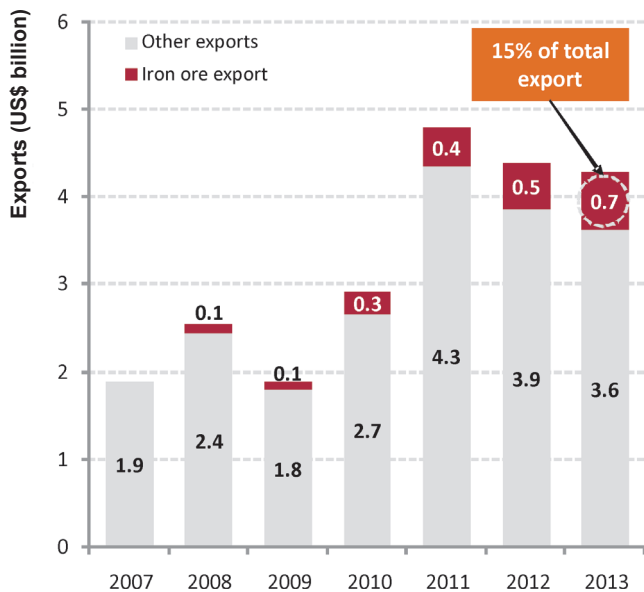


Two iron ore operations (Oyut Ovoo and Tumurtei) have been temporarily halted due to low realized iron ore prices once adjusted for iron content

Note: Selenge project is the only project expected to commission production in the short-term

Iron ore is the 3rd biggest contributor to Mongolian exports and budget after coal and copper

Contribution of the Iron ore sector to the Mongolian economy



Iron ore's contribution to exports and increased contribution to budget revenue is attracting government interest resulting in the sector declared as strategically important

Although the government sees the sector as strategic and have plans to further develop, market sentiment contradict its convictions

Market Sentiment and Government convictions

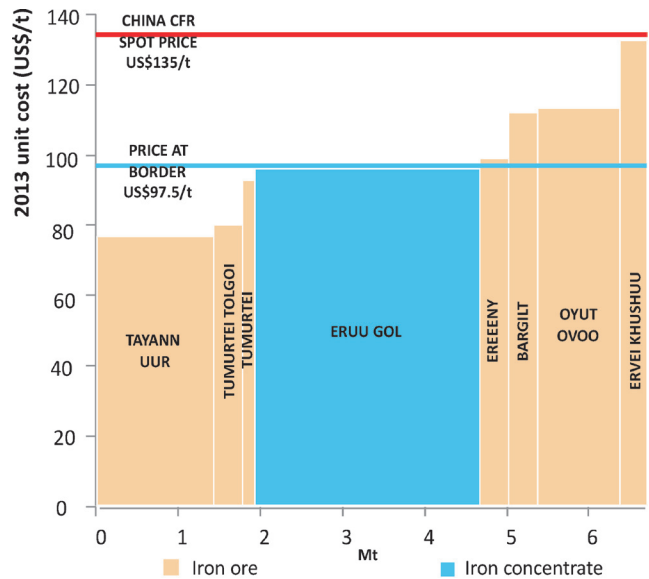
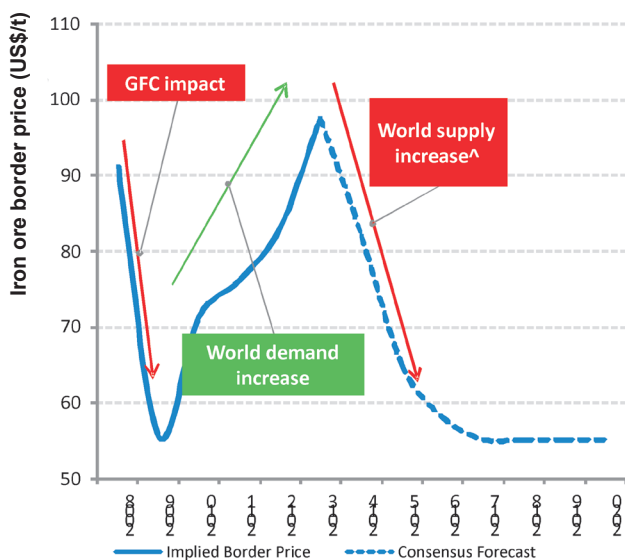
	Key themes	Key findings
Strategic commodity	<ul style="list-style-type: none"> Subject to Mongolian ownership of no-less than 34%. However, ownership restrictions are not exercised in practice 	<ul style="list-style-type: none"> Nationalistic sentiments are strong due to dominant interest of neighboring Chinese companies
Pursuing downstream processing	<ul style="list-style-type: none"> Construction of a MNT 400 million DRI plant with iron ore beneficiation in the Darkhan Region and a DRI plant with capacity of 2.5 Mtpa is also planned under Sainshand Industrial Park (SIP)* to create value add in Mongolia 	<ul style="list-style-type: none"> Significant investment obstacles are likely given the relatively short iron ore mine life in Mongolia and current price outlook for Iron Ore
Environmental issues	<ul style="list-style-type: none"> Strong public opposition towards iron ore producers due to environmental, social and community issues. Public protests have occurred seeking to halt the operations of the largest producer (Eruu Gol) 	<ul style="list-style-type: none"> Aggressive expansion plans are likely to cause friction between the government and the general public

Given short iron ore mine life in Mongolia, significant investment obstacles are likely

*SIP includes nine processing plants (copper smelter, iron pelletizing, coke plant) requiring investment of US\$ 9.5 billion (6 times higher than the Chinggis bond)

High cost, small size, and low quality impede the competitiveness of Mongolia's iron ore sector, demotivating investors

Outlook of iron ore border price and unit production cost

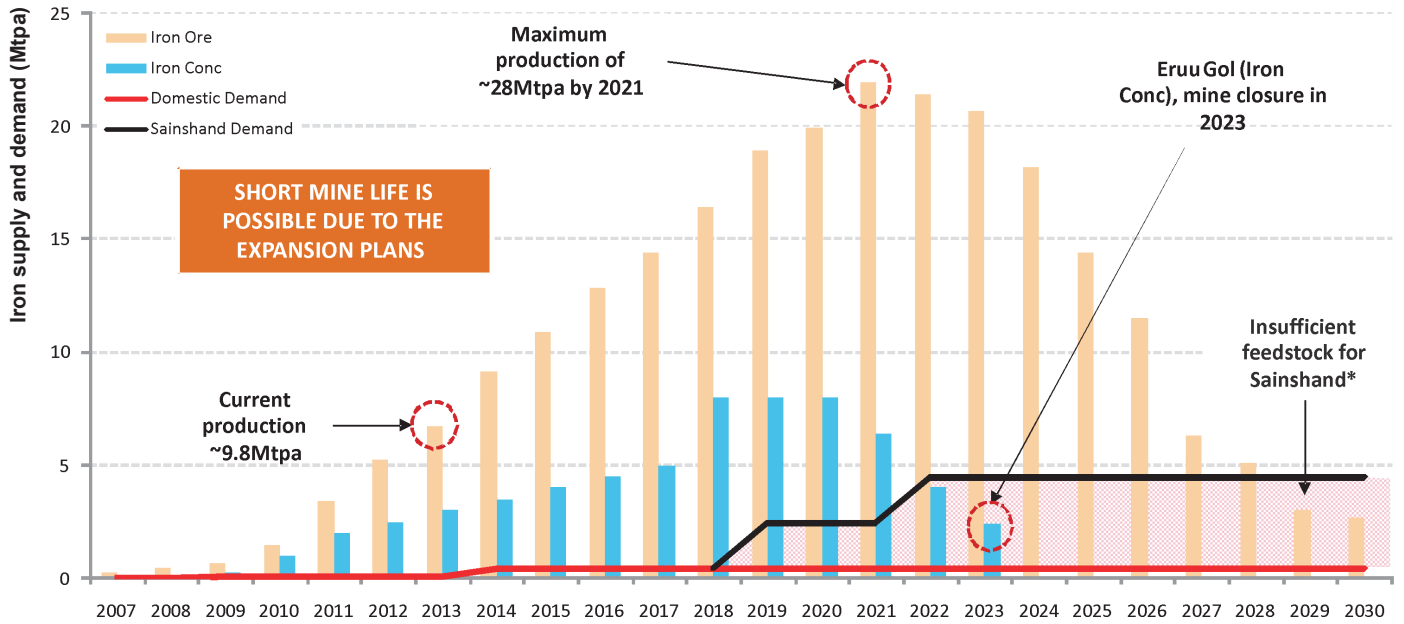


Room for cost optimisation is limited due to infrastructure constraints, vulnerable macro economic conditions and an unfavourable investment environment in the mining sector

^Over 60 iron ore projects are planned to be started in 2013-2015 with a total capacity of 625 Mt (340 Mt from BHP Billiton, Rio Tinto, Vale and FMG)

Current Mongolian iron ore producers are projected to generate ~227 Mt of iron ore and ~54 Mt of concentrate in 2014-2030

Outlook of iron ore production and demand (2007-2030)

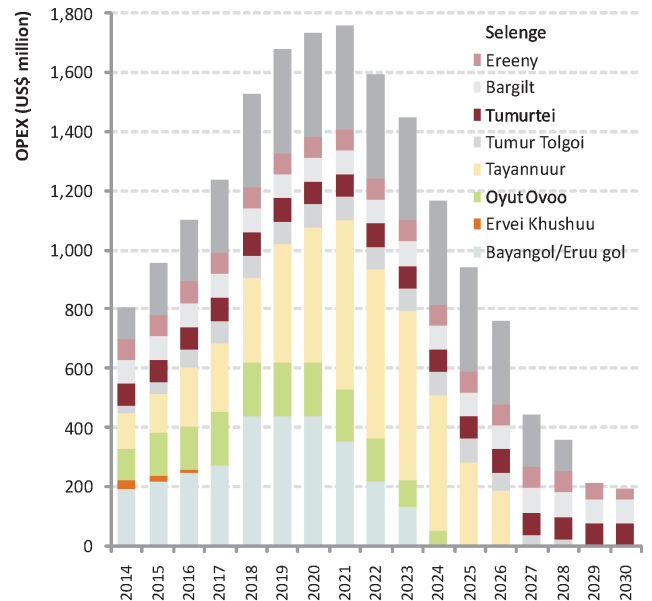
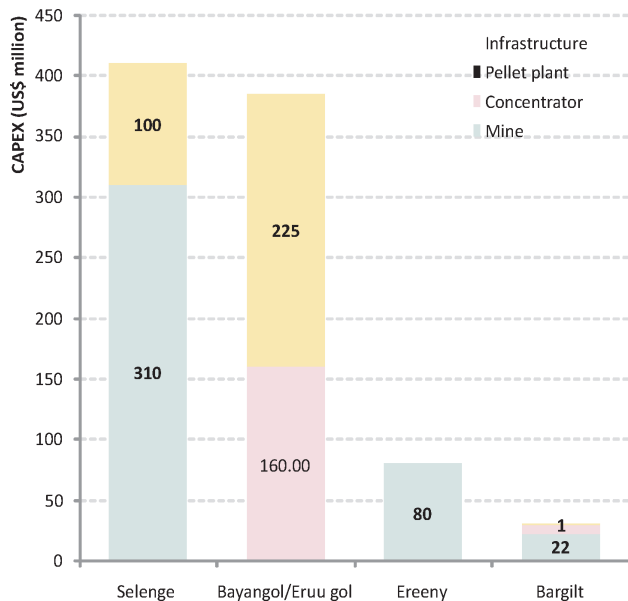


Rapid resource depletion is likely despite the governments policy to limit exports, however this is subject to investment availability for aggressive expansion plans

*Sainshand Industrial Park (SIP) – Iron Pelletizing Plant

Iron ore producers need an additional US\$18.8 billion of capital investment to develop and continue its operations in 2014-2030

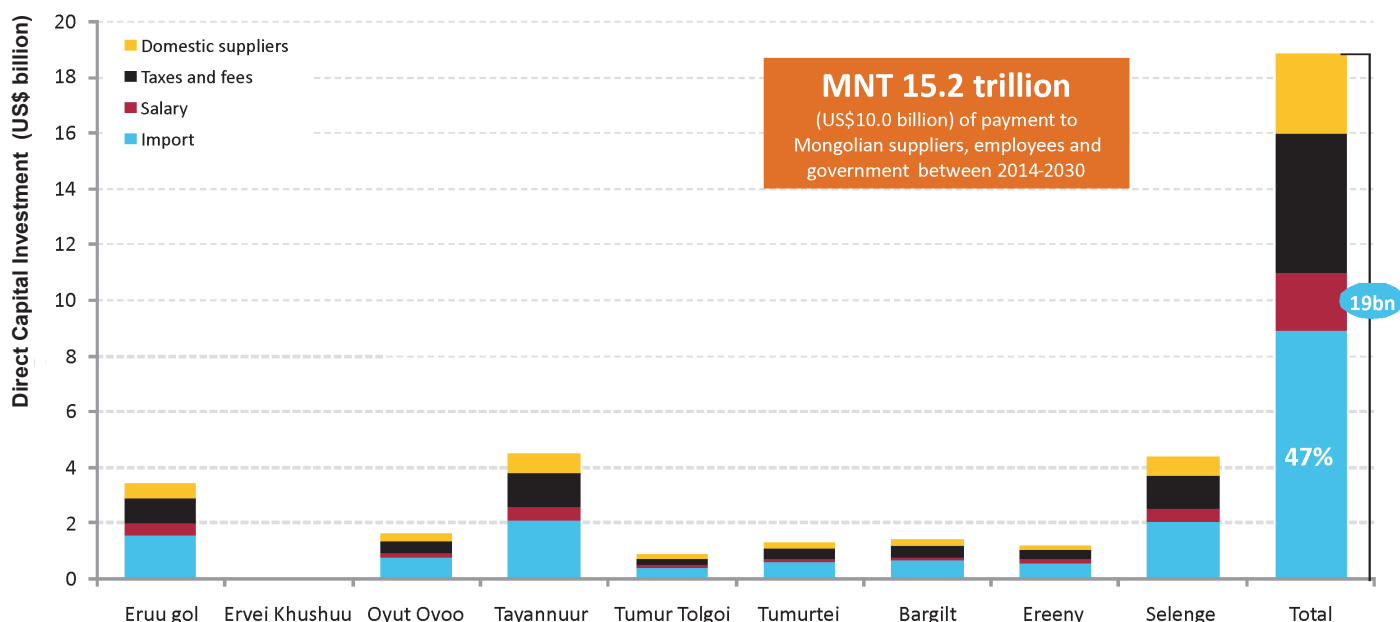
Investment assumptions



Mine development, enabling infrastructure and a concentrator requires ~US\$0.9 billion in capital investment, while total OPEX is estimated to be US\$17.9 billion across 2014-2030

Excluding import purchase, 53% of the total investment[^] in the sector is estimated to remain in Mongolia with a multiplier effect

Investment assumptions (2014-2030)



One of the main purposes of this analysis is to estimate the additional indirect impact (multiplier effect) of iron ore projects on the Mongolia economy

[^]CAPEX and OPEX

In order to estimate the economic impact of the iron ore sector in Mongolia, this analysis considered two different scenarios

Assumptions used in these two scenarios

Base Case:
No Iron Ore
(hypothetical)

- This modelling assumes **all major mining projects** will operate according to their mine **plans[^]** except iron ore (**no iron ore in the economy**)
- Commodity prices are based on consensus prices discounted to Mongolian border price
- Additional FDI into the mining sector development is estimated to be US\$13 billion excluding iron ore sector in 2014-2030, out of which: Thermal coal - **US\$1.4 billion**, Metallurgical coal - **US\$1.2 billion**, Copper - **US\$8.7 billion**

Policy Case:
With Iron Ore

- In addition to base case mining production, **227.3 Mt of iron ore and 53.8 Mt of concentrate** will be produced by current iron ore producers between 2014-2030
- Iron ore price is based on **consensus price** discounted to Mongolian border price and is expected to decline in the midterm
- An additional **US\$0.9 billion** of CAPEX will to be injected into the Mongolian economy through FDI and domestic investment in 2014-2015 for the Iron Ore industry and US\$17.9 billion of OPEX will be spent by the industry across 2014-2030

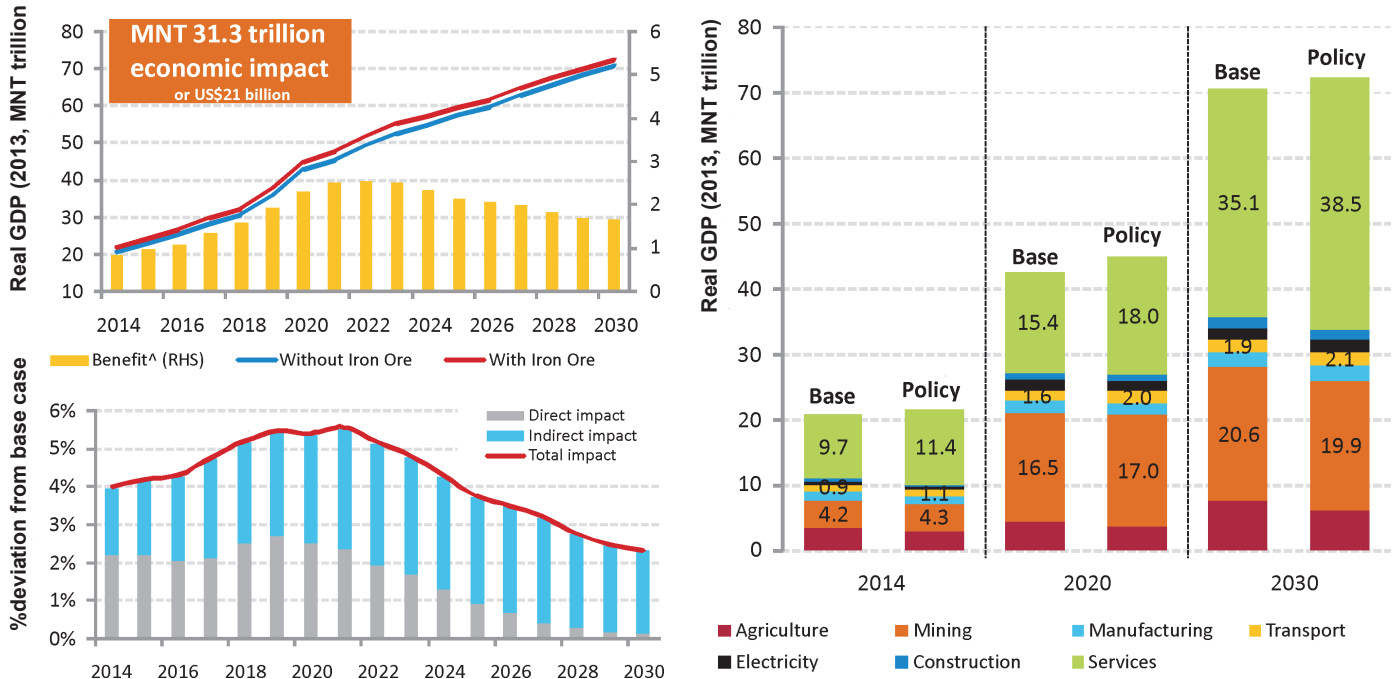
All indicators are in 2013 price. USD/MNT annual exchange rate is 1523

[^]Assumes OT underground starts in 2015

Implication

The total economic impact is ~MNT 31.3 trillion (US\$20.8 billion) from 2014-2030, notably in the mining, transport & service sectors

Direct and indirect impact of the Iron Ore sector on Real GDP (RGDP)

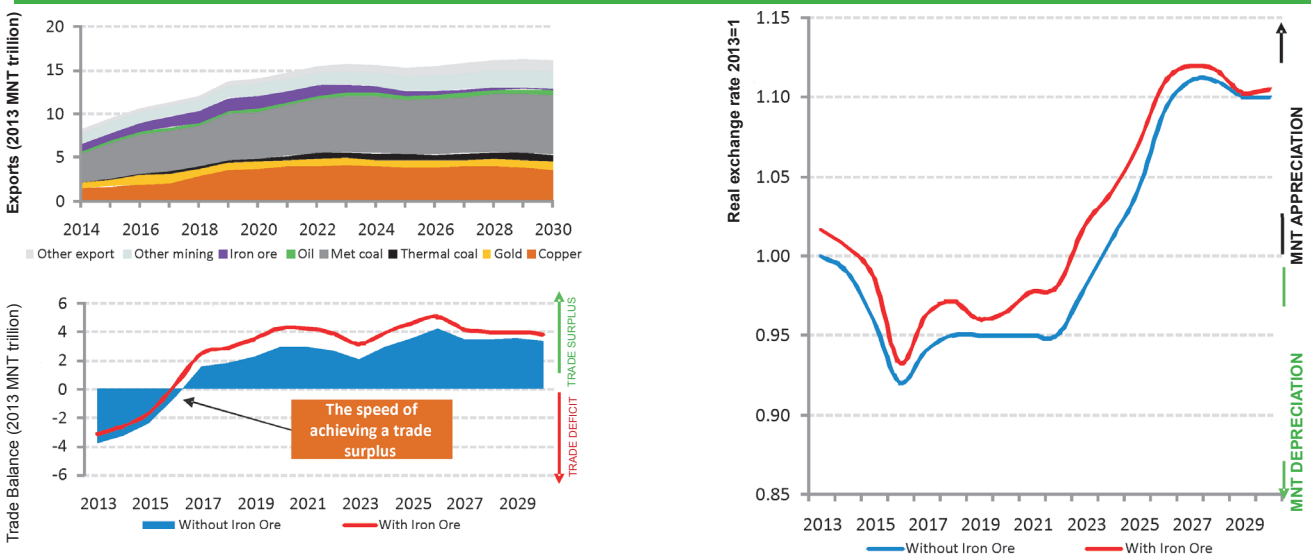


Indirect impact through domestic value add in the transport and service sectors increases over time as a key input for Iron Ore

Base case represents a scenario without Iron Ore, while policy case represents a scenario with Iron Ore, ^Benefit is the difference between the two scenarios

The sector has a higher impact on export and investment inflows than on imports that will cause moderate MNT appreciation

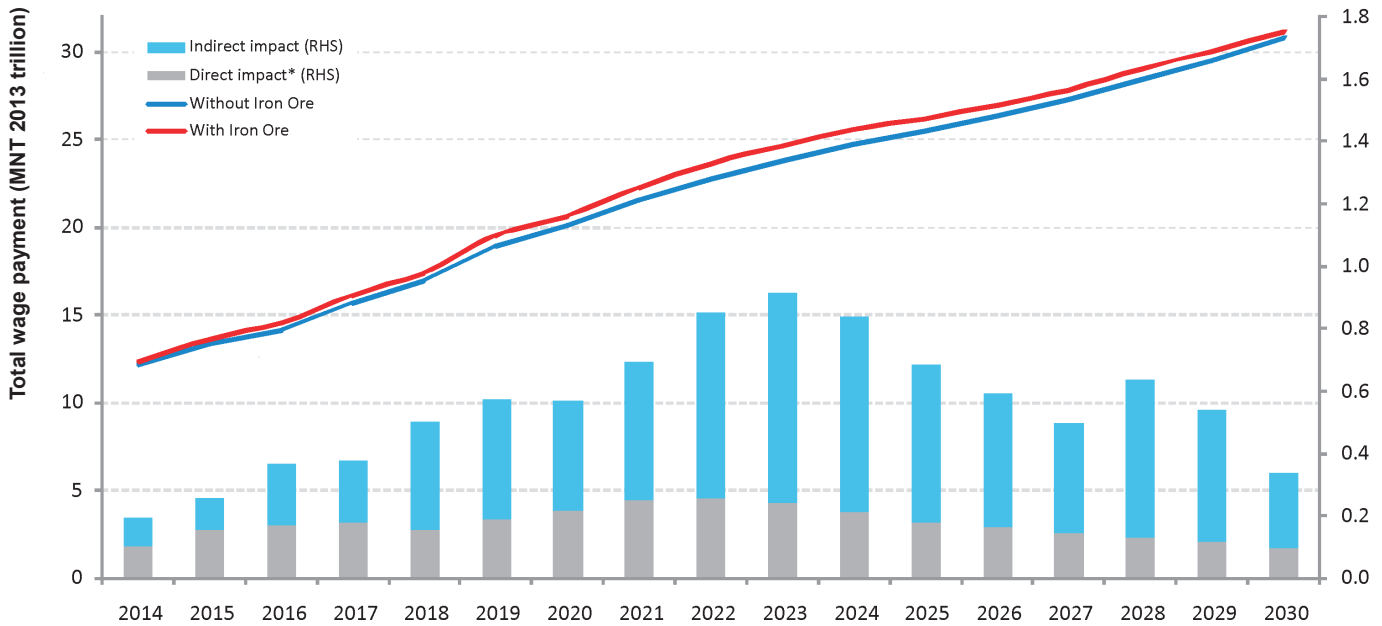
Impact on foreign trade and exchange rate



Iron ore exports will contribute ~6% of total exports on average between 2014-2030

Investment in the sector is not labour intensive however as labour demand increases by 4,300 employees wages will adjust accordingly

Impact on total wage payment

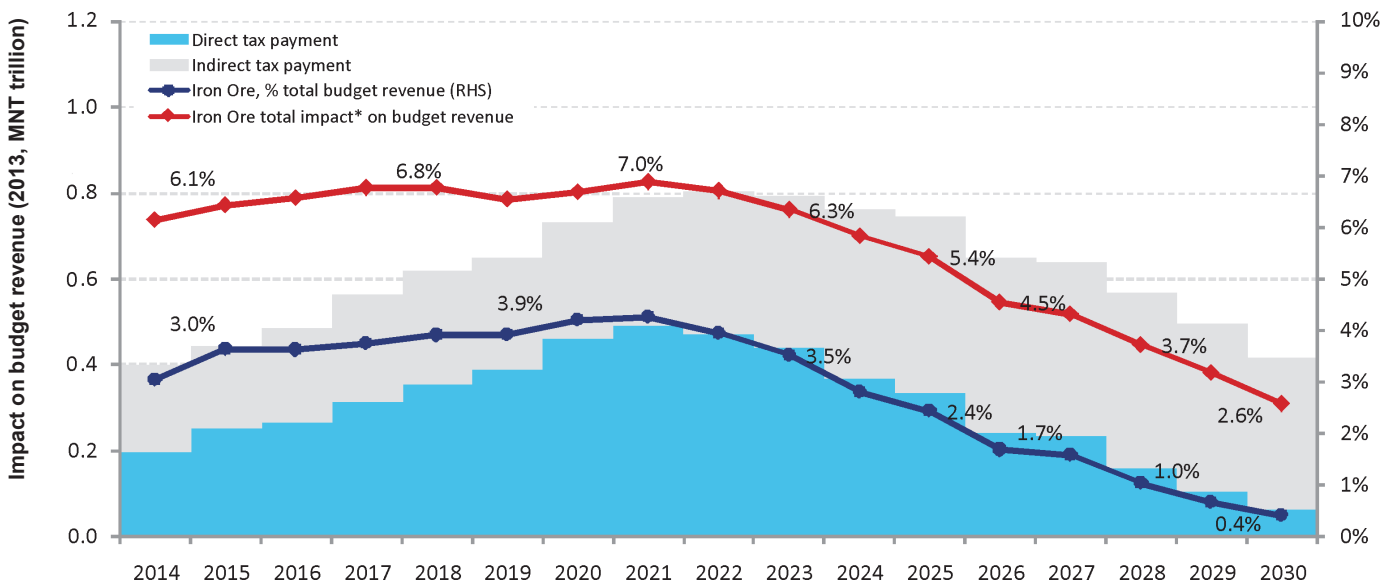


Household income will increase by ~MNT 9.4 trillion (US\$6.2 billion) in 2014-2030, of which the majority or 70% is from the sector's spill over impact for demand in the labour market

*Direct: taxes and wages paid by projects, Indirect: taxes and suppliers, employees and foreign trade revenue based on wages paid by their suppliers and services

By 2030, the direct contribution to budget revenue will decrease to 0.4%, however, total impact on budget will be more than 2%

Impact on total state budget (direct and indirect impact)

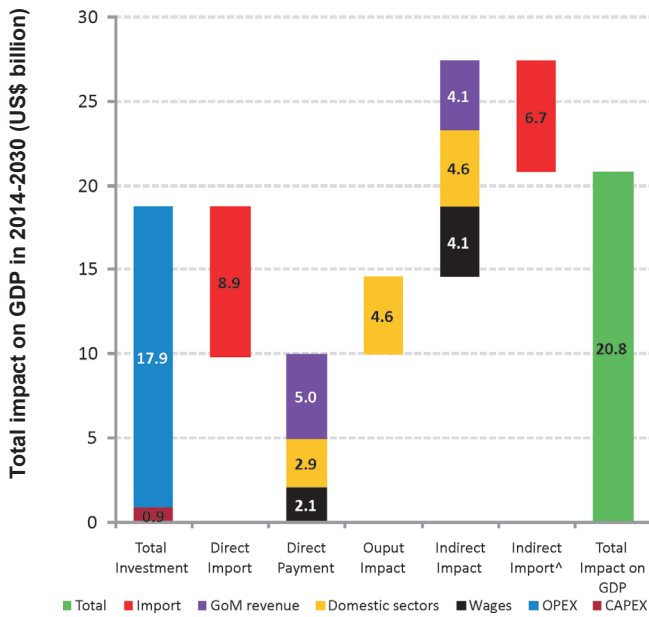


Government budget revenue will increase by MNT 13.8 trillion (US\$9.1 billion) in 2014-2030, and at its peak in 2021, the total impact will increase state budget revenue by 7%

*Direct: taxes and wages paid by projects, Indirect: taxes and suppliers, employees and foreign trade revenue based on wages paid by their suppliers and services

The development of the iron ore sector has a 4% contribution to total value add US\$1.2 billion on average annually in 2014-2030

Impact of the iron ore sector on the economy



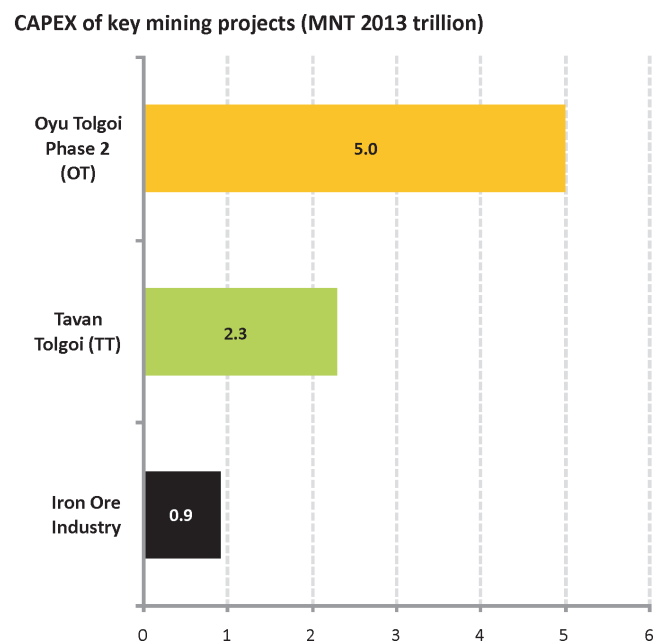
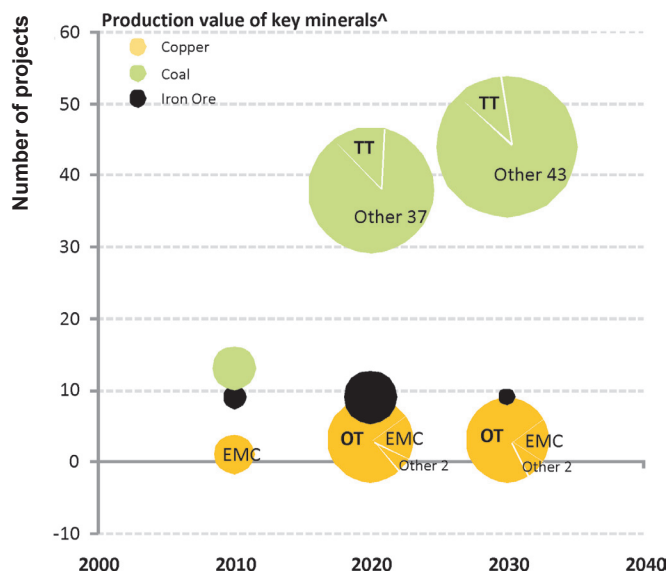
MNT trillion (2013 terms) Economic Impact we expect:	Now: 2013	By 2030	
		Base Case: No Iron Ore	Policy Case: With Iron Ore
Real GDP	17.5	70.8	72.4
Private Consumption	8.0	28.3	29.1
Government consumption	2.9	18.4	18.7
Investment	8.7	20.5	21.2
Export	4.3	16.0	16.2
Import	6.4	12.4	12.8
Total wage payment	8.2	30.8	31.1
Budget Revenue	5.9	25.8	26.2

^Domestic suppliers, employees and government's import purchase based on revenue from Iron ore projects

Comparative Analysis

The size of the iron ore sector is estimated to be marginal compared to other mineral potential in Mongolia

Size of the key mineral sectors in Mongolia



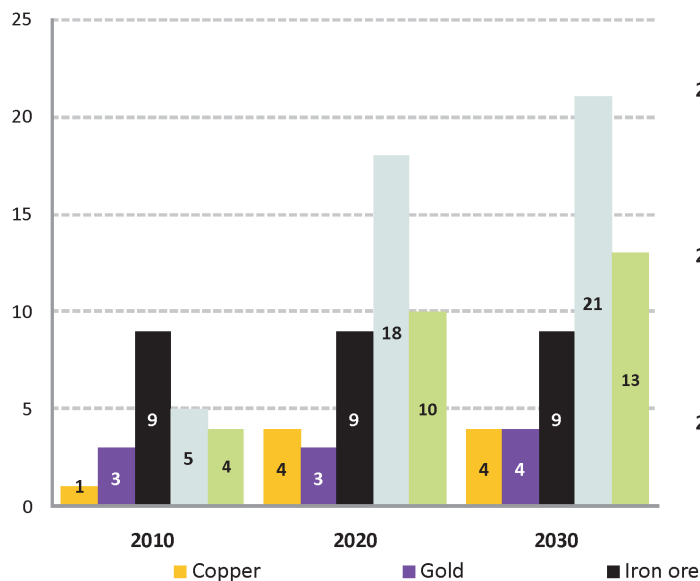
Required CAPEX for all of the iron ore projects is equal to one fifth of OT's Phase 2 investment

^Bubble size represents the estimated production value in MNT 2013 trillion

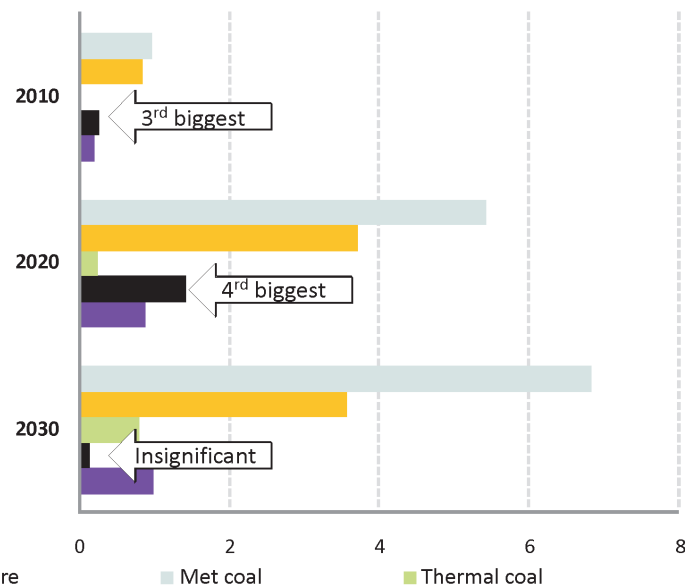
The impact of the iron ore sector on total exports is likely to diminish over time and will become negligible by 2030

Contribution to mineral exports

Number of mining operations ^



Mining exports (MNT 2013 trillion)

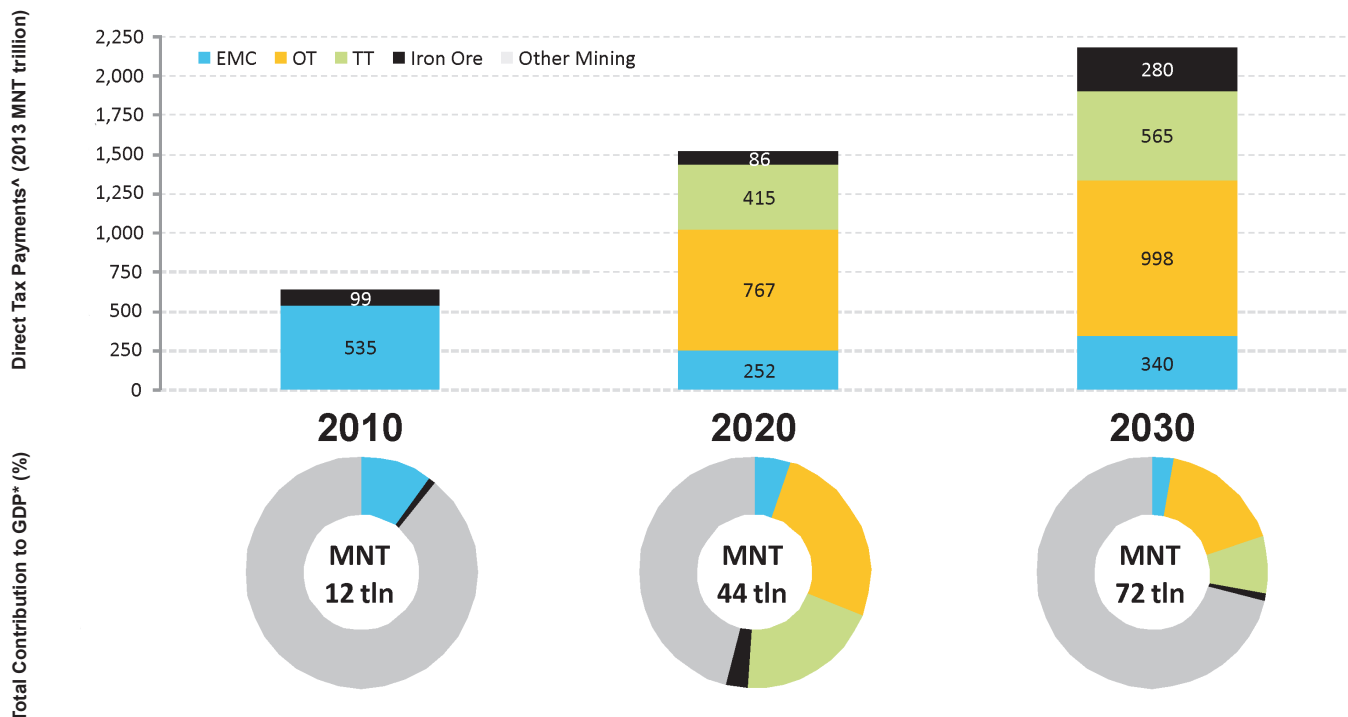


Short mine life of the mining operations such as Eruu Gol (16.5% of the sector) that is estimated to stop in 2023 will cause the economic impact of the iron ore industry to diminish over the long term

[^]No double counting: Although OT has gold reserves its considered as a copper mine only

The iron ore sector's contribution to the Mongolian economy will be ~5% at it's peak, ~5 times less than the OT 's contribution alone

Impact on the economy and state budget revenue (2013 MNT trillion)



*Direct and indirect impact , ^Indirect impact on tax revenue is not considered

The economic impact of the iron ore industry on the Mongolian economy is estimated to be marginal in the long term

Summary Findings

This study seeks to estimate the direct and indirect impact of the Iron Ore industry on the Mongolian economy until 2030

Current situation (2013)

- Iron ore is the **3rd biggest contributor** to Mongolian exports and state budget after coal and copper: 15% of total export revenue, 10% of total mining tax revenue or 2% of total budget revenue
- **Impact on labor market is low:** Employing only 4300 people, total wage paid by the iron ore sector is only 0.4% total national wage payment
- Direct **value add** from iron ore sector is **2% of GDP**, and including its indirect impact through its supply chain and job creation, total impact of the sector on GDP reaches **3.5%**

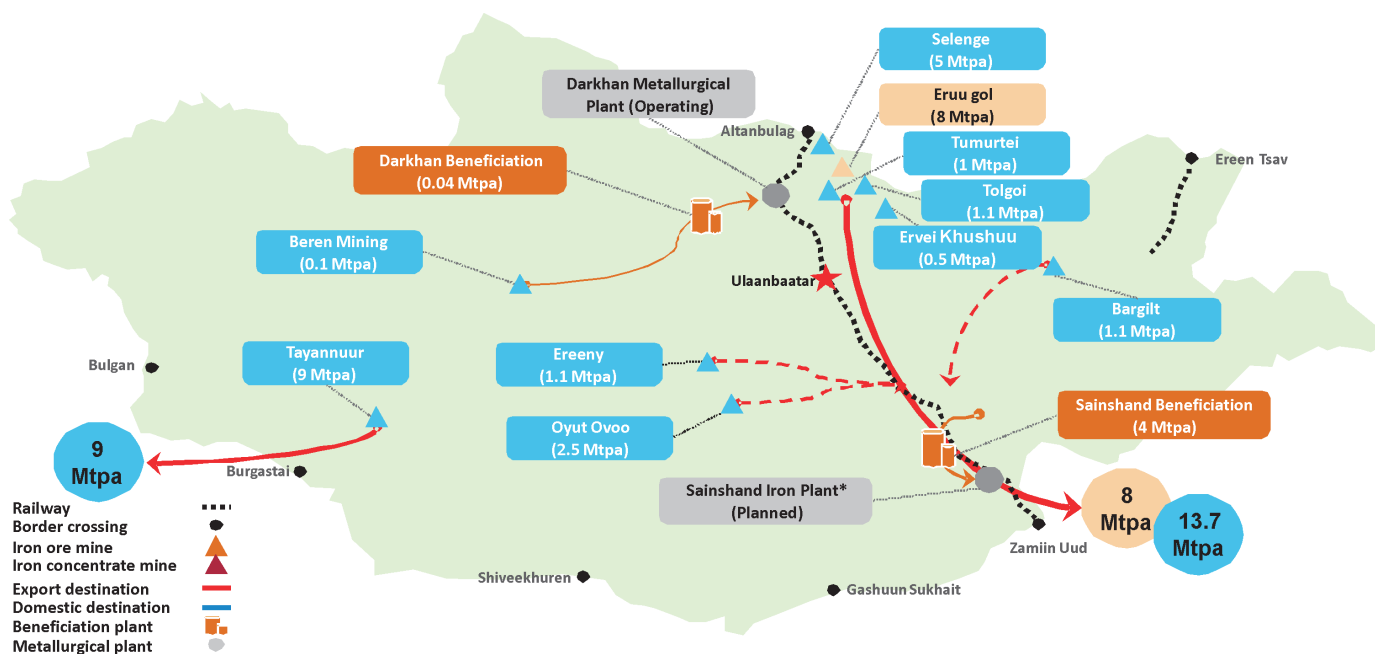
Future outlook (2014-2030)

- The impact of the iron ore sector on **total exports will diminish over time** and become negligible by 2030 (0.8% of total export by 2030)
- The development of the iron ore sector has only a **relatively small contribution to total domestic value add** (~4% of GDP or US\$1.2 billion on average annually in 2014-2030)
- **Iron ore sector's impact on the Mongolia economy will be less than only one of the other large projects:** Iron ore sector's contribution will be 5% at it's peak, ~5 times less than the OT 's contribution alone

APPENDIX

Despite aggressive industry expansion, short mine life may lead to SIP having a shortage of feedstock (in the future)

Mongolian Iron ore industry in 2020 (Mtpa)



*Sainshand Industrial Park (SIP) – Iron Pelletizing Plant