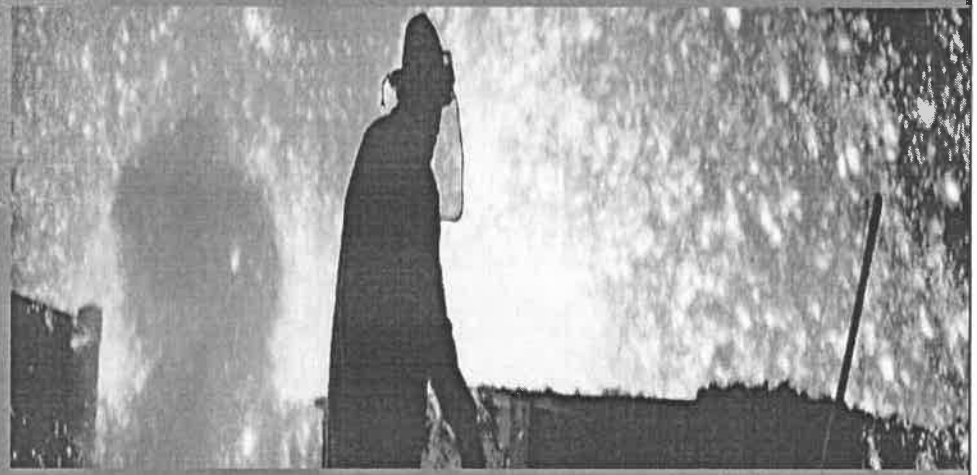
YASAI Resources



Akzhar-Sarytuma manganese deposit development and "Aksu electro-metallurgical plant" (AEMP) construction

Investment project

Overview

This is a brand new manganese ore discovery in Kazakhstan. Kazakhstan historically produced 600 000 mt of Manganese Ore per year but the mines have run our of reserves and no longer operate. The region currently consumes 700000 mt of manganese ore/concentrate and now imports its requirements from South Africa. The Akzhar-Sarytuma deposit has the potential to be a lowest quartile producer, reserves are likely to support a mine life in excess of 20 years and low cost power is available to support the construction of a 115kt Silico Manganese smelter that could consume around 50% of the ore produced. Alternatively 63kt of Ferro Silicon could be produced in the smelter and all the ore sold. The smelter will be fed by a dedicated power line direct from one of Kazakhstan's largest power stations and a fixed price of electricity at a current equivalent of 1.5USC/kHhr is guaranteed by the government for at least 7 years. $18m required to get started. $30m equity required to complete the project.

3 Elements to the project

1 Construct a concentrator plant to process manganese ore to produce a 38% manganese concentrate.
2 Construct a substation and power lines allowing access to the national grid power supply for further distribution.
3 Construct a smelter to produce either 115kt of Silico Manganese or 63kt of Ferro Silicon

All 3 elements are independent although the smelter would require the construction of the substation for the supply of power

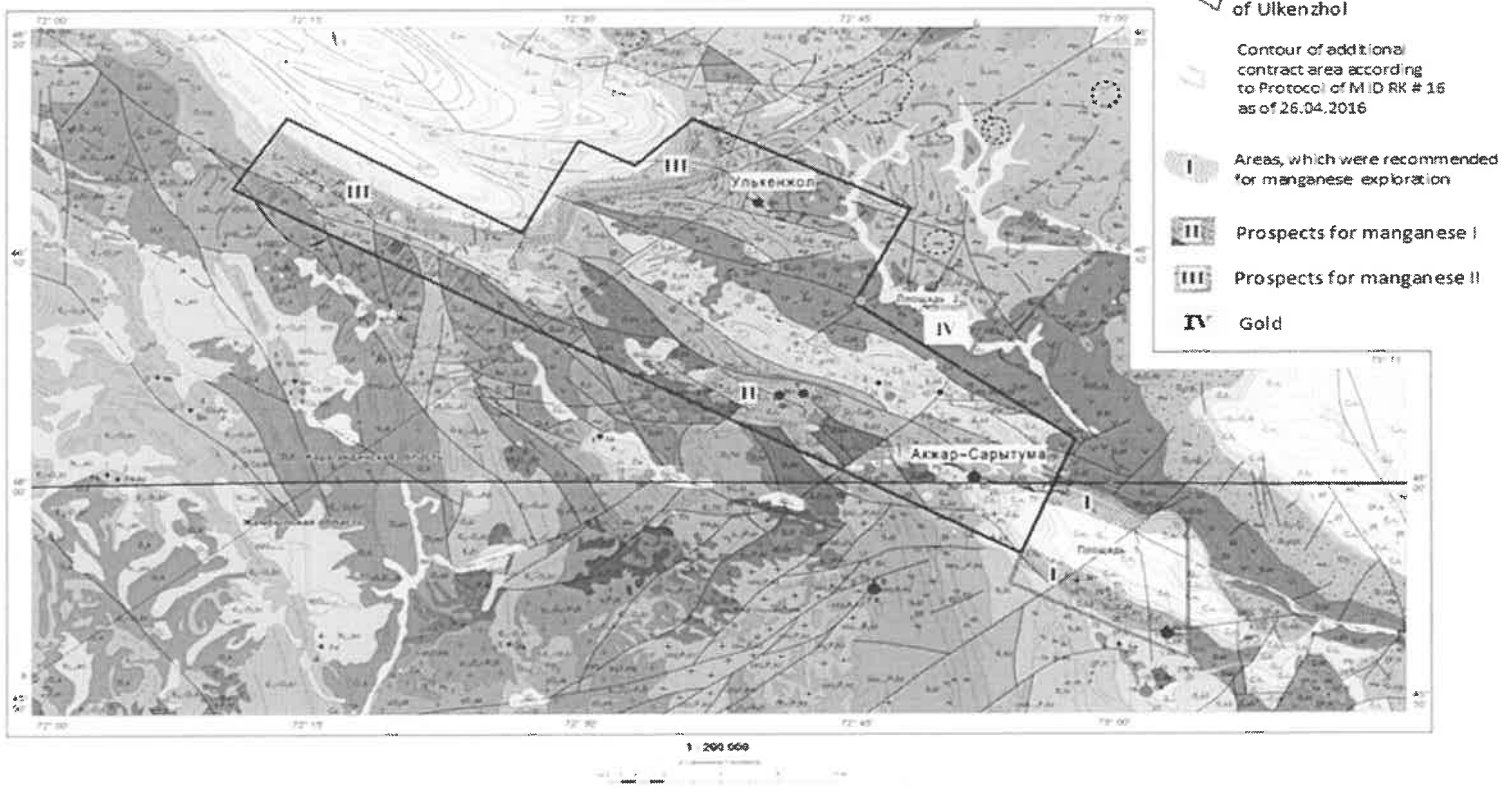
Manganese Ore Deposit location

The recently discovered manganese deposits Akzhar-Sarytuma and Ulkenzhol are located in the Karaganda region of Kazakhstan approximately in 725 km southeast of Astana, in the west of Balkhash sea, 75 km west of the Koktas railway station on the main Karaganda-Almaty rail way.
The total area of the licensed territory is approximately 1000 sq.km.

Geological map

Of the districts of Akzhar-Sarytuma and Ulkenzhol fields

1 : 200 000



Deposits reserves according to the protocol of GKZ (state reserves committee)

Location	The average content of Mn ores, %	Reserves of C2 category, ths.tons	Off-balance reserves of C2, ths.tons	Reserves P1 category, ths.tons	Total reserves, ths.tons
Akzhar-Sarytuma	22.55	4 472.5	3 468.9	3 466.0	**11 407.4**
Ulkenzhol	20.55	526.6	3 867.0	2 134.0	**6 527.6**
Akzhar-Sarytuma + Ulkenzhol		**4 999.1**	**7 335.9**	**5 600.0**	**17 935.0**

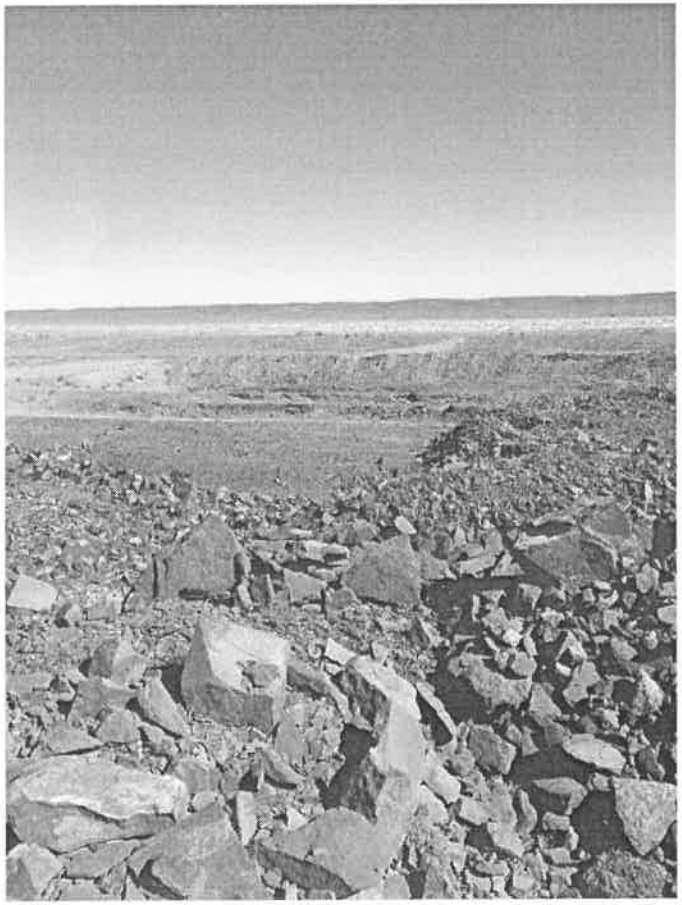
- In 2016, geological exploration was done at Akzhar-Sarytuma site and the reserves were approved in the amount of 17,935 ths.tons (GKZ, C2 category).
- In 2017, additional exploration was done on the incremental area, which will allow to increase the reserves by 5,000 ths.tons (GKZ, C2 category).
- **SRK have been retained to verify the ore reserve to JORC standard, completion expected by September 19.**

Location	The average content of Mn ores, %	Jorc indicated reserves (C1), ths.tons	Jorc inferred reserves (C2), ths.tons	Total reserves, ths.tons
Akzhar-Sarytuma + Ulkenzhol	22	12 000.0	10 000.0	**22 000.0**

- **It is anticipated in 2019 the total reserves of manganese ore will be in excess 22million metric tons.**

Currently only 10% of the license area has been explored, it is believed the reserve potential of the contract area can be in excess of 40 million metric tons.

The main stages of Akzhar-Sarytuma manganese deposit development and construction of concentrating plant (CP)



- **January 2019 – September 2019**

1. Estimation of minimal resources under JORC indicated min up to 12 mln. Tons, giving 10 years mine life;
2. Completion of feasibility study September 2019;
3. Anticipated start of construction of concentrator facility is October 2019.

- **October 2019 – December 2020**

Construction of concentrator with 400-450 ths.tons annual production capacity of manganese concentrate with a manganese content of 37-38%. Completion and 1st sales December 2020. Simple gravity separation technology will be employed.

Estimated Capex cost = $18 million

Concentrate cost

Average cash cost per 1 ton of 38% concentrate for 10 years production is $ 56.8

Cost Centre	Cost per 1 ton of concentrate ($)
Ore mining	$ 25.9
Ore transportation	$ 13.1
Ore processing	$ 12.2
Administrative expenses and MET	$ 5.7
Total	**$ 56.8**

Cash cost of 1% Mn is expected to be $ 1.5

Performance indicators

Payback period

1

year

Internal Rate of Return (IRR)

217

%

Net present value (NPV)

195.6

$ mln

Profitability Index (PI)

13.1

ratio

Ferroalloy Smelter

- Situated near Pavlodar city in the east of the country.
- ERG AKSU smelter complex next door.
- Road, rail infrastructure in place
- Skills readily available
- Feasibility study complete
- Capacity 115000mt per year of FeSiMn or
- 63000mt of FeSi
- FeSiMn exportable globally
- Total construction cost $161m

Cost of the project "Aksu electro-metallurgical plant"

- **Cost of construction of ferroalloy complex = $ 161m**
- Low cost development bank loan negotiated = $ 151m
- Equity required = $ 10m It is anticipated that this the initial equity will fund the electricity power lines and sub station.

(Historical investments as of 01.01.2019 = $ 10.2 mln

Project Benefits

Low production cost

Cheap electricity (without services for the transfer of electricity via KEGOK networks in the amount of 0.015 $/ kWh)

Optimal transport logistics

Proximity to the largest steel consumers in Russia and Kazakhstan

Potential of import substitution

The minimum production of FeSiMn and the almost complete absence of the manufacture FeSi in Kazakhstan. The nearest supplier is Chelyabinsk

Availability of own raw material base

Adelya Mining Enterprise, a member of the holding, for the extraction and enrichment of manganese ore with a production capacity of 400-450 thousand tons of concentrate per year

Governmental support

Customs duty preferences

- Exemption from customs duties when importing technological equipment and components

State in-kind grants

- Land plots, buildings, structures, machinery and equipment, etc. in the maximum amount of up to 30% of the amount of investment

Tax preferences

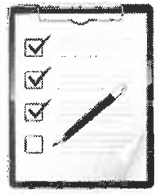
- Reducing the amount of calculated corporate income tax by 100%, applying the coefficient 0 to land tax and property tax rates

Investment Subsidy

- Reimbursement up to 30% of the actual costs of construction and installation works and the purchase of equipment excluding VAT and excise taxes

Law of the Republic of Kazakhstan "On Investments"

State Program on Forced Industrial-Innovative Development of the Republic of Kazakhstan



List of investment priority projects

Performance indicators

Discounted payback period

6.4
years

IRR

23.7
%

NPV

165.5
$ mln

PI

1.5
ratio

Project performance indicators do not take into account the possible impact of investment preferences

Technical and economic indicators

14

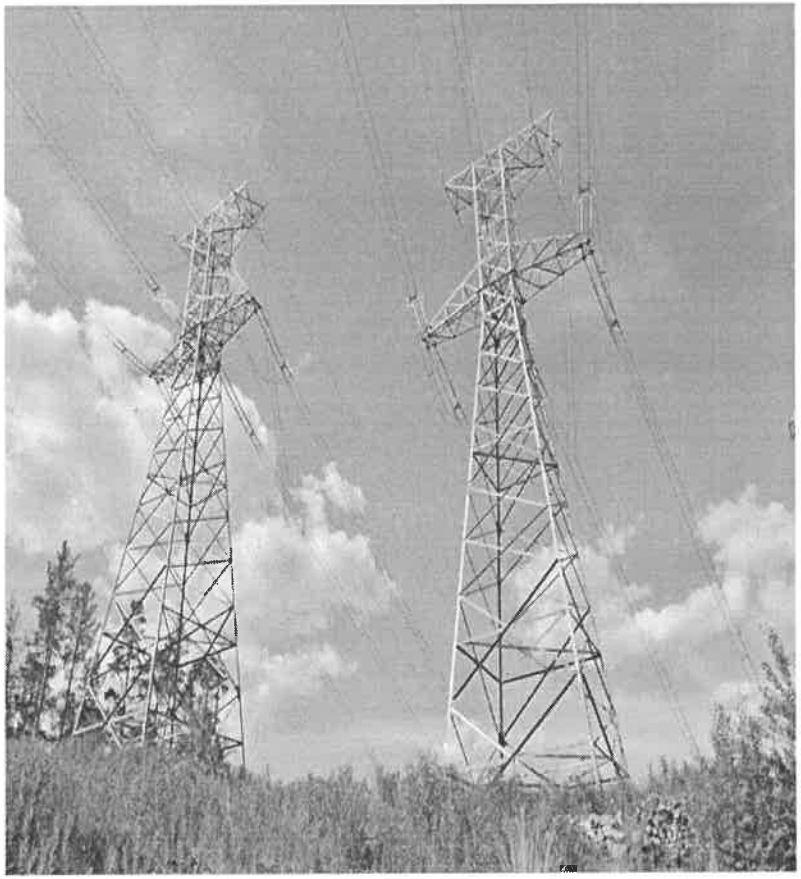
15

- Average total cost of 1 ton of FeSiMn[1]: **$ 758 /** FeSi: **$ 514**
- Average price of 1 ton of FeSiMn[1]: **$ 1220 /** FeSi: **$ 1679**
- Assumed cost of manganese concentrate: **$ 5.5 of 1% Mn**
- Average sales volume per year[1]: **$ 120.4 mln**
- Construction duration: **30 months**
- Achievement of production capacity period: **6 months**
- **Electricity cost USC1.5/kWhr for 1st 7 years**

The average EBITDA margin for twenty years of the project is 52%

1- excluding inflation and VAT

Power Distribution Project "AEMP" LLP



There is a shortage of access to the national grid in the Pavlodar area and an opportunity exists to Build power lines and a sub station To supply 3rd parties as well as the smelter

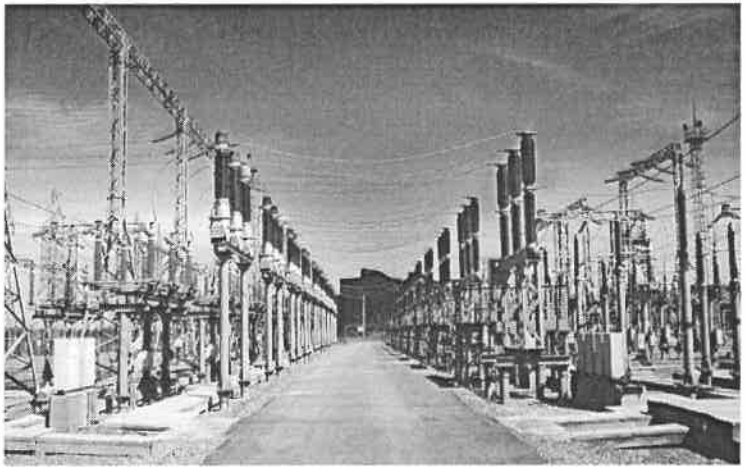
Construction cost is **$ 10 million**

- Lines 220 kW – **$ 6,6 mln**
- Sub station 220/35/10 kW – **$ 3,4 mln**

Construction duration 12 months

External power supply scheme of "AEMP" LLP

Power line 220 kW



Main reducing power station 220/35/10 kW

Revenue from electricity per year (without VAT):

- Sales volume - 840 mln. kWh
- Revenue - $ 17.1 mln.
- COGs – $ 13.6 mln.
- Gross income - $ 3.5 mln.

External power supply scheme of "AEMP" LLP

Performance indicators

Discounted payback period

2.4 years

IRR

45.2 %

NPV

20.4 $ mln

PI

3.0 ratio

On a stand alone basis. $20.4m NPV also included in Smelter NPV

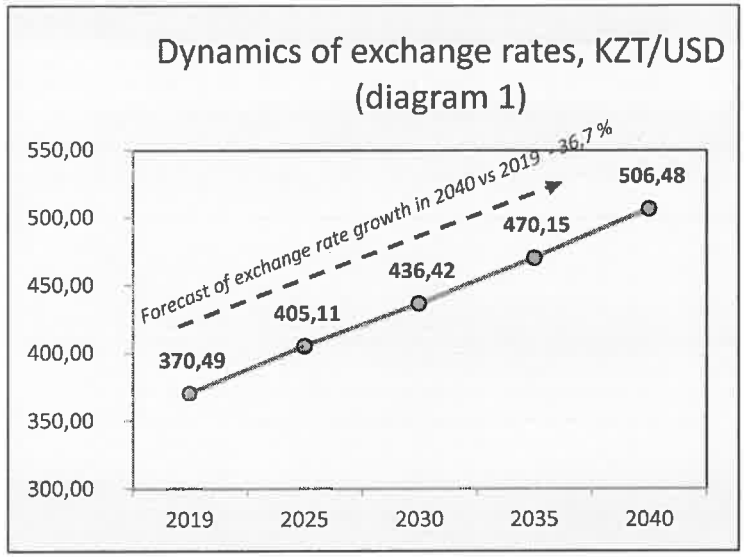
TOTAL Investments in Mn & AEMP projects

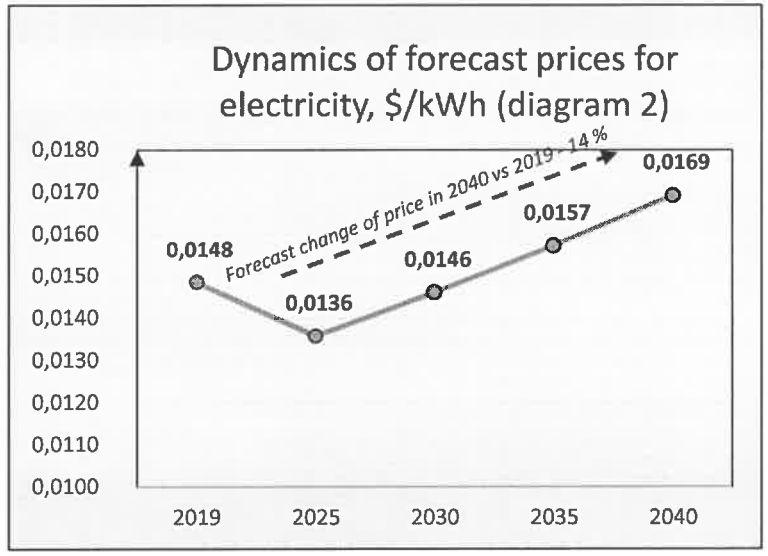
Total project cost = $ 179m

Capital expenditure	Construction, investment periods	Cost in $ mln	Source of funds
Construction of Mn concentrating plant	2019-2020	18.0	Equity
Construction of external power supply scheme, other expenses	2019-2020	10	Equity
Construction of ferroalloy production complex	2021 – 2023	151	Loan

- **Initial estimated life of project – 22 years**
- **Payback period – 3 years**
- **NPV >$360m**

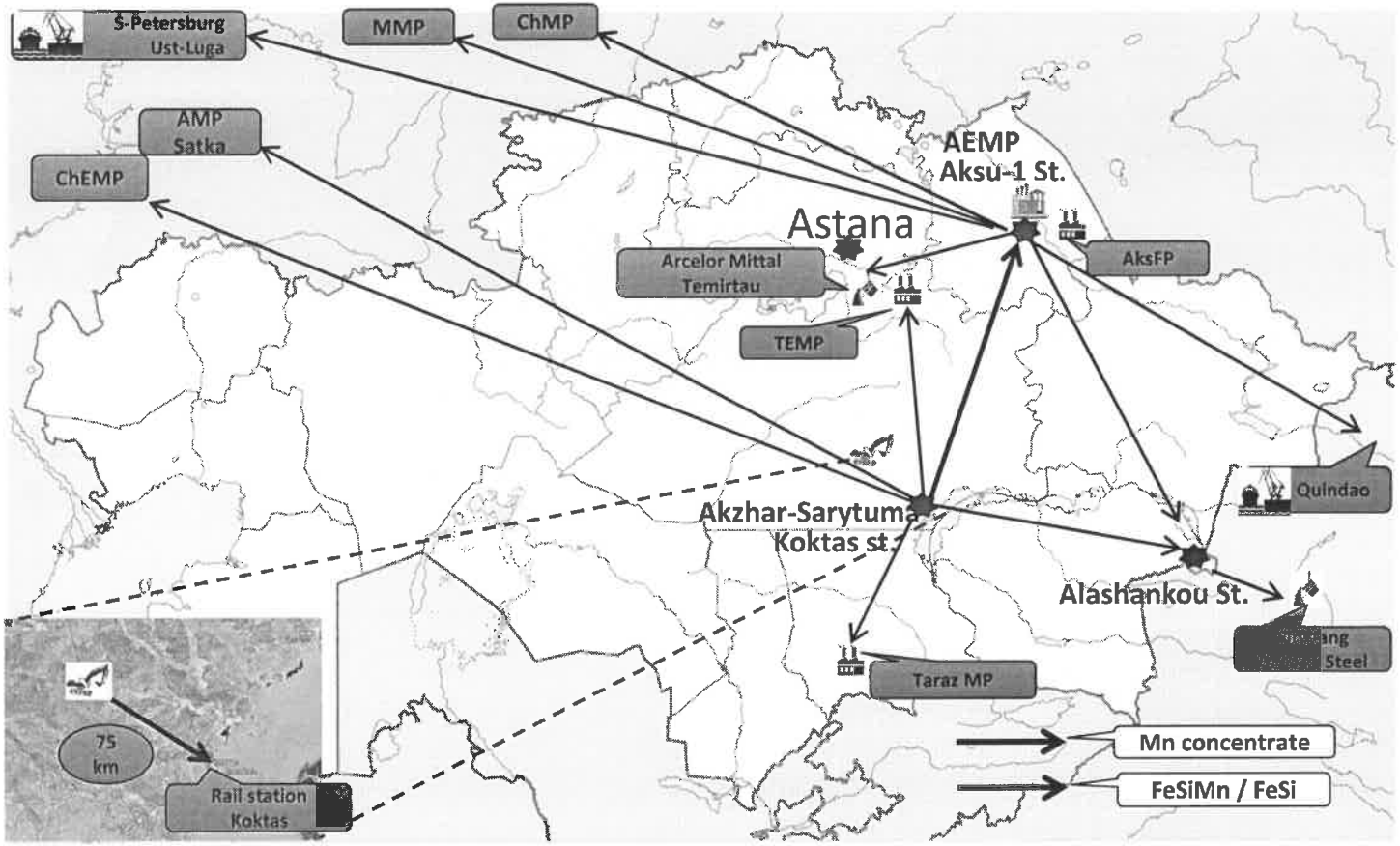
Economic Assumptions





- The project considers the growth of exchange rate from 370,5 KZT/USD in Y 2019 to 506,5 KZT/USD by Y 2040. Diagram 1
- The prices for electricity used in project estimations for the first 7 years (2019-2025), were taken based on the Order of the Ministry of Energy of RK: 5,5 KZT/kWh (0,0148 $)
- Starting from 2026 the annual 3% growth of the price for electricity was estimated.
- By 2040 the forecast price for electricity is 8,6 KZT/kWh (0,0169 $) Diagram 2

Marketing research



Transportation cost, $/ton

Koktas st.	Mn
Aksy-1	8,5 $/t
Zhana-Arka	4,9 $/t
Zhambyl	5,5 $/t
DAP Alashankou	7,4 $/t
Satka	16,6 $/t
Chelyabinsk cargo	14,2 $/t

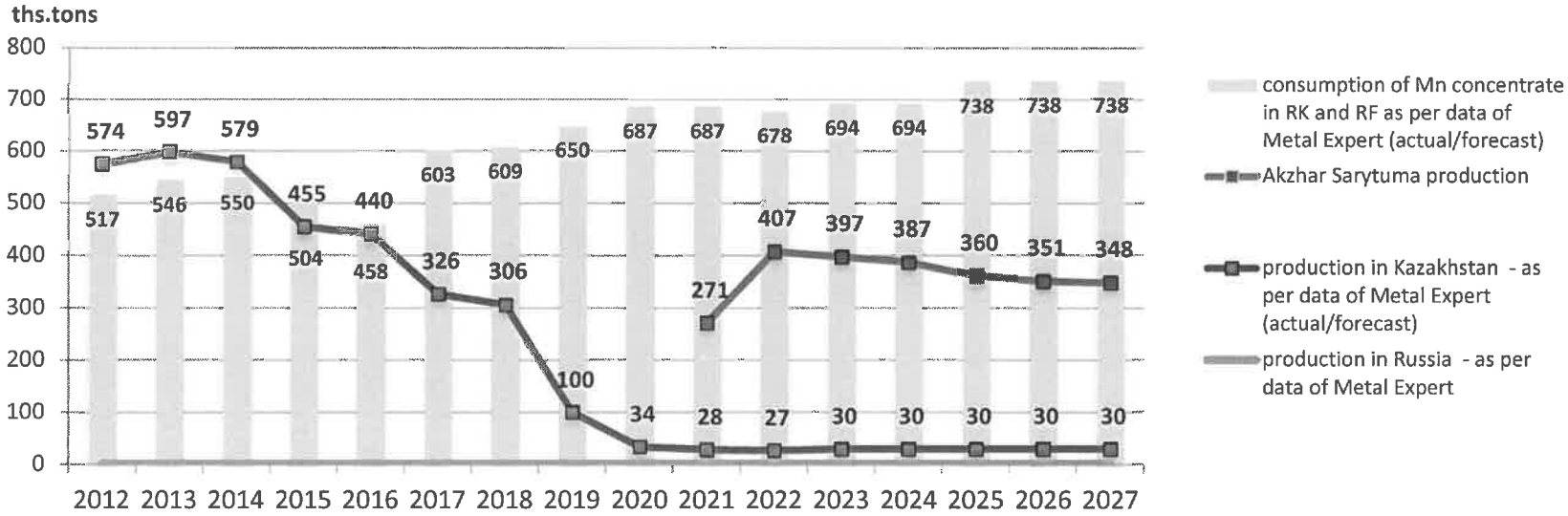
Aksu-1 st.	FeSiMn, FeSi
Zhana-Arka	14 $/t
DAP Alashankou	12,8 $/t
Ust-Luga port	66,4 $/t
port of St. Petersburg	64,7 $/t
Magnitogorsk cargo	26,0 $/t

Benefits of Akzhar-Sarytuma and AEMP Mn concentrate supply over import competitors:

- ***convenient geographical location to metallurgical plants,***
- ***relatively low transportation costs,***
- ***short delivery time.***

Marketing research of Mn

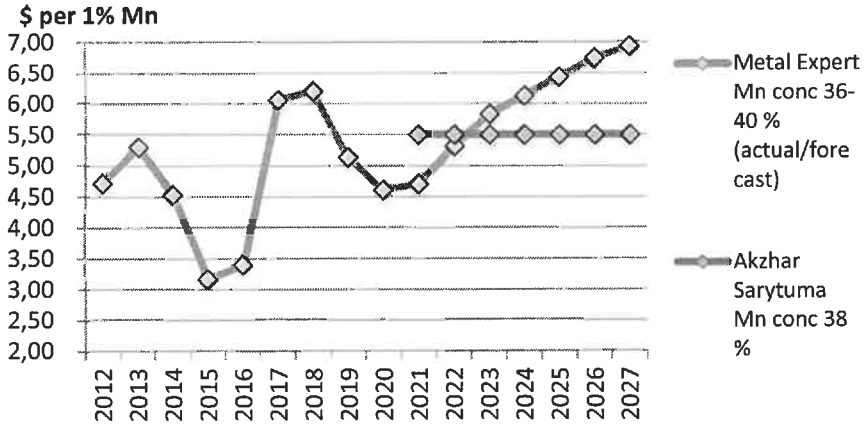
Dynamics of production and consumption of Mn concentrate in RK and RF in Y 2012-2027



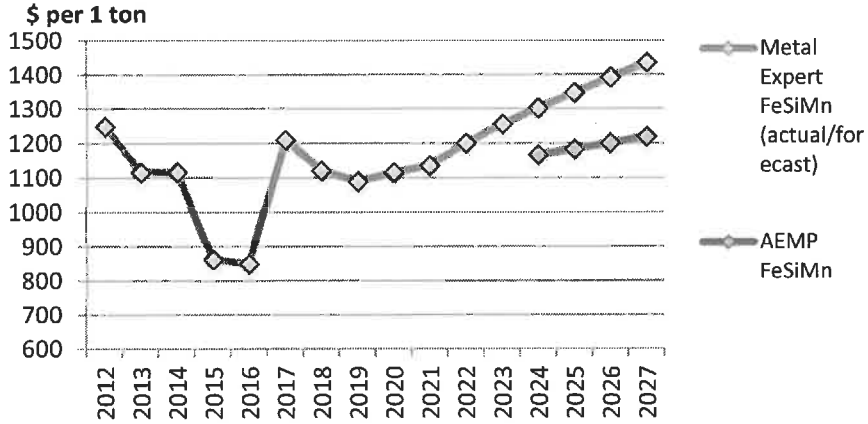
- Mn concentrate production in Kazakhstan decreases since Y2012 from 574 000 tons to 30 000 tons in Y2020 due to depletion of ERG Mn ore reserves in Kazakhstan.
- No production of Mn concentrate in the Russian Federation.
- Regional deficit 700000mt (excluding NW China)
- Region currently supplied mainly from South Africa.

International Market Prices

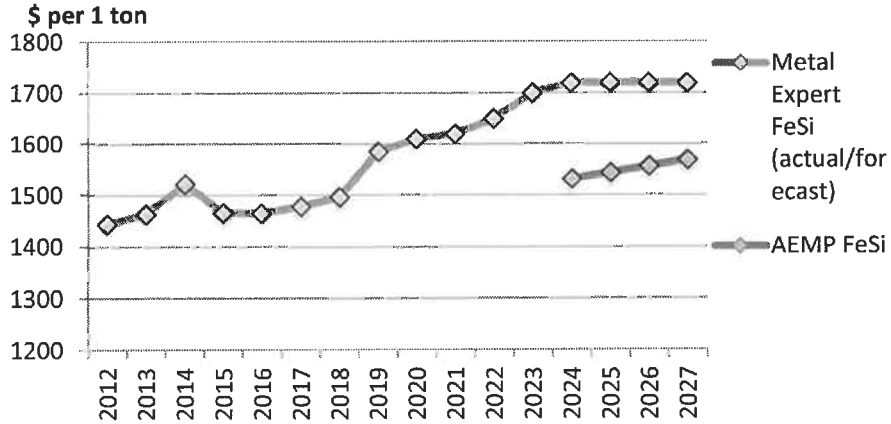
Dynamic of prices for Mn concentrate in 2012-2027



Dynamic of prices for FeSiMn in 2012-2027



Dynamic of prices for FeSi in 2012-2027



Forecast prices for Mn conc, FeSiMn, FeSi in the project are below forecast prices as per Metal Expert.

Conclusion: The project considers pessimistic variant of prices for production products.

Consolidated indicators of project in Options

Product name	2019-2020	2021-2023	2024-2030	2030-3040	Consolidated indicators of Manganese & AEMP project in options			
					Discounted payback period, years	IRR, %	NPV, mln $	PI, ratio
Option 1								
manganese ore	36 t/year				3,3	67,4%	$ 361	2,8
manganese concentrate		347 t/year						
Electricity		840 mln kWh / year						
FeSiMn			115,6 ths.t/year					
FeSi				63,1 ths.t/year				
Option 2								
manganese ore	36 t/year				3,2	74,4%	$ 413	3,3
manganese concentrate		347 t/year						
Electricity		840 mln kWh / year						
FeSiMn								
FeSi			63,1 ths.t/year					
Option 3 (if additional Mn deposits are investigated)								
manganese ore	36 t/year				3,2	74,7%	$ 494	3,9
manganese concentrate		347 t/year						
Electricity		840 mln kWh / year						
FeSiMn								
FeSi			63,1 ths.t/year					
Option 4 (if additional Mn deposits are investigated)								
manganese ore	36 t/year				3,3	67,7%	$ 430	3,4
manganese concentrate		347 t/year						
Electricity		840 mln kWh / year						
FeSiMn			115,6 ths.t/year					
FeSi								

Project Options

The maximum value of the project is achieved if the manganese concentrate is sold to 3rd parties and the smelter produces FeSi as FeSi can by exported globally. However if the manganese concentrate price is very low or demand is weak then the smelter can produce SiMn which can be sold in the region or exported globally.

The project has also been modelled with the 10 year mine life anticipated to be supported by SRK's indicated reserve as well as the expected 20 year mine life which is likely to result from further definition of the ore body

Shareholders will benefit from strong free cash

Terms of dividends calculation and payment:

- Only 50% of net income is distributed to dividends
- Dividends tax rate – 10 %
- The first year of dividends accrual – under results of Y2021
- The beginning of dividends payment - Y2022

Option	Total for the period (2019-2040)			Dividends payable to shareholders	incl. dividends in years:						Cash as of 01/01/42
	Net income	Dividends accrued (50 % of NI)	Tax on dividends (10 %)		2022	2023	2024	2025	2026	2027-2041	
	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$	тыс.$
Option 1	$ 1 407 009	$ 703 425	$ 70 342	$ 624 153	$ 17 985	$ 23 854	$ 23 287	$ 39 178	$ 38 269	$ 481 580	$ 635 237
Option 2	$ 1 504 377	$ 752 105	$ 75 211	$ 667 318	$ 17 985	$ 23 854	$ 23 287	$ 48 276	$ 46 133	$ 507 783	$ 675 009
Option 3	$ 1 946 547	$ 973 183	$ 97 318	$ 863 553	$ 18 097	$ 23 931	$ 23 363	$ 48 354	$ 46 210	$ 703 598	$ 880 140
Option 4	$ 1 823 041	$ 911 430	$ 91 143	$ 808 839	$ 18 097	$ 23 931	$ 23 363	$ 39 256	$ 38 345	$ 665 846	$ 829 247

And there is icing on the cake…

Gold and Lead for starters..

Gold contract territory evaluation

In 2015-17 on the contract territory in the course of prospecting in the area of manifestations: West Kargabulak, North Kargabulak, East Kargabulak, Kargabulak, Gryadovoye, Kenkuduk, gold-bearing areas of quartz zones are confirmed. According to geochemical samples taken in the course of the route studies, the gold content is up to **45.87 g / t.**

By single small-prospecting wells, the gold ore zones were traced to a depth of up to 10-20 m. Gold content is up to **9.42 g / t.**

In addition to gold-bearing facilities installed within the contract area, in the adjacent area in 2015-2017. on the West and **East Karazhal** manifestations, prospecting and appraisal works were carried out at the expense of the budget, according to the results of which the reserves of category C2 for these objects were estimated at about **10 tons of gold**.

There are more that 10 similar objects on contract area.

Therefore, this area is of interest to identify gold deposits.

Total forecast resources of the gold ($P_1 + P_2 + P_3$) in area estimated up **to 100 t**.

Lead

There are aware 15 sites with polymetallic mineralization within the contract area. The largest of them are the Georgiyevskaya structure 1 and 2 stratiform deposits.

Georgiyevskaya structure 1 deposit. Ore beds capacity: 0.5-6.9m; 1.0-7.5m, length is up to 1100m. Average lead content – 0.46%. **P_1 – 272.4 thousand tons.**

Georgiyevskaya structure 2 deposit. Ore beds capacity: 2.2 and 4.1m with thin sulfide shot, length is 16.6 km. Average lead content – 0.3-1.25%. **P_2 – 183.5 thousand tons.**

The total estimated resources of the territory for polymetalls ($P_1 + P_2 + P_3$) are 1 million tons.

Свинец - эталон

Галенит — руда на свинец