



Sector teaser on non-ferrous base metals

December 2021



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- Non-ferrous metals are broken down into four main groups according to their physical and chemical properties, with each group incorporating specific non-ferrous metal types: heavy, light, noble and rare.
- Base noble non-ferrous metal production accounts for 13% of the country's industrial production, and approximately 29% of processing industry production in monetary terms.
- In the last five years, the non-ferrous metal production sector demonstrated positive average growth of 16%, reaching 9.7 billion USD by the end of 2020. Roughly 81% of non-ferrous metal production is focused in 6 regions of the country, predominantly East-Kazakhstan (28%), Karaganda (27%), Akmola (13%) and Pavlodar (9%) Oblasts.
- The non-ferrous metal production sector has immense potential for further development as it is dependent on processed product imports, while exporting both ore and low-tech products. The availability of a sufficient raw material base and state support against the backdrop of demand for non-ferrous metals are key to increasing Kazakhstan enterprise production capacity, including introducing advanced non-ferrous metal production capacity.



Non-ferrous metal production sector

Kazakhstan is rich in natural resources and has the world's 6th largest reserves of explored mineral resources. Non-ferrous metallurgy in Kazakhstan is a long-standing and leading industrial sector based on mineral resources and is key to the country's industrial complex. The availability of a mineral resource base, which is a sector advantage, means non-ferrous metallurgy is competitive. Kazakhstan has the largest tungsten reserves in the world, the second largest chrome and uranium reserves, the fourth largest silver reserves, and the fifth largest lead and zinc reserves. In January-September 2021, non-ferrous ore production increased 5.5% to 3.8 billion USD year-on-year (or 13% of the total mining industry). In the same period, production of base noble non-ferrous metals accounted for 63% of the country's total metallurgical production (8.1 billion USD).

Import substitution / export potential



Kazakhstan exports non-ferrous metals to over 30 different countries. Non-ferrous metallurgy accounts for approximately 8% of Kazakhstan GDP. The main non-ferrous metallurgy subsectors in Kazakhstan are copper, chrome, lead-zinc, aluminium and titanium--manganese. In 2020, total mining and metallurgy exports reached 7.6 billion USD, while non-ferrous metallurgy accounted for 55.8%, predominantly due to refined copper (35.7% of total annual mining and metallurgy exports), untreated aluminium (6.1%), untreated zinc (8.2%) and untreated titanium, powders (1.6%). Total mining and metallurgy sector imports in 2020 amounted to 4.1 billion USD, of which non-ferrous metallurgy accounted for 19.8%. 87% of imported non-ferrous metallurgy products are made up of advanced processing items (metal constructions, rods, sheet metal and others), 13% — non-ferrous metals (aluminium, tin, copper, zinc and nickel).

State support

"Base noble and non-ferrous metal production" is a priority sector of the economy that is eligible for state support from the SIIDP 2020-2025 Programme, the Entrepreneurial Code and "Saving Simple Things" programmes, the "Road Map 2025" programme, and may also be operated in a SEZ.



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Classification of non-ferrous metals



Non-ferrous metals in terms of physical and chemical properties are broken down into four main groups: heavy, light, noble and rare. In turn, rare metals are divided into high-melting, light rare, disseminated, rare-earth and radioactive metals. This document considers the following non-ferrous metals in detail: copper, zinc, lead, aluminium, tin, nickel, cobalt, titanium, zirconium, gold, silver, platinum, palladium, tungsten and molybdenum.



Heavy	Light	Noble	Rare	
Tin	Aluminium	Gold	High-melting (chrome, tungsten, molybdenum and vanadium)	Radioactive (uranium, radium, thorium, fermium, zirconium and others)
Copper	Titanium	Silver	Light rare (beryllium, rubidium and caesium)	Rare earth (scandium, yttrium, lanthanum and others)
Zinc	Magnesium	Platinum	Disseminated (gallium, indium, thallium, germanium, selenium, tellurium, rhenium)	
Lead	Beryllium	Palladium		
Nickel	Barium	Rhodium		
	Lithium	Ruthenium		
	Sodium	Osmium		
	Calcium	Iridium		
	Strontium			

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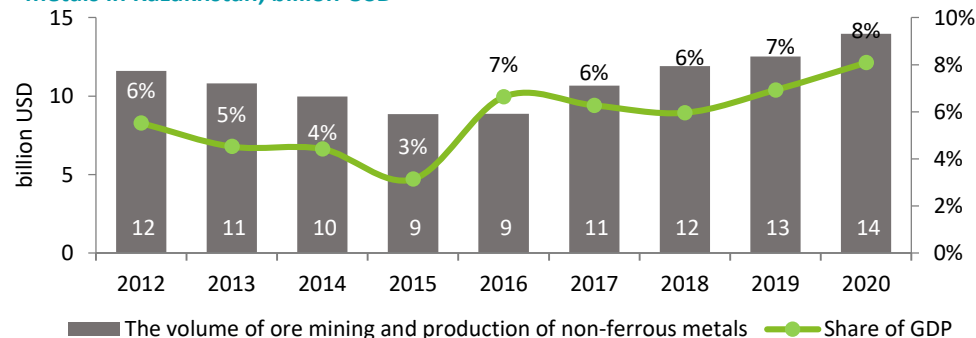


Mining and metallurgy sector: non-ferrous metals

Sector overview in Kazakhstan

- Non-ferrous metals are those that do not contain iron in significant quantities. They are used in many areas, such as metallurgy, metal fabrication, mechanical engineering, radio electronics, construction, the aviation industry, ship building, high-tech industry and others.
- Kazakhstan is one of the world's richest countries in terms of mineral resources and has its own mineral resource base. Kazakhstan has the largest tungsten reserves in the world, the second largest chrome and uranium reserves, the fourth largest silver reserves, and the fifth largest lead and zinc reserves.
- In 2019-2020, non-ferrous metallurgy in Kazakhstan developed steadily (total production amounted to 3,995 billion USD in 2020), which affected total mining and metallurgy production – 25 billion USD in monetary terms, compared to 20.6 billion USD in 2017.
- Total investment in non-ferrous metal production and extraction increased 7% in 2020 due to the growth in field investment from overseas and increases in field production capacity. The majority of investment is used to develop polymetallic (20%), copper (24%) and gold (22%) fields.

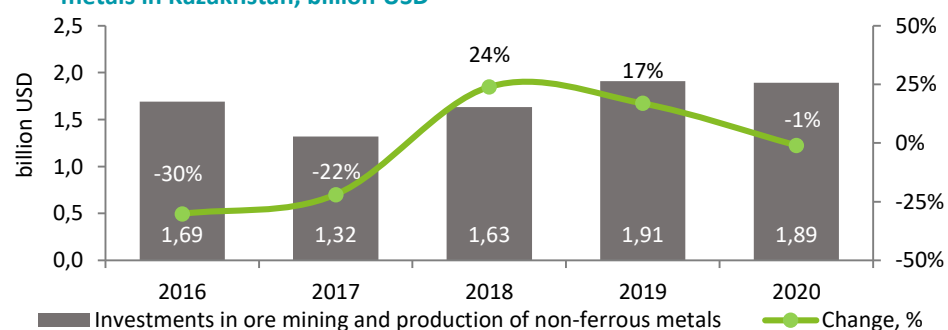
Non-ferrous metal ore extraction and production of base noble and non-ferrous metals in Kazakhstan, billion USD



Mineral resource reserves by global position

Mineral resource	Reserves (thousand tonnes)	Global placing (reserves)	Global placing (metal content in ore)
Chrome	382,700	2	1
Bauxite (aluminium)	365,400	12	n/a
Lead	17,200	5	41
Zinc	39,800	5	40
Copper	39,300	12	63
Titanium	24,100	10	15
Tungsten	2,100	1	25
Gold	2.2	15	2
Silver	53.2	4	31
Tin	69.3	10	23
Uranium	1,600	2	n/a

Investment in metal ore extraction and production of base noble and non-ferrous metals in Kazakhstan, billion USD



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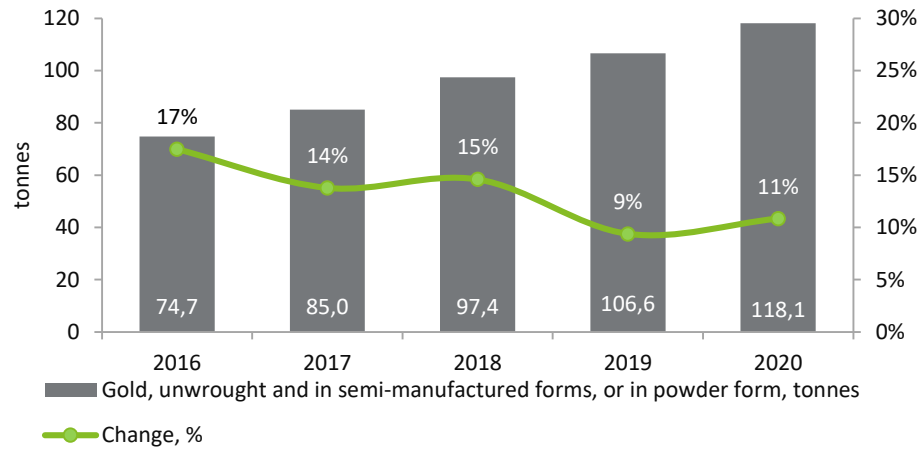
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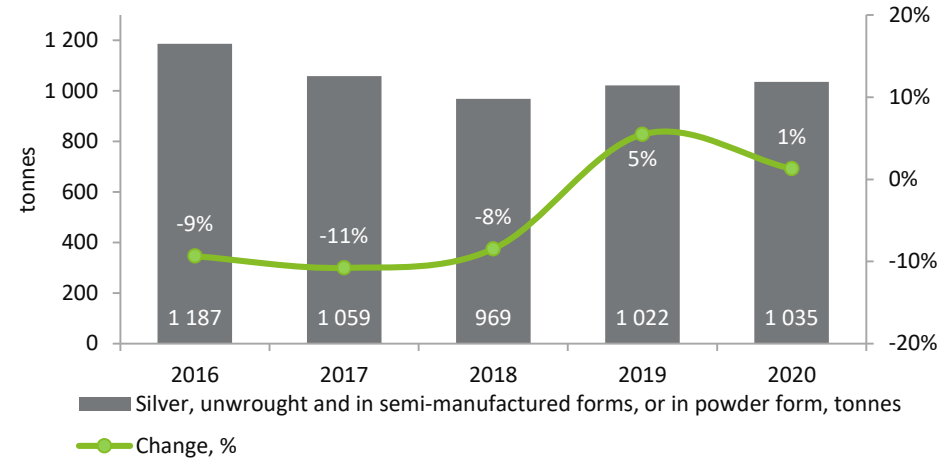
Production of base noble metals in Kazakhstan



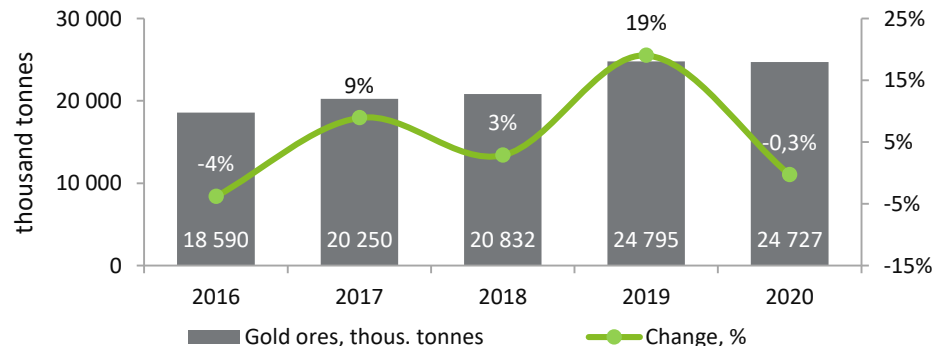
Gold production in Kazakhstan in 2016-2020, tonnes



Silver production in Kazakhstan in 2016-2020, tonnes



Changes in gold-containing ore extraction in Kazakhstan in 2016-2020, thousand tonnes



- Base noble metals include gold, silver and platinum, and are extracted as ore, acquiring their normal appearance only after processing.
- Gold production in Kazakhstan has been growing steadily, reaching 118.1 tonnes in 2020. Gold production CAGR in 2016-2020 was 17%. Gold production increased thanks to major Kazminerals projects such as Bozshakol and Aktogai, upgrade work at the JSC Ak Altynalmas gold processing plant and the commissioning of a new Tau-Ken Altyn LLP refinery plant in Nur-Sultan with gold and silver production capacity of 25 tonnes and 50 tonnes respectively.
- Gold ore extraction grew steadily in 2016-2020, reaching 24,727 thousand tonnes in 2020, with CAGR at 7.4%.
- Silver production in 2016-2020 was unstable and amounted to 1,035 tonnes in 2020. Silver production CAGR in 2016-2020 was -6%.

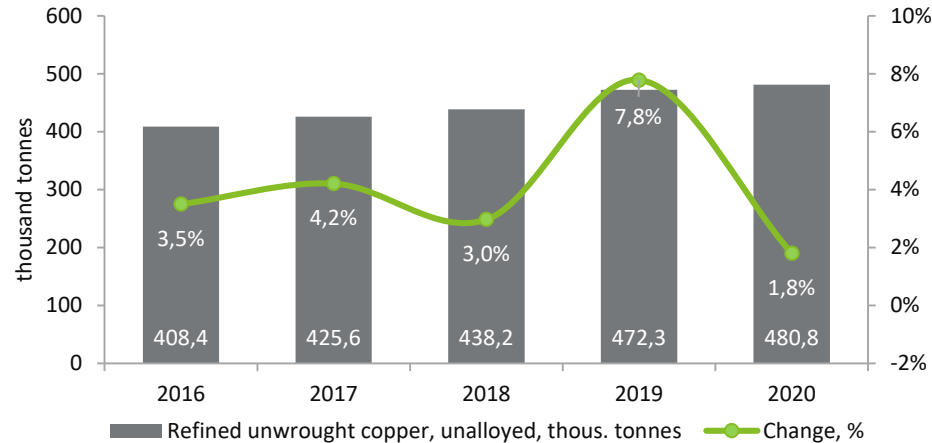
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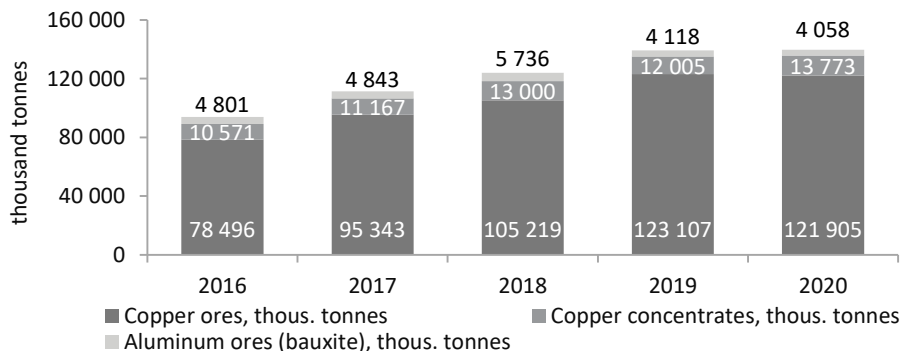
Copper and aluminium production in Kazakhstan



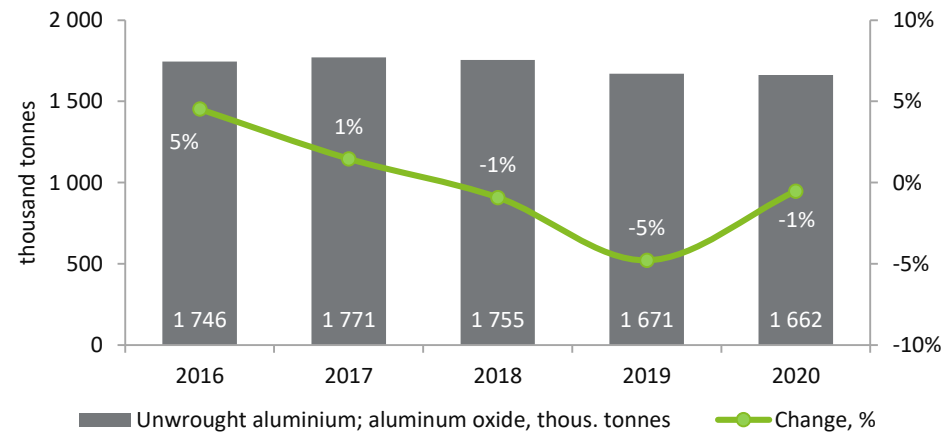
Refined copper production in Kazakhstan in 2016-2020, thousand tonnes



Changes in copper and aluminium ore and concentrate extraction in 2016-2020, thousand tonnes



Untreated aluminium production in Kazakhstan in 2016-2020, thousand tonnes



- Untreated copper production in Kazakhstan increased 1.1% in 2020 to 480.8 thousand tonnes. Untreated copper production CAGR in 2016-2020 was 4.2%.
- Untreated aluminium production in 2016-2020 fell 1% to 1,662 thousand tonnes in 2020. According to JSC Aluminium Kazakhstan, technical equipment failure was the main cause of production decline. Untreated aluminium with technical purity of A7-A85 is currently being produced at the JSC Kazakhstan Electrolysis Plant.
- Copper ore extraction grew steadily by 55% in the last 5 years to 121,905 thousand tonnes in 2020. Copper concentrate extraction has varied against ore extraction. Aluminium ore extraction has been accelerated, but in 2019, extraction levels fell, only to return to growth the following year.

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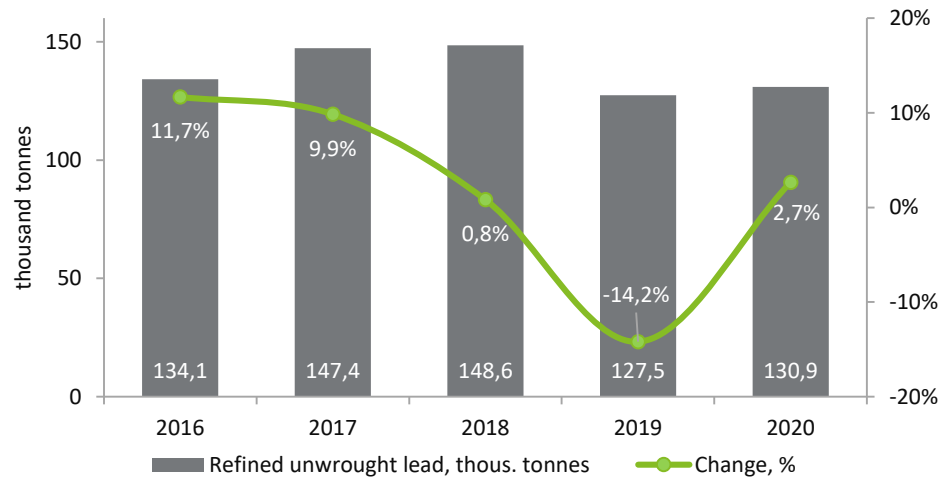
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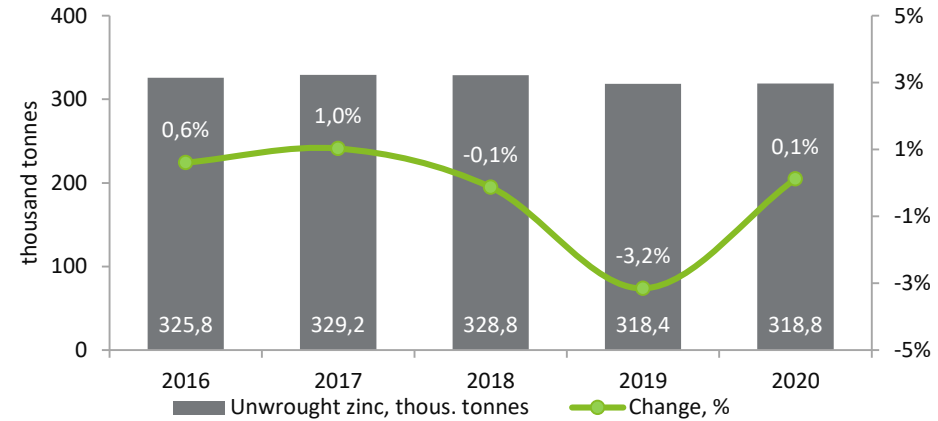
Heavy metal (lead, zinc, cobalt, nickel and tin) production in Kazakhstan



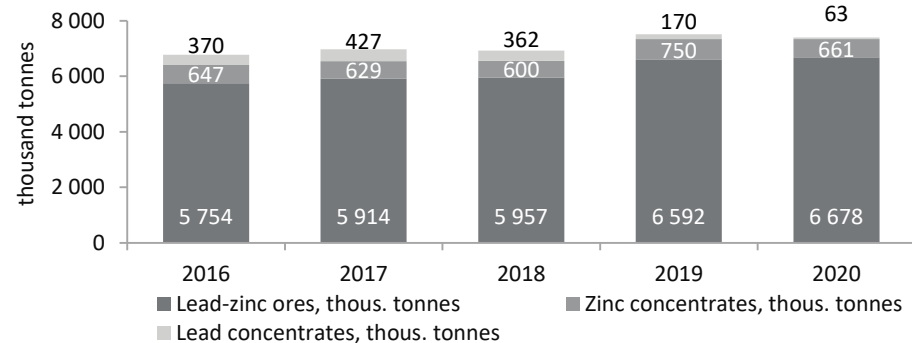
Untreated lead production in Kazakhstan in 2016-2020, thousand tonnes



Untreated zinc production in Kazakhstan in 2016-2020, thousand tonnes



Changes in lead and zinc ore and concentrate extraction in Kazakhstan in 2016-2020, thousand tonnes



- Untreated lead production in Kazakhstan increased 2.7% in 2020 to 130.9 thousand tonnes. CAGR for 2016-2020 was -0.6%.
- Untreated zinc production increased slightly in 2020 by 0.1% to 318.8 thousand tonnes. In the last 5 years, untreated zinc production averaged 324.1 thousand tonnes.
- Lead-zinc ore extraction in Kazakhstan grew steadily in 2020 to 6,678 thousand tonnes. In 2016-2020, zinc concentrate production levels were unstable, falling 83% in the last five years.
- The leading zinc and lead producer in Kazakhstan is Kazzinc, producing up to 150 thousand tonnes of C1-C lead and up to 300 thousand tonnes of ZV, ZV0 and Z0A zinc per year.

*Cobalt-nickel and tin ore fields in Kazakhstan are in the development stage. Extraction and production statistics are not kept.

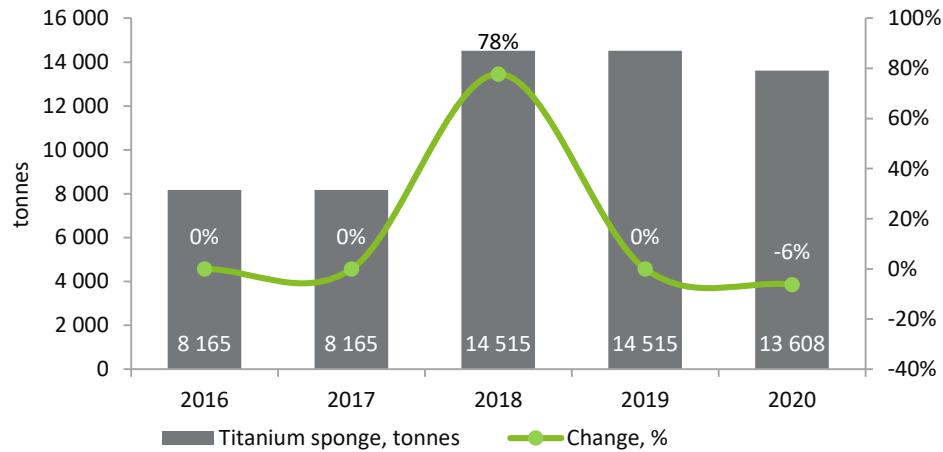
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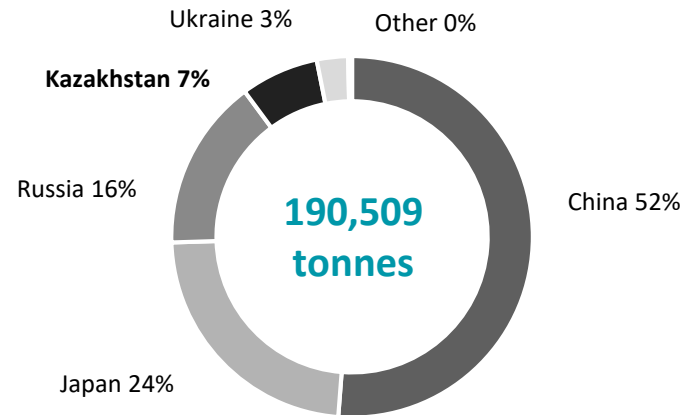
Titanium and zirconium production* in Kazakhstan



Changes in titanium sponge production in Kazakhstan in 2016-2020, tonnes



Structure of titanium sponge production by country in 2020, tonnes



JSC Ust-Kamenogorsk Titanium-Magnesium Plant is one of the world's largest fully integrated titanium producers, with operations ranging from raw material extraction to generating advanced processing products. Its product portfolio includes titanium sponge, elementary magnesium in bars, titanium bars and alloys, and vanadium pentoxide. UKTMP products are certified by leading aerospace products such as SNECMA, GeneralElectric, RMI, Pratt&Whitney, TIMET, UKAD and Airbus. Its products are exported to industrially developed countries such as the USA, France, Russia, the UK, South Korea, India and China.

- Titanium sponge production in the last five years has been unstable. If in 2016-2017, production was at 8,165 tonnes per year, in 2018, that figure was down by 78% at 14,515 tonnes. The increase in production in 2017-2019 was caused by increased demand for titanium sponge in aircraft engineering.
- In 2020, titanium sponge production fell to 13,608 tonnes, which is 6% less than in 2019. Global aircraft engineering orders fell due to the sharp decrease in air traffic during the pandemic.
- Kazakhstan is a top four titanium producer, and is responsible for approximately 7% of global titanium sponge production. The only major titanium producer in Kazakhstan is the flagship non-ferrous metallurgy company JSC Ust-Kamenogorsk Titanium-Magnesium Plant.

*Zirconium is extracted in Kazakhstan from complex ore. Extraction and production statistics are not kept.

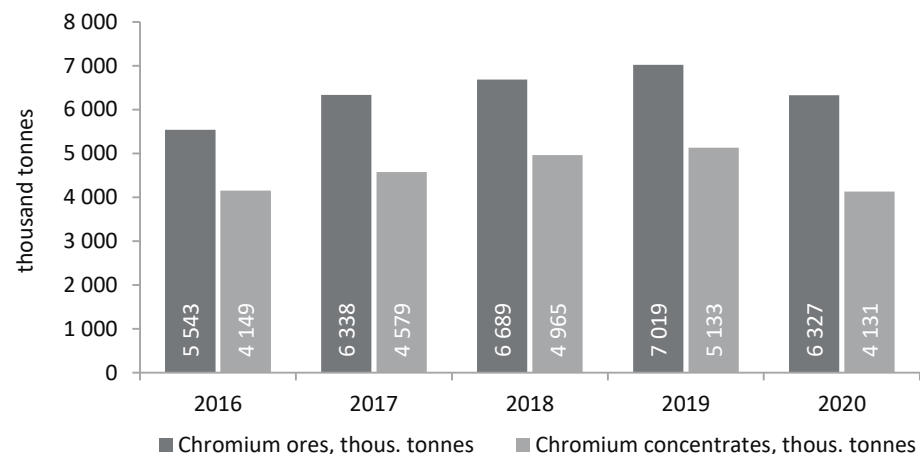
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High-melting metal (chrome, tungsten, molybdenum and vanadium) production in Kazakhstan

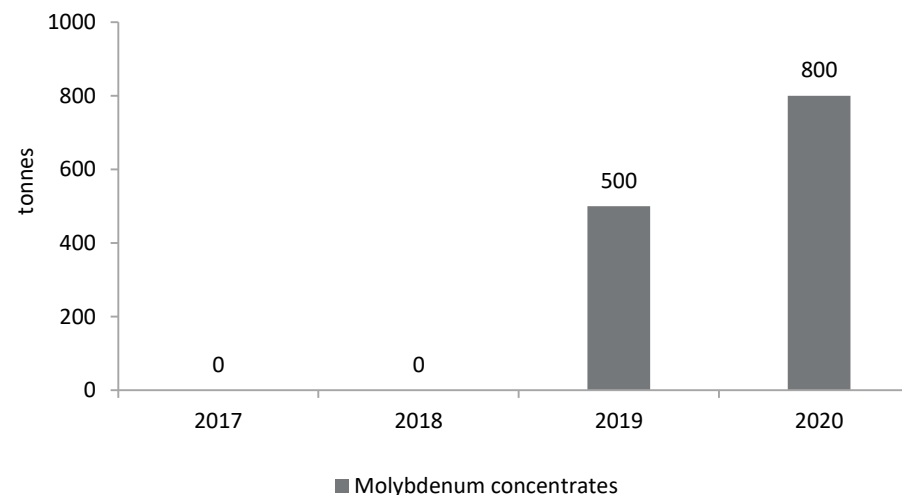


Changes in chrome ore and concentrate extraction in Kazakhstan in 2016-2020, thousand tonnes



- Chrome ore and concentrate extraction in Kazakhstan in 2020 were at 6,327 and 4,131 thousand tonnes, respectively, which accounts for 17% of global chrome production. Chrome ore CAGR in 2016-2020 was 3.4%, while the figure for concentrates was -0.1%.
- Kazakhstan has the largest chrome deposits in the world and is in the top three in terms of extraction. Chrome concentrate is the main component in the production of ferrochrome, which is used to produce stainless steel. Chrome concentrate is predominantly produced in Kazakhstan in Aktobe Oblast by JSC Kazchrome.

Changes in molybdenum concentration production in Kazakhstan in 2017-2020



- In Kazakhstan, molybdenum concentrate is produced at the Bozshakol and Aktogai mining complexes. Both enterprises belong to Kazminerals and produce molybdenum concentrates as an associated product. Production in 2020 grew by 60% against the previous year to 800 tonnes.
- Likewise, Karaganda and Kyzylorda Oblasts also have rich reserves of base high-melting metals such as tungsten and vanadium. However, they are not yet extracted. Companies such as Tau-Ken Samruk and Ferro-Alloy Resources are currently developing and exploring tungsten and vanadium fields.

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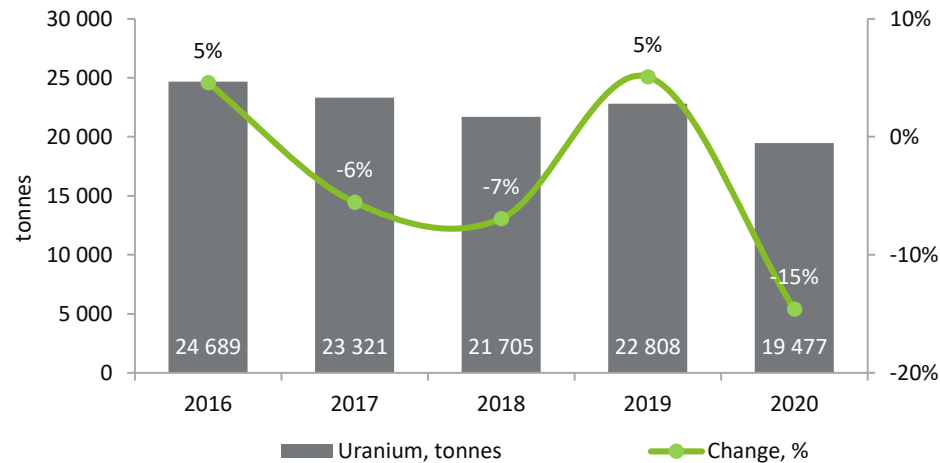
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Uranium production in Kazakhstan



Uranium production in Kazakhstan in 2016-2020, tonnes



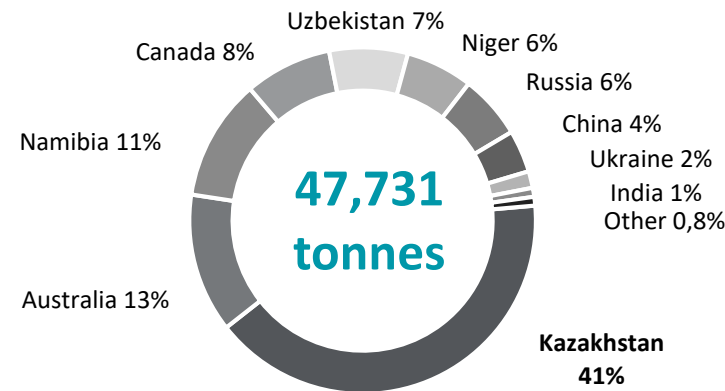
Uranium resources by country in 2019

Country	tonnes	share
Australia	1,692,700	28%
Kazakhstan	906,800	15%
Canada	564,900	9%
Russia	486,000	8%
Namibia	448,300	7%
South Africa	320,900	5%
Brazil	276,800	5%
Global total	6,147,800	100%

Source: world-nuclear.org

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Structure of global uranium production in 2020, tonnes



- Kazakhstan is the largest uranium producer in the world and has the second largest reserves. In 2015, Kazakhstan had 145 registered uranium fields, over 200 ore manifestations and over 30 thousand radioactive anomalies. Uranium production in Kazakhstan, with CAGR in 2016-2020 of -4.7%, reached 19,447 tonnes in 2020, which is 41% of global uranium production, but 15% lower than in 2019 due to a decision to reduce production.
- In 2020, JSC Kazatomprom announced its intention to reduce production by a further 20% until 2022 within the framework of subsoil use contracts. The decision was taken due to surplus global uranium supply and falling prices.
- According to the World Nuclear Association, in 2020, the 10 leading uranium production companies, with the largest being JSC Kazatomprom, accounted for over 85% of global uranium production.

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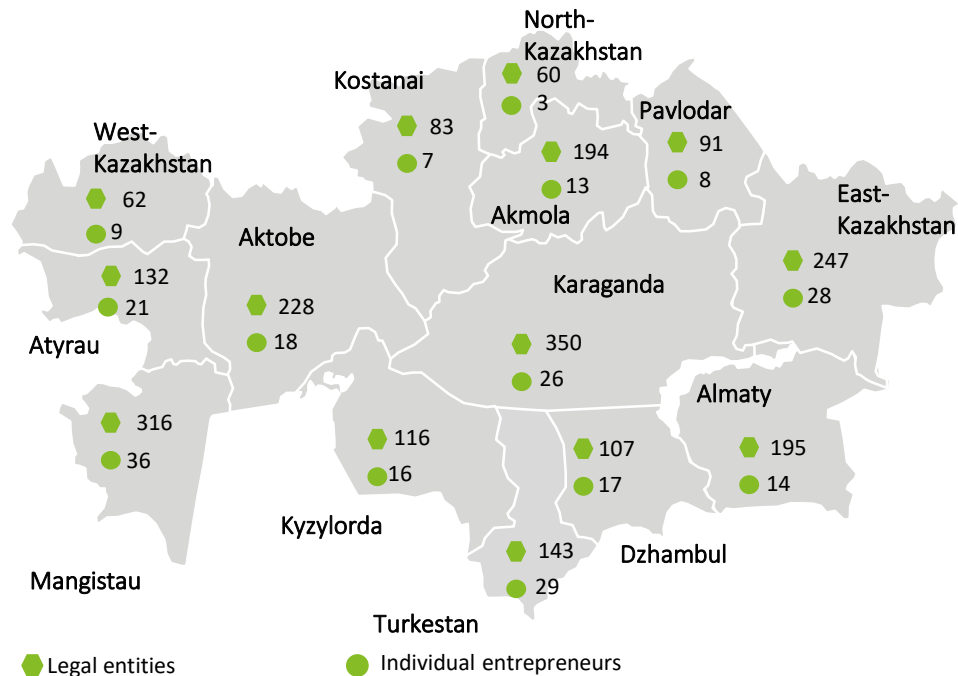
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Enterprise types (1/2)



Location (oblast) and number of operational mining enterprises, September 2021



In September 2021, there were 3,648 legal entities operating in the Kazakhstan mining and excavation industry, of which 95% were small enterprises. The majority of legal entities are in Almaty (17%), Nur-Sultan (14%) and Karaganda (10%) Oblasts. In addition, the sector has 327 individual entrepreneurs, the majority of whom are in Almaty (12%), Mangistau Oblast (11%) and Nur-Sultan (9%).

Number of mining and excavation industry enterprises, September 2021

	Total	including			
		public	business partnerships	joint stock companies	other organisational and legal forms
Mining and excavation industry	3 648	-	3 557	54	37
Small	3 463	-	3 411	16	36
Medium-sized	83	-	73	9	1
Large	102	-	73	29	-

Number of individual entrepreneurs in the mining and excavation industry, September 2021

	Total	including those operating as	
		an individual entrepreneur	a joint venture
Kazakhstan	1,095,188	1,023,917	71,271
Mining and excavation industry	327	327	-

The mining industry is one of the main economic sectors in Kazakhstan. Its distinguishing feature is the variety of mineral resources extracted and, consequently, the large quantity of enterprises operating directly in field exploration and operation, as well as in subsoil logistics. Contemporary strategic objectives include the maximum use of Kazakhstan's traditional advantages, such as the development of mineral resources.

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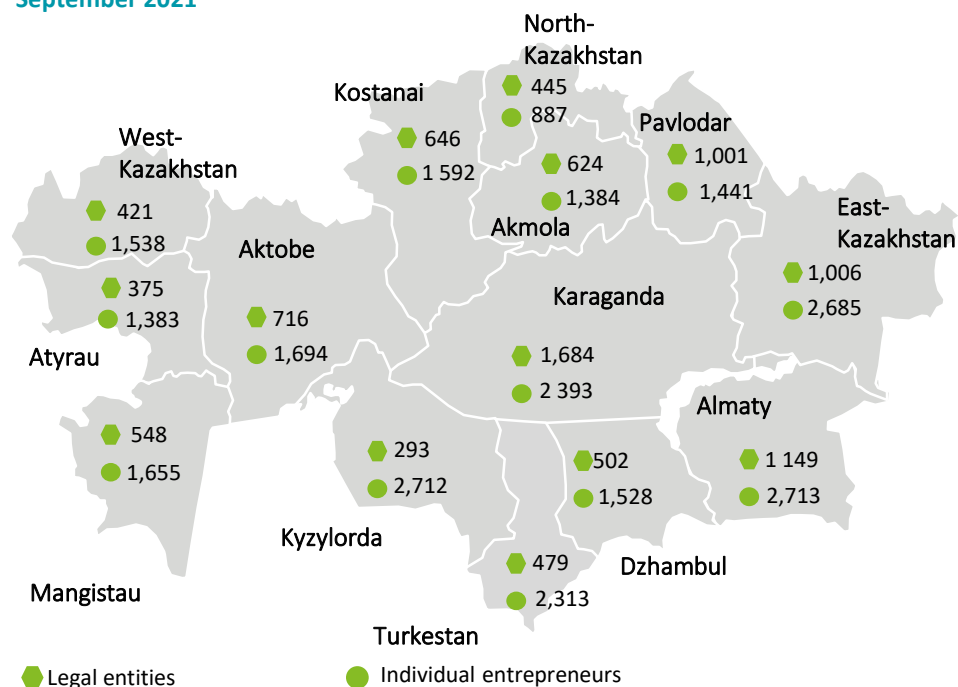
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Enterprise types (2/2)



Location (oblast) and number of operational processing industry enterprises, September 2021



In September 2021, there were 17,568 legal entities operating in Kazakhstan in the processing industry, of which small enterprises accounted for roughly 96%. The majority of legal entities are in Almaty (23%), Nur-Sultan (13%) and Karaganda Oblast (11%). In addition, 36,163 individual entrepreneurs operate in the sector, the majority of which are in Almaty (12%), Nur-Sultan (10%) and Almaty Oblast (8%).

Source: Kazakhstan Statistics Committee

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Number of legal entities in the processing industry, September 2021

	Total	including			
		public	business partnerships	joint stock companies	other organisational and legal forms
Processing industry	17,568	4	17,145	138	281
Small	16,860	1	16,540	42	277
Medium-sized	466	1	424	38	3
Large	242	2	181	58	1

Number of individual entrepreneurs in the processing industry, September 2021

	Total	including those operating as	
		individual entrepreneurs	as joint ventures
Kazakhstan	1,095,188	1,023,917	71,271
Processing industry	36,163	36,156	7

As development of the processing industry is key for Kazakhstan, it is supported actively throughout the country. The processing industry has a special position as it creates new technology, which often aids growth in other sectors of the economy. Common priorities for all sector enterprises are technical production upgrades; energy and resource saving; technical and ecological safety; a reduction in losses and the rational use of mineral resources.

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Local base non-ferrous and noble metal producers



 The majority of non-ferrous metals are concentrated in the eastern, central and northern regions of the country. The main non-ferrous metal extraction and production companies in Kazakhstan are Kazzinc, Kazakhmys, Kazatomprom, KAZ Minerals and Aluminium Kazakhstan. The majority of small companies are subsidiaries of the above large enterprises. As at 1 April 2021, there were 391 metallurgy enterprises operating in Kazakhstan, of which 29 were large, 29 medium-sized and 333 small.

Company	Location	Activity	Products
JSC Kazatomprom	Nur-Sultan	Uranium, rare metal and nuclear extraction and production for nuclear power stations	Uranium, rare metals, nuclear fuel for nuclear power stations and vanadium
Kazzinc LLP	Ust-Kamenogorsk, East-Kazakhstan Oblast	Zinc, copper, nickel, noble metal and lead extraction and production	Zinc, copper, precious metals and lead
Shalkiya Zinc Ltd	Shalkiya, Zhanakorgan District, Kyzylorda Oblast	Polymetallic ore extraction and production	Zinc and lead
Kazakhmys LLP	Karaganda	Copper ore extraction and processing; precious metal and other associated metal sales	Copper, gold and silver in bars, sulphuric acid, selenium and tellurium copper and lead dust
KAZ Minerals LLP	Almaty	Copper extraction and production	Zinc, copper, nickel and lead
JSC TNK Kazchrome	Aktobe, Aktobe Oblast	Chromic ore extraction and processing; chrome, manganese and silicon ferrous alloy production	High-carbon ferrochrome, chrome, manganese and silicon
Aktobe Copper Company LLP	Aktobe, Aktobe Oblast	Copper in copper concentrate and zinc in zinc concentrate extraction and production	Copper in copper concentrate, zinc in zinc concentrate, and construction ballast
JSC Altyntau Kokshetau	Zerendin District, Akmola Oblast	Gold ore extraction and production	Gold
JSC AK Altyntalmas	Almaty	Gold ore extraction and processing	Affined gold and silver
JSC Mining and Metallurgy Kazakhaltyn	Stepnogorsk, Akmola Oblast	Gold ore extraction and processing; gold product production	Gold and other precious metals
Tau-Ken Altyn LLP	Nur-Sultan	Gold-containing raw materials processing and refined gold and silver production	Affined gold and silver
Bakyrchik Mining and Production Enterprise LLP	Zharmin District, East-Kazakhstan Oblast	Gold ore extraction	Gold
JSC Maikainzoloto	Maikain, Bayanaul District, Pavlodar Oblast	Gold pyrite-complex ore extraction and processing	Gold, copper and zinc concentrates
JSC Varvarinskoye	Kostanai Oblast	Gold ore extraction and processing	Gold and copper ore
JSC Aluminium Kazakhstan	Pavlodar Oblast	Alumina and aluminium sulphate production and sale	Alumina, aluminium, aluminium sulphate, bauxite, limestone, fire-retardant clay, ballast and gallium
JSC Kazakhstan Electrolysis Plant	Pavlodar, Pavlodar Oblast	Aluminium and alumina production	Elementary aluminium
JSC Ust-Kamenogorsk Titanium-Magnesium Plant	Ust-Kamenogorsk, East-Kazakhstan Oblast	Titanium and manganese production	Titanium sponge, elementary magnesium in bars, titanium bars and alloys, and vanadium pentoxide

Source: Emis, company sites

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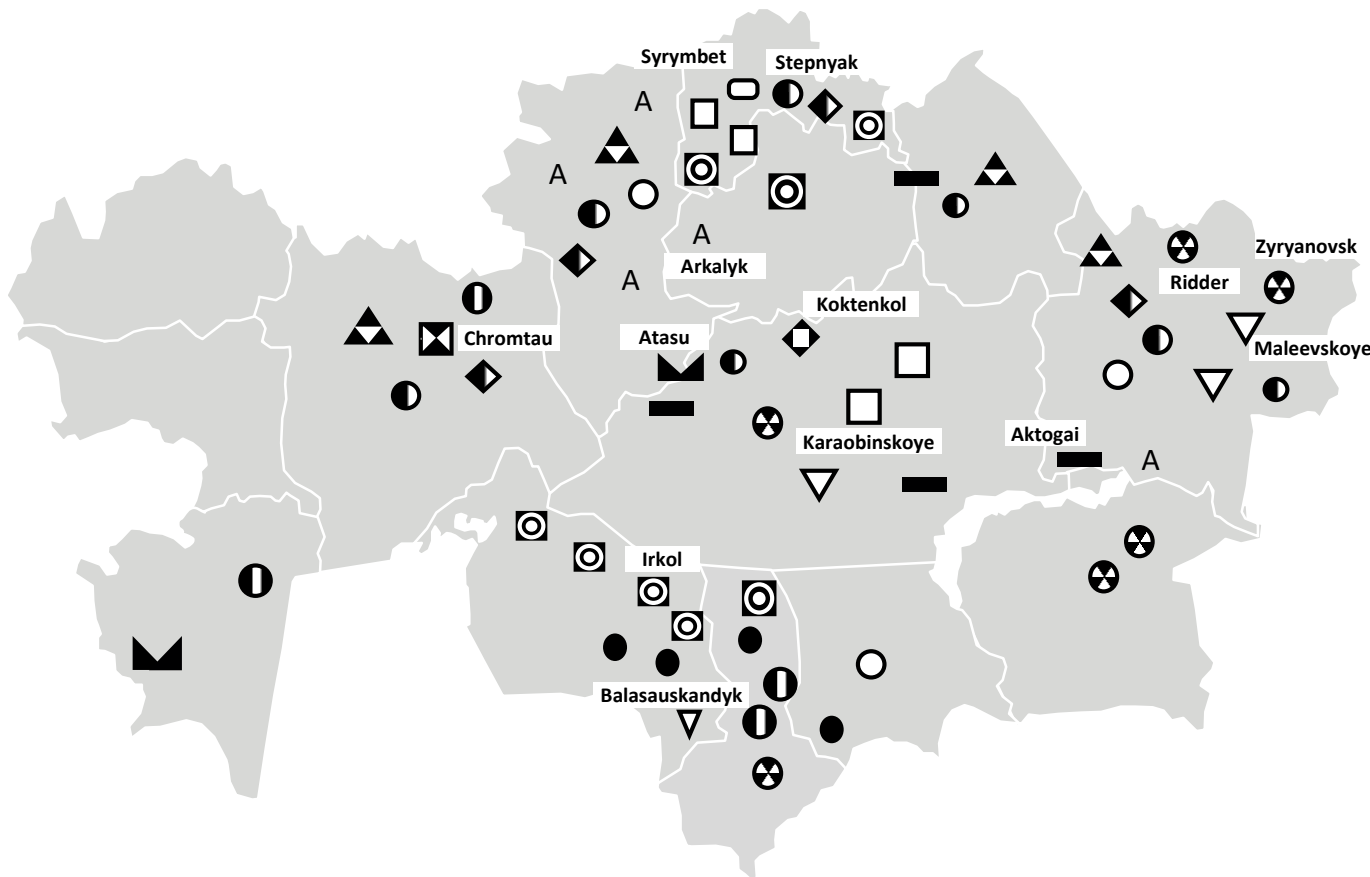
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Kazakhstan mineral resource base



Map of non-ferrous metal fields in Kazakhstan



- Base non-ferrous and noble metal fields are found across nearly all regions of Kazakhstan, more exactly in the eastern (East-Kazakhstan Oblast), northern (Pavlodar, Kostanai, North-Kazakhstan and Akmola Oblasts), central (Karaganda Oblast), western (Aktobe Oblast) and southern (Kyzylorda and Turkestan Oblasts) regions.
- There are 551 solid mineral resource contracts in place, while another 103 are currently being processed.

- | | | | |
|--|--------------|--|-----------|
| | Complex ores | | Titanium |
| | Uranium | | Vanadium |
| | Tin | | Manganese |
| | Aluminium | | Chromites |
| | Tungsten | | Copper |
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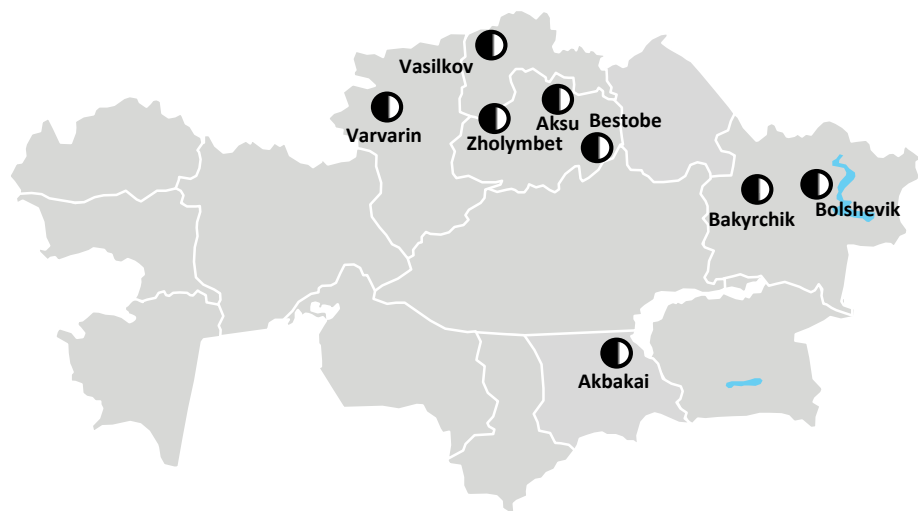
Gold fields



Gold fields in Kazakhstan

Kazakhstan has over 2 thousand registered gold fields and manifestations, and the third highest gold reserves in the CIS. There are 20 gold ore geological and economic districts, the most developed gold extraction regions being Stepnyak-Bestyubinsk, Kalbin, Maikain, Rudno-Altai, Shu-Ili, Kokshetau, Mugodzhar and South-Dzhungar. Regions under development include Zhetygarin, Karatau, Chingiz-Tarbatai, North-Balkhash and North-Dzhungar. Talas, Kirgiz, Kendyktas-Kastek, Ultytau-Argynatin, Yermentau-Niyaz, Sarysu-Teniz and Zailli regions require additional research.

The Kazakhstan gold production industry raw material base is represented by small (reserves of up to 25 tonnes) and medium-sized (25-100 tonnes) fields. The largest fields are Vasilkov, Bakyrchik, Bolshevik, Varvarin, Zholymbet, Aksu, Bestobe and Akbakai



Major fields

Enterprises	Location	Fields	Total resources
Polymetal International plc	East-Kazakhstan Oblast	1. Bakyrchik 2. Bolshevik	208 tonnes of gold
JSC JV Varvarinskoye	Kostanai Oblast	Varvarin	50 tonnes of gold
JSC Altyntau Kokshetau	North-Kazakhstan Oblast	Vasilkov	370 tonnes of gold
JSC Mining and Metallurgy Kazakhaltyn	Akmola Oblast	1. Zholymbet 2. Aksu 3. Bestobe	100 tonnes of gold, forecast – 400 tonnes of gold
JSC AK Altynalmas	Dzhambul Oblast	Akbakai	n/a

- The largest gold ore facilities in Kazakhstan are located 17 km to the north-west of Kokshetau. Vasilkov proven reserves include 370 tonnes of gold, with average ore metal content of 2.8 g/tonne. Altyntau Kokshetau (former Vasilkov Mining and Enrichment Plant) is the largest gold production company in Akmola Oblast at the Vasilkov gold ore field. It is a 100% subsidiary of Kazzinc LLP.
- The next largest reserves are at the Bakyrchik and Bolshevik fields in north-east Kazakhstan. Total reserves amount to 208 tonnes with average gold content of 5.4 g/tonne. The fields belong to the Russian company Polymetal.
- The Aksu, Bestobe and Zholymbet fields are located in Akmola Oblast, close to Stepnogorsk. The mines have been in operation since the 1930's. Ore is extracted using the underground and open methods. Fields are developed by the company Kazakhaltyn.

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North Kazakhstan gold fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes/kg)*	Level of development	Subsoil user
1. Uzboi	Akmola	Gold-quartz	A+B+C1 – 1,169/3,969.8 C2 – 2,825/11,509.5 off-balance – 890/1,311.3	Operational	Saga Krik Gold LLP
2. Beskauga	Pavlodar	Gold-quartz	C2 – 38,702.6/15,351.1	Exploration	Dostyk LLP
3. Kolomenskoye	Kostanai	Gold-sulphide	C2 – 4,086.2/11,326.3	Exploration	Complex Geological and Ecological Expedition LLP
4. Akkargin	Kostanai	Gold-sulphide	A+B+C1 – 19/204 C2 – 9/101	Exploration	Brendt LLP
5. Raigorodok North	Akmola	Gold-sulphide	A+B+C1 – 1,233.8/1,541.2 C2 – 8,423.9/13,464.4 off-balance – 12,964/8,510.4	Exploration	Raigorodok LLP
6. Zholymbet	Akmola	Gold-quartz	A+B+C1 – 2,859/20,244 C2 – 545/4,173	Operational	JSC Mining and Metallurgy Kazakhaltyn
7. Varvarin	Kostanai	Gold-copper	A+B+C1 – 19,435.8/20,629.9 C2 – 34,300/68,552.2 off-balance – 2,197.9/1,998.3	Operational	JSC JV Varvarinskoye
8. Toktar	Kostanai	Gold-sulphide	A+B+C1 – 199.7/1,668.9 C2 – 1,016.4/10,123.2 off-balance – 14.9/15	Operational	GRK Toktar LLP
9. South-Toktar	Kostanai	Gold-sulphide	A+B+C1 – 898.8/3,508.8 C2 – 4,055.4/20,806.1 off-balance – 1,026.4/1,791	Operational	Komplexnaya GEE LLP
10. Vasilkov	Kokshetau	Gold-quartz	A+B+C1 – 68,079.9/175,370.5 C2 – 38,280.7/120,221.7 off-balance – 64,551.9/72,216.5	Operational	JSC Kazzinc and JSC Altyntau Kokshetau
11. Komarovskoye	Kostanai	Gold-sulphide	A+B+C1 – 689.5/2,156.8 C2 – 17,298.9/41,979.2 off-balance – 5,393.1/10,348.6	Operational	Polymetal International plc
12. Bestobe	Akmola	Gold-quartz	A+B+C1 – 2,052/14,747 C2 – 2,511/10,285 off-balance – 1,936/14,441	Operational	JSC Mining and Metallurgy Kazakhaltyn
13. Raigorodok South	Akmola	Gold-sulphide	A+B+C1 – 3,041.6/5,771.5 C2 – 5,397.8/13,492.2 off-balance – 361.3/511	Exploration	Raigorodok LLP
14. Aksu	Akmola	Gold-quartz	A+B+C1 – 6,300/6,535.3 C2 – 1,108.6/1,219.5 off-balance – 233/1,541	Operational	JSC Mining and Metallurgy Kazakhaltyn

*As at 1 January 2014

Source: Kazakhstan gold field reference guide

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Central and West Kazakhstan gold fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes/kg)*	Level of development	Subsoil user
1. Dolinnoye KRG	Karaganda	Gold-quartz	A+B+C1 – 1,029.4/10,887.4 C2 – 1,497.9/9,329.9 off-balance – 939.3/2,175.8	Exploration	Aktogai Mys LLP
2. V Maikain	Pavlodar	Gold-polymetallic	A+B+C1 – 12,613/32,718 C2 – 466/1,119 off-balance – 6,222/6,503	Operational	JSC Maikainzoloto
3. Quartz Hills	Akmola	Gold-quartz	A+B+C1 – 2,343/14,061 C2 – 273/1,457 off-balance – 286/1,192	Operational	JSC Mining and Metallurgy Kazakhaltyn
4. Yenbekshi	Karaganda	Gold-polymetallic	A+B+C1 – 25/268 C2 – 289.7/1,700.5	Reserve	
5. Pystynnoye	Karaganda	Gold-quartz	A+B+C1 – 11,005.8/16,861.5 C2 – 384/657 off-balance – 1,174/3,075.4	Operational	Vostok Mining LLP
6. Zhaltyrbulak	Karaganda	Gold-quartz	A+B+C1 – 1,491/1,704.4 C2 – 7,206.1/10,062.3 off-balance – 944.3/320.3	Exploration	PGTT Geocentre LLP
7. Sayak IV	Karaganda	Gold-cobalt	A+B+C1 – 2,217/16,006 C2 – 140/974 off-balance – 1,113/1,568	Operational	Kazakhmys LLP
8. Pervomaiskoye	Akmola	Gold-quartz	C2 – 1,553.9/813.5	Exploration	Tauken-Stepnogorsk LLP
9. Yubileynoye	Aktobe	Gold-quartz-sulphide	A+B+C1 – 20,135.9/54,603 C2 – 20,643/28,478.8 off-balance – 1,935/2,850.1	Operational	Yubileynoye LLP
10. Akpan	Aktobe	Gold-quartz	A+B+C1 – 143/1,301 C2 – 93/856 off-balance – 144/589	Exploration	JSC NC SPK Aktobe
11. Zhilandin	Aktobe	Gold-quartz	A+B+C1 – 4/26 C2 – 1/9 off-balance – 30/64	Exploration	JSC NC SPK Aktobe
12. Mynzhasar	Aktobe	Gold-quartz	A+B+C1 – 1/12	Reserve	
13. Abyz	Karaganda	Gold-polymetallic	A+B+C1 – 4,343.8/17,736.9 C2 – 2,051.7/7,942.1 off-balance – 543.6/987.4	Operational	Kazakhmys LLP

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East and South Kazakhstan gold fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes/kg)*	Level of development	Subsoil user
1. Bakyrchik	East-Kazakhstan Oblast	Gold-sulphide	A+B+C1 – 22,497.6/212,063.4 C2 – 6,077.6/52,157.1 off-balance – 5,659.7/16,529.5	Operational	Polymetal International plc
2. Mizek	East-Kazakhstan Oblast	Gold-quartz-sulphide	A+B+C1 – 22,497.6/212,063.4 C2 – 6,077.6/52,157.1 off-balance – 5,659.7/16,529.5	Operational	JSC AK Altynalmas
3. Bolshhevik	East-Kazakhstan Oblast	Gold-sulphide	C2 – 5,317.1/24,635.9	Operational	Polymetal International plc
4. Arkharly	Almaty	Gold-quartz-beresite	A+B+C1 – 118/1,022 C2 – 292/1,360	Exploration	Altyn Ken LLP
5. Ridder-Sokolnoye	East-Kazakhstan Oblast	Gold-polymetallic	A+B+C1 – 19,389.6/20,275.3 C2 – 28,719.9/20,456.4 off-balance – 29,721.2/24,116.3	Operational	JSC Kazzinc
6. Boko	East-Kazakhstan Oblast	Gold-quartz	A+B+C1 – 6/69	Reserve	
7. Akzhal	East-Kazakhstan Oblast	Gold-quartz	A+B+C1 – 592.3/1 207.9 C2 – 1,760/2,086.4 off-balance – 2,438/10,008	Operational	Gornyak AS LLP
8. North-Nikolayevskoye	East-Kazakhstan Oblast	Gold-polymetallic	C2 – 3,071.7/2,442.1	Exploration	Kazakhmys LLP
9. Akbakai	Dzhambul	Gold-quartz	A+B+C1 – 662/20,176.6 C2 – 1,356.9/14,365.2 off-balance – 1,303.8/6,249.9	Operational	JSC AK Altynalmas
10. Altyntas	Dzhambul	Gold-quartz	A+B+C1 – 0.7/51.7 C2 – 1,137/5,206	Reserve	
11. Karamurun Central	Kyzylorda	Gold-sulphide	C2 – 66.4/342	Exploration	Tez Kazinvest LLP
11. Karamurun South	Kyzylorda	Gold-sulphide	A+B+C1 – 4/13	Reserve	
12. Aksakal	Dzhambul	Gold-кварц-beresite	A+B+C1 – 1,329.5/11,707.7 C2 – 348/2 428.9 off-balance – 1,242/2,835.5	Operational	Odak LLP
13. Mynaral	Dzhambul	Gold-quartz	A+B+C1 – 19.2/381.1 C2 – 0.1/480.1 off-balance – 12.1/64.4	Operational	Rudgormash LLP
14. Zharkulak	Almaty	Gold-quartz	A+B+C1 – 318.2/685.2 C2 – 623.4/923.8 off-balance – 85.8/64.8	Operational	Marum zhar gold LLP

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Platinum and palladium fields



Platinum and palladium fields in Kazakhstan

Platinum and palladium are effective catalytic agents used in the production of high-octane gasoline, nitric acid, in hydrolysis and in the production of pure hydrogen. A wide range of platinoids and their alloys are used in the electrical industry, the production of special types of glass and porcelain, glass fibre, medical instruments, dentoprosthetic rehabilitation and in the jewellery business.

Platinum ore fields have either primary or placer deposits, and in composition terms – their own platinum and complex (many primary copper and copper-nickel sulphide ore and placer gold fields, as well as gold with osmiridium).



Major fields

Enterprises	Location	Fields	Total resources
Altyn-Tas LLP	Dzhambul Oblast	1. Uzun-su	n/a
		2. Aldaushye	n/a
Odak 79 K LLP	Karaganda Oblast	Kyzyl-Kainar	n/a
		Odak West	n/a
Khan Tau Minerals LLP	Dzhambul Oblast	Akbakai-Kengir	n/a
Polymetal International plc	East-Kazakhstan Oblast	1. Bakyrchik	0.436 g/tonne of platinum
		2. Bolshevik	
Yertys Mining LLP	East-Kazakhstan Oblast	Alisher site	n/a
Surov Resources LLP	East-Kazakhstan Oblast	Surov site	n/a

- Platinum group metal field ore is often accompanied by gold. Metal field ore is not extracted during gold extraction.
- Thus, platinum can be extracted as a metal by-product from complex ore. However, in Kazakhstan the platinum extraction process is underdeveloped and has not been studied. In addition, full geological and exploration data is not kept on reserves and the percentage content of platinum and palladium in complex fields.
- Exploration work is currently being performed at fields in Dzhambul Oblast (Uzun-su, Aldaushye, Kyzyl-Kainar, Akbakai-Kengir), Karaganda Oblast (Odak West) and East-Kazakhstan Oblast (Alisher and Surov sites). The Bakyrchik and Bolshevik gold ore fields are recorded as having platinum and palladium in extracted ore.

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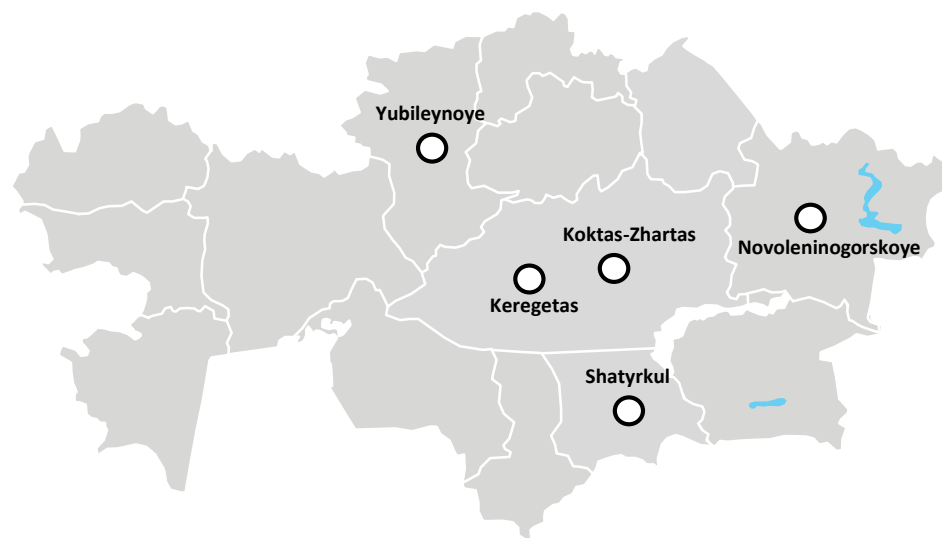
Silver fields



Silver fields in Kazakhstan

According to Thomson Reuters, Kazakhstan has the second largest silver production in the CIS after Russia and is the world's 12th largest silver producer. Kazakhstan accounts for 1.95% of global silver production, and has the 2nd largest explored silver reserves.

The country has over 250 silver (with a total specific silver value in ore of 70% or more compared to other mineral resources) and complex (polymetallic) silver fields (with specific value of 30-70%). Silver is produced in the north, south, central and north-east regions of the country.



Major fields

Enterprises	Location	Fields	Total resources
JSC Tau-Ken Samruk	Karaganda Oblast	Koktas-Zhartas	1,842.8 kg
Keregetas LLP	Karaganda Oblast	Keregetas Square	n/a
JSC AltynEx Company	Aktobe Oblast	Yubileynoye	108,590 tonnes
OJSC Kazakhmys Corporation	Dzhambul Oblast	Shatyrykul	149.3 tonnes
Kazzinc LLP	East-Kazakhstan Oblast	Novoleninogorskoye	n/a

- The field with the greatest potential is Shatyrykul (copper – 667.2 thousand tonnes, silver – 149.3 tonnes and gold – 16.7 tonnes). Reserves are predicted to last for another 43 years. The Shatyrykul field, which is located in Dzhambul Oblast, is known for five major ore-hosting shatter belts - Main, Western, Interim, Northern and Western, including over 50 ore bodies. Silver content is 20 g/tonne. The ore is of high quality, complex and easily concentrated. The field is not well-developed. Additional field exploration will almost double reserves. Ore beds may be worked using the open method to a depth of 120-150 m.
- The Yubileynoye field, which was opened in 1964, is a fixed asset of JSC AltynEx Company. Pilot extraction work using the open method was started in 1969 before reserves were confirmed, and has been performed using the underground method since 1994.

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Copper fields



Copper fields in Kazakhstan

Kazakhstan has the 4th largest explored copper reserves and is home to 6% of global proven reserves and 4% of production. Of the 100 fields on the state balance, over 50 of them are in operation. Copper is mostly produced in three regions – East-Kazakhstan (52 million tonnes), Karaganda (34.1 million tonnes) and Pavlodar (33.6 million tonnes) Oblasts. The largest fields are Zhezkazgan, Aidarly, Aktogai, Bozshakol, Konyrat and Kyzylata.

- The Zhezkazgan field is a large copper ore field in Karaganda Oblasta, in the Sarysu river basin, close to Zhezkazgan. Mine development began with the Neolithic age at the Zhezkazgan-Ulutau mountain range. In addition to copper, ore contains lead, zinc, molybdenum and silver. Approximately 70% of copper ore in Kazakhstan is produced in the Zhezkazgan region.



Major fields

Enterprises	Location	Fields	Total resources
KAZ Minerals LLP	East-Kazakhstan Oblast	Aktogai	6 million tonnes of copper
KAZ Minerals	Pavlodar Oblast	Bozshakol	4 million tonnes of copper
Kazakhmys Corporation LLP	East-Kazakhstan Oblast	Aidarly	6 million tonnes of copper
Kazakhmys Corporation LLP	Karaganda Oblast	Zhezkazgan	n/a
Balkhashtsvetmet	Karaganda Oblast	Konyrat	883 thousand tonnes of copper
Ai-Karaaul LLP	Turkestan Oblast	Kyzylata	650 thousand tonnes of copper

- Bozshakol is a copper field in the north of Kazakhstan, in Pavlodar Oblast. Its mineral resources have been valued at 1.17 billion tonnes of ore with average copper content of 0.36 %. The field also contains a valuable associated product in the form of gold and molybdenum. The Bozshakol field mine and enrichment plant should be operational for over 40 years.
- Aktogai is a large open-type mine in the Ayaguz District of East-Kazakhstan Oblast. The field is operated by KAZ Minerals PLC and after Bozshakol is the group's second largest mining project. The Aktogai field mine and enrichment plant should be operational for over 25 years.
- Geological work at the Kyzylata field, which is close to the city of Kentau, began in 2017. According to preliminary data, copper resources amount to 650 thousand tonnes.

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Copper fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes/kg)*	Level of development	Subsoil user
1. Aktogai	East-Kazakhstan Oblast	Copper-porphyritic	A+B+C1 – 1,528,277/5,884.8 off-balance – 676,410.9/1,836.6	Operational	Kazakhmys LLP
2. Aidarly	East-Kazakhstan Oblast	Copper-porphyritic	A+B+C1 – 1,529,256/5,870.5 off-balance – 265,842/478	Operational	Kazakhmys LLP
3. Kounrad	Karaganda	Copper-porphyritic	A+B+C1 – 161,188.7/526.6 off-balance – 222,294.1/517.9	Operational	Kazakhmys LLP
4. Bozshakol	Pavlodar	Copper-porphyritic	A+B+C1 – 176,063/1,268.6 C2 – 162/0.9 off-balance – 224,305/871.7	Operational	Kazakhmys LLP
5. Nurkazgan	Karaganda	Gold-copper	A+B+C1 – 177,694.1/1,423.3 C2 – 55,289.1/420.3 off-balance – 78,882.7/188.1	Operational	Kazakhmys LLP
6. Zhezkazgan	Karaganda	Copper sandstone	A+B+C1 – 288,897.3/2,917 C2 – 16,999.2/208.3 off-balance – 682,651.6/2,274.5	Operational	Kazakhmys LLP
7. Sayak 1	Karaganda	Skarn	A+B+C1 – 1,471.2/51 C2 – 2,152.9/32.4 off-balance – 2,821/12.3	Operational	Kazakhmys LLP
8. Sayak 2	Karaganda	Skarn	C2 – 907.2/16.5	Operational	Kazakhmys LLP
9. Nurkazgan (Samara)	Karaganda	Gold-copper	A+B+C1 – 177,694.1/1,423.3 C2 – 55,289.1/420.3 off-balance – 78,882.7/188.1	Operational	Kazakhmys LLP
10. Kyzyltu	Akmola	Copper-molybdenum	C2 – 34,145.8/254.4 off-balance – 34,070.1/94.1	Exploration	JSC Kazatomprom
11. Koksai	Almaty	Copper-porphyritic	A+B+C1 – 344,367.7/1,754 C2 – 6,717/25.9	Exploration	Koksai-Muzbel LLP
12. Koktaszhal	Karaganda	Copper-porphyritic	A+B+C1 – 30,014/184 C2 – 29,573/169 off-balance – 49,372/232	Exploration	Altai Polymetal
13. Kyzylshoky	Karaganda	Copper-porphyritic	C2 – 36,617.1/383.1 off-balance – 18,433.4/186.9	Exploration	Altai Polymetal

*As at 1 January 2014

Source: Kazakhstan copper field reference guide

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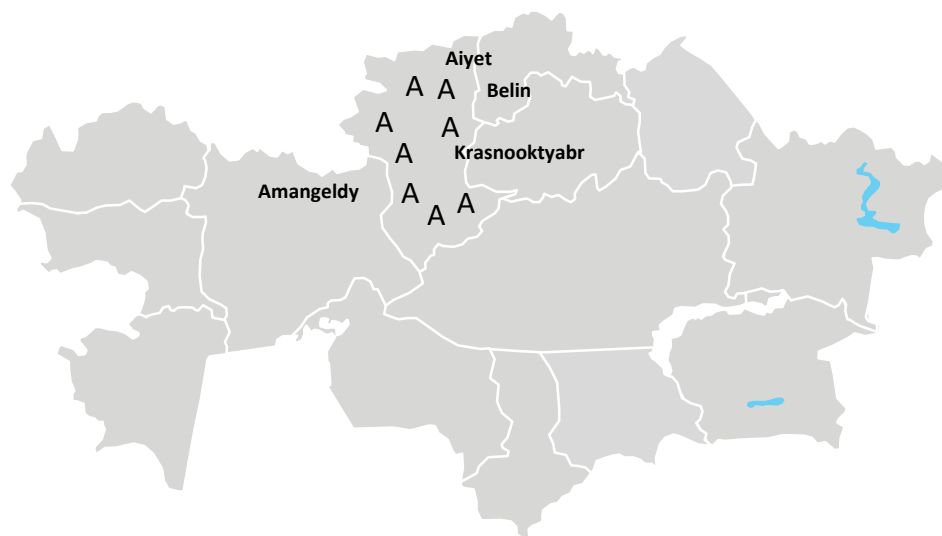
Aluminium fields



Aluminium fields in Kazakhstan

Bauxite is aluminium ore consisting of aluminium oxide hydrates, iron and silicon oxides, raw materials for producing alumina and alumina-containing refractory materials.

- Kazakhstan has the world's 17th largest bauxite reserves and the 2nd largest in the CIS, after Russia.
- Kazakhstan bauxite fields are grouped into eight bauxite-rich regions: East-Torgai (Amangeldy), West-Torgai, Central-Torgai, North-Kokshetau, Mugodzhar, Akmola, Ekibastuz and Prichimkent, which are known for their geological and morphological properties and mineralisation.
- The largest fields are in the Central-Torgai and West-Torgai bauxite regions. A total of 250 bauxite manifestation, bauxite rock and aluminium-iron fields have been discovered in Kazakhstan.



Major fields

Enterprises	Fields	Annual production
Kostanai Oblast		
JSC Aluminium Kazakhstan	Aiyet	7,044.2 thousand tonnes/year
JSC Aluminium Kazakhstan	Belin	350 thousand tonnes/year
JSC Aluminium Kazakhstan	Krasnooktyabr	3,706 thousand tonnes/year
JSC Aluminium Kazakhstan	Arkalyk	316 thousand tonnes
JSC Aluminium Kazakhstan	Northern	n/a
JSC Aluminium Kazakhstan	Lower-Ashut and Upper-Ashut	136 thousand tonnes
JSC Aluminium Kazakhstan	Ushtobe	n/a

- JSC Aluminium Kazakhstan is one of the largest bauxite mining enterprises in the CIS and owns the Aye, Belin and Krasnooktyabr mines. Geological reserves at the Krasnooktyabr field, which is the largest bauxite field in Kazakhstan, are valued at 125 million tonnes. Total Aye field reserves are valued at 50 million tonnes.
- The Amangeldy bauxite district is located in Kostanai Oblast. Bauxite is produced using the open method at the M Bykova raw materials based opened in 1932 and belonging to the Pavlodar aluminium plant. The Torgai bauxite mine group will cease bauxite and fire-retardant loam after 2023 as Amangeldy field group reserves will be replete. The company's objective will be to eradicate the consequences of its mining activity, including technical and biological spoil heap restoration.

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Aluminium fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes)*	Level of development	Subsoil user
1. Aye	Kostanai	Bauxite	A+B+C1 – 6,310.5 C2 – 1,340.2 off-balance – 1,507	Operational	JSC Aluminium Kazakhstan
2. East-Aiyet	Kostanai	Bauxite	A+B+C1 – 46,343.9 C2 – 564.9 off-balance – 7,683.9	Operational	JSC Aluminium Kazakhstan
3. Karabatal	Kostanai	Bauxite	A+B+C1 – 11,071 C2 – 596 off-balance – 1,174	Reserve	
4. Belin	Kostanai	Bauxite	A+B+C1 – 2,838.1 C2 – 4,372.2 off-balance – 3,406	Operational	JSC Aluminium Kazakhstan
5. Krasnooktyabr	Kostanai	Bauxite	A+B+C1 – 100,770 C2 – 7,109 off-balance – 7,925.4	Operational	JSC Aluminium Kazakhstan
6. Arkalyk	Kostanai	Bauxite	A+B+C1 – 257 C2 – 59	Exploration	JSC Aluminium Kazakhstan
7. Northern	Kostanai	Bauxite	A+B+C1 – 562	Operational	JSC Aluminium Kazakhstan
8. Ushtobe	Kostanai	Bauxite	off-balance – 1,108	Operational	JSC Aluminium Kazakhstan
9. Upper-Ashut	Kostanai	Bauxite	A+B+C1 – 2,466.8 C2 – 2,591 off-balance – 1,137.2	Operational	JSC Aluminium Kazakhstan
10. Lower-Ashut	Kostanai	Bauxite	C2 – 136 off-balance – 187.8	Operational	JSC Aluminium Kazakhstan
11. Koktal	Kostanai	Bauxite	C2 – 44 888	Reserve	

*As at 1 January 2014

Source: Kazakhstan aluminium field reference guide

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Lead and zinc fields



Kazakhstan lead and zinc fields

Kazakhstan has the world's 2nd largest explored lead reserves (11.5 million tonnes) and 3rd largest explored zinc reserves (24.2 million tonnes). The state balance incorporates reserves at 82 fields, the largest of which are Ridder-Sokol, Shalkiya, Zhairam, Maleevskoye, Chekmar and Orlovskoye.

- The Shalkiya polymetallic ore field (zinc and lead) is located 17 km to the north-east of the Zhanakorgan District in Kyzylorda Oblast in the south of Kazakhstan. Total Shalkiya field zinc reserves according to BrookHunt account for over 30% of all Kazakhstan reserves and are the 5th largest in the world in terms of field size.
- Zhairam is a polymetallic ore field (lead, zinc, copper and silver) in Karaganda Oblast, 60 km to the north-west of Karazhal. Opened in 1951, geological exploration work has been performed since 1964. Ore is processed by the Zhairam Mining and Enrichment Plant.



Major fields

Enterprises	Location	Fields	Total resources
JSC ShalkiyaZinc	Kyzylorda Oblast	Shalkiya	6.5 million tonnes of zinc
JSC Zhairam GOK	Karaganda Oblast	Zhairam	6 million tonnes of zinc
Kazzinc LLP	East-Kazakhstan Oblast	Maleevskoye	1 million tonnes of zinc
Kazzinc LLP	East-Kazakhstan Oblast	Ridder-Sokol	n/a
Kazzinc LLP	East-Kazakhstan Oblast	Chekmar	2 million tonnes of zinc
KAZ Minerals LLP	East-Kazakhstan Oblast	Orlovskoye	n/a

- The Ridder-Sokolskoye mine has been in operation since 1789 and has a 200-year history. It is 3 km from the centre of Ridder and is one of the oldest polymetallic fields (lead and zinc) in Kazakhstan with a high content of associated precious metals, producing 2.6 million tonnes per year.
- The Maleevskoye field is located 18 km to the east of Altai. Metal content is as follows: zinc – 7.5%, copper – 2.3%, lead – 1.3%, gold – 0.75 g/tonne and silver – 75 g/tonne. In 2017, Kazzinc launched the innovative Pitram system, which, with the help of digital technology, helps manage the mine online, ensuring work safety and high operating performance.
- East-Kazakhstan Oblast is the main mining region of Kazakhstan, where mineral resources have been produced for hundreds of years. Resource potential in East-Kazakhstan Oblast has not been exhausted, and the region has many ore manifestations requiring research and assessment.

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Lead and zinc fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes)*	Level of development	Subsoil user
1. Shaimerden	Kostanai	Lead-zinc	A+B+C1 – zinc (523.4) off-balance – lead (11.4), zinc (7.2)	Operational	JSC Shaimerden
2. Shalkiya	Kyzylorda Oblast	Lead-zinc	A+B+C1 – zinc (4,829.4), lead (1,480) C2 – lead (154.4), zinc (615.6) off-balance – lead (735.2), zinc (3,258.6)	Operational	Shalkiya Zinc Ltd
3. Zhairam	Karaganda	Lead-zinc	A+B+C1 – lead (2,602.5), zinc (5,619.7) C2 – lead (223), zinc (476) off-balance – lead (496.7), zinc (1,935.9)	Operational	JSC Zhairam GOK
4. Maleevskoye	East-Kazakhstan Oblast	Lead-zinc	A+B+C1 – lead (296.5), zinc (1,626.4) C2 – lead (51), zinc (133.7)	Operational	Kazzinc LLP
5. Ridder-Sokol	East-Kazakhstan Oblast	Lead-zinc	A+B+C1 – lead (99.5), zinc (293.88) C2 – lead (157.7), zinc (450.2) off-balance – lead (98.57), zinc (98.56)	Operational	Kazzinc LLP
6. Chekmar	East-Kazakhstan Oblast	Lead-zinc	A+B+C1 – lead (729), zinc (1,987.9) C2 – lead (144.4), zinc (392.7) off-balance – lead (76.8), zinc (191.7)	Operational	Kazzinc LLP
7. Orlovskoye	East-Kazakhstan Oblast	Copper-lead-zinc	A+B+C1 – lead (173.4), zinc (732.9) C2 – lead (15.7), zinc (55.3)	Operational	KAZ Minerals LLP
8. Nikolayevskoye	East-Kazakhstan Oblast	Copper-lead-zinc	A+B+C1 – lead (12.17), zinc (104.05) off-balance – lead (2.17), zinc (14.09)	Operational	Kazakhmys LLP
9. Mirgalimsai	Turkestan Oblast	Barium-lead-zinc	C2 – lead (10.6) off-balance – lead (765.5)	Reserve	
10. Kamyshin Ore Field	East-Kazakhstan Oblast	Lead-zinc	A+B+C1 – lead (123.9), zinc (346.5) C2 – lead (292.4), zinc (953.5) off-balance – lead (2.8), zinc (7.7)	Operational	Kazakhmys LLP

*As at 1 January 2014

Source: Kazakhstan lead and zinc field reference guide

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Tin fields

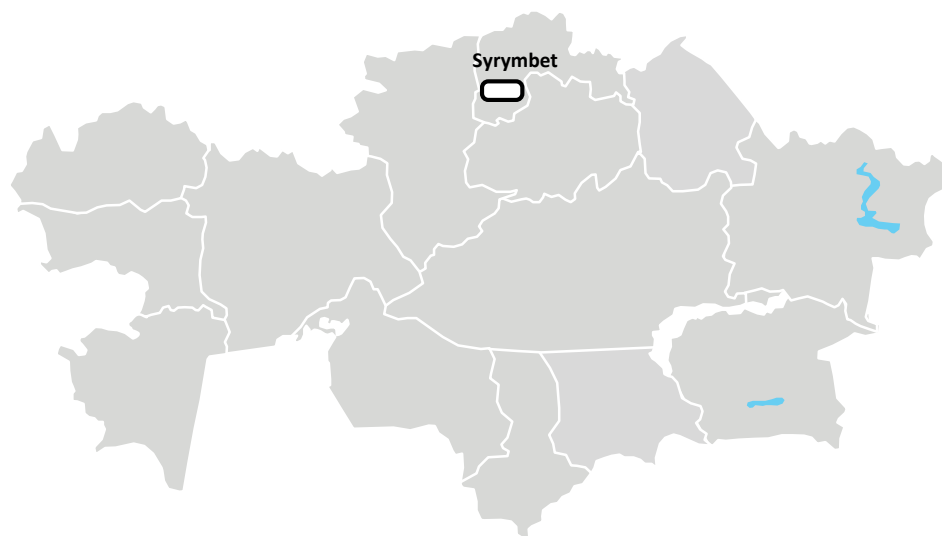


Tin fields in Kazakhstan

The Syrymbet ore field is located in North-Kazakhstan Oblast's Aiyrtau District.

The Syrymbet field is the only one in Kazakhstan and has the world's largest undeveloped, developed and classified tin reserves (according to the international Joint Ore Reserves Committee). Syrymbet commercial reserves, which are extracted for processing, amount to 123,298 million tonnes of ore with total tin reserves of roughly 492 thousand tonnes.

The section of the Syrymbet ore field stretching to the JSC Tin One Mining geological site, incorporates the Syrymbet tin ore field, which consists of three sites – South-West, Central and North-East, as well as the Sarybulak tantalum-niobate section.



Major fields

Section	Ore	Tin, %	Tin, tonnes
	million tonnes		
North-Kazakhstan Oblast			
Sarybulak	2.4	0.38%	9,147
South-West	23.3	0.44%	103,747
Central	54.8	0.43%	236,877
	35.5	0.32%	113,925
North-East	7.25	0.40%	28,663
East-Kazakhstan Oblast			
Gremyachyee			289
Kalai-tapkan	category A+B+C1 - 2017 tonnes, category C2 - 852 tonnes, off-balance - 325 tonnes		
Asu-Bulak	off-balance - 52 tonnes		

- The Syrymbet field was opened in 1986. Reconnaissance and exploration work was suspended between 1986 and 2010. Detailed exploration and pre-exploration work was performed in 1989-1996 on oxide-bearing ore. It has not been completed and reserves are based on an operational calculation from 1997.
- On 31 August 1999, JSC Tin One Mining received subsoil use rights (contract No.362) for exploration work with subsequent production of tin ore.
- Stripping and tin production was started in May 2019. The company produces rich tin concentrate, with an average tin content of at least 50%, tin sublimate with a tin content of at least 68%, as well as copper and fluoride concentrates.

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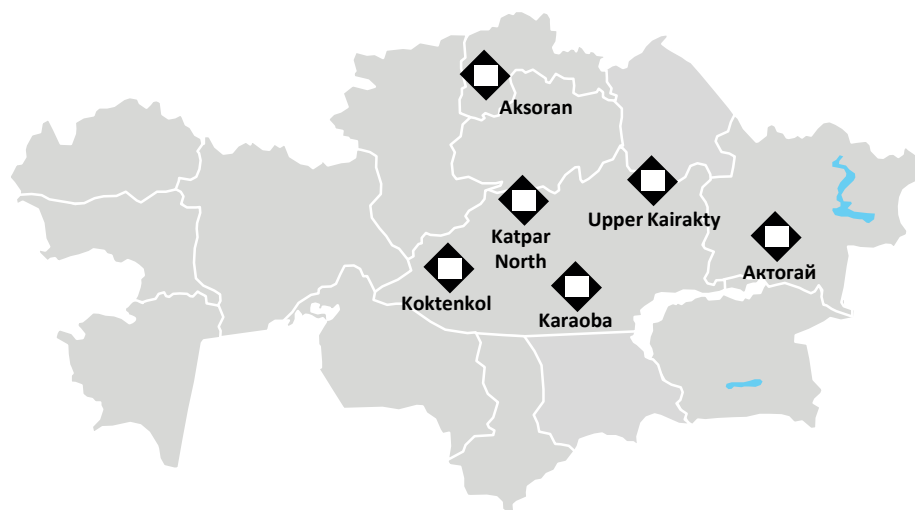
Tungsten and molybdenum fields



Tungsten and molybdenum fields in Kazakhstan

According to the regional geology committee department, Karaganda Oblast holds 84.8% of balance tungsten resources in Kazakhstan in 14 fields.

There are also complex fields containing molybdenum, copper, silver and other mineral resources. Tungsten is the main component at the Upper Kairakty, Karaoba and Katpar North fields, which account for a significant portion of tungsten reserves. Koktenkol is another important source of tungsten, incorporating molybdenum in ore. The Aktogai field is also a source of molybdenum.



Major fields

Enterprises	Location	Fields	Total resources
Karaoba-2005 LLP	Karaganda Oblast	Karaoba	247 thousand tonnes of tungsten
Dala Mining LLP	Karaganda Oblast	Koktenkol	196 thousand tonnes of tungsten, 448 thousand tonnes of molybdenum
Katpar North LLP	Karaganda Oblast	Katpar North	90 thousand tonnes of tungsten, 13 thousand tonnes of molybdenum
Katpar North LLP	Karaganda Oblast	Upper Kairakty	1,2 million tonnes of tungsten, 40 thousand tonnes of molybdenum
KAZ Minerals LLP	East-Kazakhstan Oblast	Aktogai	115 thousand tonnes of molybdenum
Esil Mining LLP	North-Kazakhstan Oblast	Aksoran	65 thousand tonnes of tungsten, 13 thousand tonnes of molybdenum

- The Upper Kairakty field is located in the Shet District of Karaganda Oblast, 35 km from the Zharyk railway station, in favourable geographical and economic conditions, and close to transport and power hubs. In 2016, the company Katpar North LLP signed a contract to explore and produce tungsten-molybdenum ore at the Upper Kairakty field in Karaganda Oblast, which has strategic importance. A Tau-Ken Samruk subsidiary with the same name is also involved in developing the Katpar North field.
- Companies with tungsten and molybdenum subsoil use rights in Karaganda Oblast are currently developing fields and raising investment. A lack of investment and China's dominance of the tungsten market are seen as reasons for the failure to develop tungsten fields in Kazakhstan.

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Tungsten, molybdenum and tin fields



No. Field	Oblast	Ore type	Reserves (tonnes)*	Level of development	Subsoil user
1. Koktenkol	Karaganda	Tungsten-molybdenum-bismuth-copper-silver-rhenium	A+B+C1 – molybdenum (426,324), tungsten (192,078) C2 – molybdenum (21,972), tungsten (4,278) off-balance – molybdenum (341,134), tungsten (179,383)	Operational	Dala Mining LLP
2. Upper Kairakty	Karaganda	Tungsten-molybdenum-bismuth-silver	A+B+C1 – molybdenum (37,341), tungsten (1,132,806) C2 – molybdenum (2,296), tungsten (83,469) off-balance – molybdenum (128,325), tungsten (1,497,708)	Exploration	Katpar North LLP
3. Karaoba	Karaganda	Tungsten-molybdenum-tin	A+B+C1 – molybdenum (30,023), tungsten (234,430), tin (23,419) C2 – molybdenum (499), tungsten (12,764), tin (581) off-balance – molybdenum (5,890), tungsten (35,657), tin (4,463)	Operational	Karaoba-2005 LLP
4. Katpar North	Karaganda	Tungsten-molybdenum-bismuth-selenium-tellurium-silver	A+B+C1 – molybdenum (13,900), tungsten (90,346) C2 – molybdenum (27), tungsten (147) off-balance – molybdenum (6,333), tungsten (45,816)	Operational	Katpar North LLP
5. Aktogai	East-Kazakhstan	Copper-molybdenum	A+B+C1 – molybdenum (121,700) off-balance – molybdenum (37,600)	Operational	Kazakhmys LLP
6. Bogutin	Almaty	Tungsten-molybdenum	A+B+C1 – molybdenum (3,255), tungsten (218,564) C2 – molybdenum (925), tungsten (24,493) off-balance – tungsten (22,539)	Exploration	JSC NC Zhetysu
7. Yubileynoye	East-Kazakhstan	Tin-tantal-caesium-lithium-beryllium	A+B+C1 – tin (204) C2 – tin (8) off-balance – tin (260)	Reserve	
8. Shalgiya	Karaganda	Molybdenum-lead-copper	A+B+C1 – molybdenum (43,050) C2 – (18,559) off-balance – molybdenum (366)	Exploration	JSC Duniye Corporation
9. Syrymbet	North-Kazakhstan	Tungsten-molybdenum-tin	A+B+C1 – tin (37,326) C2 – tin (61,220) off-balance – tin (177,837), molybdenum (738), tungsten (6,788)	Exploration	Syrymbet LLP
10. Aidarly	East-Kazakhstan	Copper-molybdenum	A+B+C1 – molybdenum (154,278) off-balance – molybdenum (19,638)	Exploration	Kazakhmys LLP

*As at 1 January 2015

Source: Kazakhstan rare metal and rare earth metal field reference guide

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Titanium and zirconium fields



Titanium fields in Kazakhstan

Titanium and its alloys with unique physical and chemical properties (strong; light; ductile; corrosion resistant and heat resistant) are the main, and in many cases, only construction materials in the aviation, rocket, machine and ship building, power and other sectors.

The main large titanium and zirconium fields in Kazakhstan are Satpayev, Shokash, Obukhov, Karaotkel, Zayachye and Aschisai. The first three fields are currently being developed, while the remainder are only in the research and development stages. Titanium and zirconium fields are located in various regions – East-Kazakhstan, North-Kazakhstan, Akmola and Aktobe Oblasts.



Major fields

Enterprises	Location	Fields	Total resources
n/a	Aktobe Oblast	Aschisai	n/a
n/a	Akmola Oblast	Zayachye	1.2 million tonnes of titanium dioxide
n/a	East-Kazakhstan Oblast	Karaotkel	600 thousand tonnes of zirconium dioxide
JSC UKTMK	East-Kazakhstan Oblast	Satpayev	3 million tonnes of titanium dioxide
Expoengineering LLP	Aktobe Oblast	Shokash	1.5 million tonnes of titanium dioxide 338 thousand tonnes of zirconium dioxide
Tioline LLP	North-Kazakhstan Oblast	Obukhov	1.5 million tonnes of titanium dioxide

- The Shokash titanium-zirconium field is located in the Martuk District of Aktobe Oblast, 110 km to the west of Aktobe and was discovered following geological images in 1986. The Obukhov field (131) is located in Kokshetau Oblast, 35 km to the north of Kokshetau, in the Berezov village district, is rich in reserves, and close to average ore minerals in content terms, ilmenite-zirconium. The Satpayev field is located in the Kokpetkin District of East-Kazakhstan Oblast.
- Kazakhstan is one of the world's top four titanium producers. The only major titanium producer in Kazakhstan is JSC Ust-Kamenogorsk Titanium-Manganese Plant, in Ust-Kamenogorsk, which extracts ore at Satpayev fields.
- A mining and enrichment complex is currently being built at the Shokash field to extract between 600 thousand and 1 million tonnes of titanium-zirconium ore per year.

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Titanium and zirconium fields



No. Field	Oblast	Ore type	Reserves (thousand m3/thousand tonnes)*	Level of development	Subsoil user
1. Satpayev (Bektemir)	East-Kazakhstan Oblast	Ilmenite deposits	A+B+C1 – 7,571.8/595.2 C2 – 14,655/1,060.9	Operational	Satpayevsk Titanium Mines LTD
2. Karaotkel	East-Kazakhstan Oblast	Ilmenite-zirconium deposits	A+B+C1 – 256,643/3,202 off-balance – 126,865/1,077	Reserve	
3. Zayachye	Akmola	Ilmenite-zirconium deposits	A+B+C1 – 23,291/698.4 C2 – 2,298/55.3	Reserve	
4. Obukhov	North-Kazakhstan	Ilmenite-zirconium deposits	A+B+C1 – 5,965.4/448.4 C2 – 100.4/4 off-balance – 7,543.6/187.9	Operational	Tioline LLP
5. Karaagash	North-Kazakhstan	n/a	650 thousand tonnes of explored titanium dioxide reserves	Reserve	
6. Slavyanovskoye	North-Kazakhstan	Ilmenite-zirconium sand	C2 – 20,639/631	Reserve	
7. Letovochnoye	North-Kazakhstan	Ilmenite-zirconium sand	C2 – 10,889/138	Reserve	
8. Tobolskoye	Kostanai	Ilmenite-zirconium deposits	A+B+C1 – 14,777/407 C2 – 584/12 off-balance – 12,075/118	Reserve	
9. Alasor	Kostanai	Ilmenite-zirconium sand	off-balance – 30,546/341	Closed	
10. Kumkol	Aktobe	Ilmenite-zirconium deposits	A+B+C1 – 55,710/1,338	Reserve	
11. Shokash	Aktobe	Ilmenite-zirconium deposits	A+B+C1 – 9,007.7/1,113.4 C2 – 587.1/60.5 off-balance – 4,254.2/119.7	Operational	Expoengineering LLP
12. Aschisaisk	Aktobe	Ilmenite deposits	C2 – 55,710/1,338	Exploration	Kaz Minerals LLP
13. Prognoznoye	Aktobe	Ilmenite-zirconium sand	C2 – 264,590	Reserve	

*As at 1 January 2014

Source: Kazakhstan titanium field reference guide

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Nickel and cobalt fields



Nickel and cobalt fields in Kazakhstan

Nickel ore beds are centred in northern and north-west regions of Kazakhstan, and in particular at the Bugetkol (Aktobe Oblast) and Gornostayev (East-Kazakhstan Oblast) fields, and the Kempirsai (Aktobe Oblast) and Ekibastuz-Shidertin (Pavlodar Oblast) group of fields.

In nickel content terms, Kazakhstan ore is considerably inferior to other countries with significant nickel reserves. In Kazakhstan's mineral resource base, nickel is the 8th largest in terms of mineral resource reserves.

The Western-Turgai nickel district is also well known as a concentration of nickel fields in Kostanai Oblast, which include Shevchenkovskoye, Kundybai, Podolskoye, Zhitikarin, Akkargin, Milyutinskoye and others. The region's total cobalt-nickel ore reserves have been assessed at 100 million tonnes. Ore can be extracted using the open method as the ore beds are not deep.



Major fields

Enterprises	Fields	Total resources
East-Kazakhstan Oblast.		
Kaznickel LLP	Gornostayev	1 million tonnes of nickel, 65 thousand tonnes of cobalt
Kostanai Oblast		
Kazakhstan Nickel LLP	Shevchenkovskoye	1 million tonnes of nickel, 5.8 million tonnes of cobalt
Pavlodar Oblast		
Avtoransservice LLP	Ekibastuz-Shidertinskoye	262 thousand tonnes of nickel, 13 million tonnes of cobalt
	Adilbek	381.6 thousand tonnes of nickel, 24.3 thousand tonnes of cobalt
Aktobe Oblast		
Kyzyl-Kain Mamyt LLP	Kempirsai	188 thousand tonnes of nickel, 868 thousand tonnes of cobalt
	Kyzyl-Kain	5.7 thousand tonnes of nickel, 202.6 thousand tonnes of cobalt
	Kara-Obin	60.3 thousand tonnes of nickel, 4,247 thousand tonnes of cobalt
Sary Arka LLP	Bugetkol	95.6 thousand tonnes of nickel, 4.6 thousand tonnes of cobalt
	Oktyabrskoye	77.8 thousand tonnes of nickel, 3,242 thousand tonnes of cobalt
Zhety Kazyna LLP	Scherbakovskoye	17.2 thousand tonnes of nickel, 1,055 thousand tonnes of cobalt
	South-Shirpakain	31.3 thousand tonnes of nickel, 1,896 thousand tonnes of cobalt

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Nickel and cobalt fields



No. Field	Oblast	Ore type	Reserves (thousand tonnes)*	Level of development	Subsoil user
1. Kara-Obin	Aktobe	Cobalt-nickel	A+B+C1 – nickel (59.45), cobalt (3,444.1) C2 – nickel (2.6), cobalt (152) off-balance – nickel (2.2), cobalt (149)	Exploration	Kyzyl-Kain Mamyt LLP
2. Kokpektin	Aktobe	Cobalt-nickel	A+B+C1 – nickel (3.3), cobalt (181) off-balance – nickel (0.1), cobalt (29)	Reserve	
3. Kempirsai	Aktobe	Cobalt-nickel	A+B+C1 – nickel (23.6), cobalt (1,336) C2 – nickel (11.6), cobalt (680) off-balance – nickel (5.2), cobalt (228)	Closed	
4. Zhusalin	Aktobe	Cobalt-nickel	A+B+C1 – nickel (40.5), cobalt (2,327) C2 – nickel (3.7), cobalt (241) off-balance – cobalt (1)	Operational	Asia-Invest Corporation
5. Kyzyl-Kain	Aktobe	Cobalt-nickel	C2 – nickel (1.5), cobalt (37) off-balance – nickel (6.4), cobalt (656)	Reserve	
6. Bugetkol	Aktobe	Cobalt-nickel	A+B+C1 – nickel (73.5), cobalt (3,650) C2 – nickel (22.1), cobalt (970) off-balance – nickel (29.3), cobalt (1,700)	Exploration	Sary Arka LLP
7. Oktyabrskoye	Aktobe	Cobalt-nickel	A+B+C1 – nickel (91), cobalt (2,961) off-balance – nickel (76.9), cobalt (4,108)	Closed	
8. Scherbakovskoye	Aktobe	Cobalt-nickel	A+B+C1 – nickel (1.4), cobalt (80) off-balance – nickel (17.1), cobalt (829)	Exploration	Zhety-Kazyna LLP
9. South-Shirpakain	Aktobe	Cobalt-nickel	A+B+C1 – nickel (26.48), cobalt (1,400) C2 – nickel (4), cobalt (368) off-balance – nickel (0.1), cobalt (3.0)	Exploration	Zhety-Kazyna LLP
10. Gornotstayev	East-Kazakhstan	Cobalt-nickel	C2 – nickel (173.2), cobalt (11,983)	Exploration	Kaznickel LLP
11. Shevchenkovskoye	Kostanai	Cobalt-nickel	A+B+C1 – nickel (808.79), cobalt (41,855.9) C2 – nickel (266.6), cobalt (16,737.6) off-balance – nickel (70.2), cobalt (4,042)	Operational	Kaznickel LLP
12. Ekibastuz-Shidertin	Pavlodar	Cobalt-nickel	A+B+C1 – nickel (162.5) C2 – nickel (100), cobalt (14,733.7)	Exploration	Avtoransservice LLP
13. Adilbek	Pavlodar	Cobalt-nickel	n/a	Exploration	Avtoransservice LLP

*As at 1 January 2015

Source: Kazakhstan chrome, nickel, cobalt and vanadium field reference guide

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Human capital (1/2)



Work force in Kazakhstan

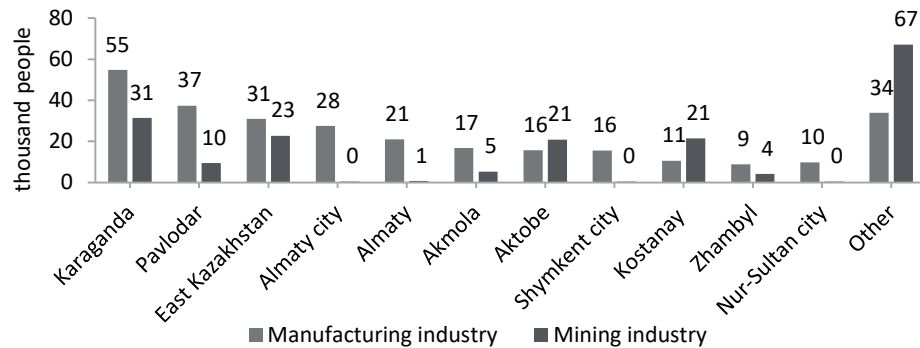


9.3 million persons
in 2021 QII

9.7 million persons
in 2024

As at 2021 QII, the work force in Kazakhstan was 9.3 million, of whom 95% (8.8 million persons) were employed, while 5% (0.5 million) were unemployed.

Processing and mining industry headcount by oblast in 2021 QII, thousand persons

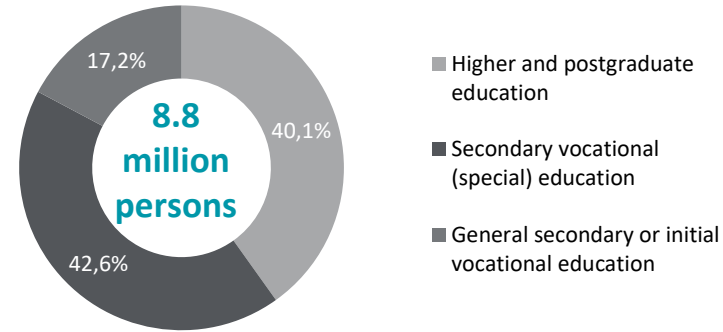


Broken down into regions, the greatest share of **processing and mining** industry employees are in Karaganda Oblast – 19% and 17% and East-Kazakhstan Oblast – 11% and 16% of total employees in the region.

Source: Kazakhstan Statistics Committee

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Distribution of the working population by education level, 2021 QII



The working population (8.8 million persons) includes 3.5 million persons with higher and post-graduate education; 3.7 million persons with secondary professional (special) education; 822 thousand persons with elementary professional education; while the remaining 695 thousand have a secondary general education, core secondary or elementary education.

Employee salaries by activity type, thousand persons

Index	2020 QII	2021 QII
Construction	151	136
Agriculture, forestry and fishing industries	58	67
Wholesale and retail sales	195	201
Education	999	1,006
Transportation and warehousing	223	215
State administration and defence	397	390
Heavy industry	605	607
Processing industry	279	282
Mining industry	186	184

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Human capital (2/2)



Headcount of noble and non-ferrous metal production employees in 2021 QII

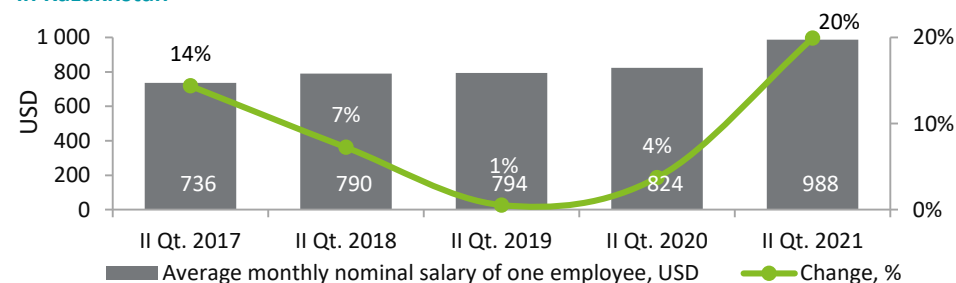


44
thousand persons

7.3%
of heavy industry employees

Processing industry headcount in 2021 QII was 44 thousand, which is 1.2% of total processing industry headcount.

Average nominal employee salaries in base noble and non-ferrous metal production in Kazakhstan

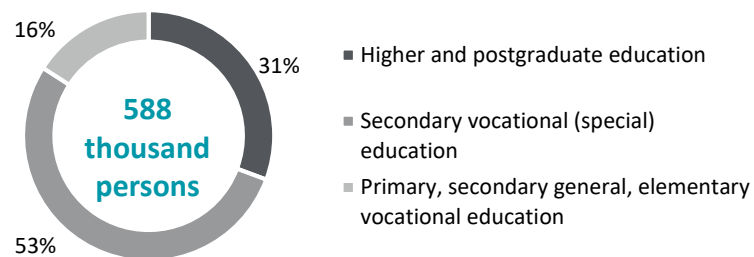


As at 2021 QII, average employee salaries in the processing industry were 988 USD, which is 20% higher year-on-year. Nominal salary CAGR for 2017-2021 was 7.6%.

Source: Kazakhstan Statistics Committee

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Allocation of the working population in the processing industry by education level as at 2021 QII



The working population in the processing industry (588 thousand persons) includes 312 thousand persons with secondary education; 182 thousand persons with higher education; 94 thousand persons with post-graduate education

Industry headcount by position, thousand persons

	2017 QII	2018 QII	2019 QII	2020 QII	2021 QII
Heavy industry	614.8	622.7	625.9	604.8	606.7
Mining and excavation industry	195.4	194.2	192.6	186.1	184.3
Processing industry	277.5	284.6	291.1	278.7	282.3
Production of base noble and non-ferrous metals	39.4	41.8	45.0	44.0	44.1

At the end of 2021 QII, headcount in base noble and non-ferrous metal production was 44.1 thousand persons, with CAGR of 2.86% for 2017-2021 (as at QII for each year).

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Potential consumption growth in Kazakhstan



Kazakhstan economic growth

Index	2020	2021 F	2022 F	2023 F	2024 F	2025 F
GDP	-2.6%	3.7%	4.2%	3.7%	3.8%	4.0%
Personal consumption	-3.8%	4.2%	4.8%	4.4%	4.6%	3.7%
State consumption	0.0%	2.0%	1.5%	2.0%	2.2%	2.2%
Gross investment in capital stock	-0.3%	3.0%	2.0%	3.5%	4.0%	3.8%
Goods and service exports	-12.1%	12.2%	7.1%	5.7%	4.7%	4.1%
Goods and service imports	-10.7%	11.4%	5.0%	6.9%	6.1%	3.5%
Domestic demand	-2.8%	3.1%	3.4%	4.0%	4.1%	3.5%
Heavy industry	3.0%	4.8%	5.9%	5.5%	4.1%	3.8%

According to EIU forecasts, personal consumption in Kazakhstan will increase 4.2% after a 3.8% decline in 2020. Domestic demand will recover by 3.1% to a level exceeding pre-pandemic levels. Thanks to government efforts to stimulate the economy, gross investment in fixed assets will grow 3% after a 0.3% decline in the previous year.

Furthermore, EIU has also forecast average heavy industry growth of 4.5% between 2021 and 2025.

The metallurgy sector is a sensitive sector for the country as it has a raw material focus to a greater or less extent. The lack of sufficient processing in the metallurgical sector is the main deterrent to the development of high-tech and science-intensive areas of the economy, such as mechanical engineering, and the transportation and construction sectors.

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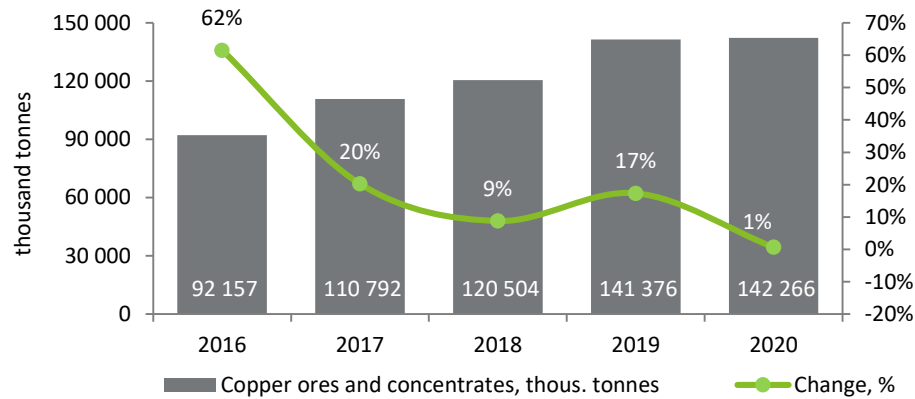


Base non-ferrous metal consumption (1/5)

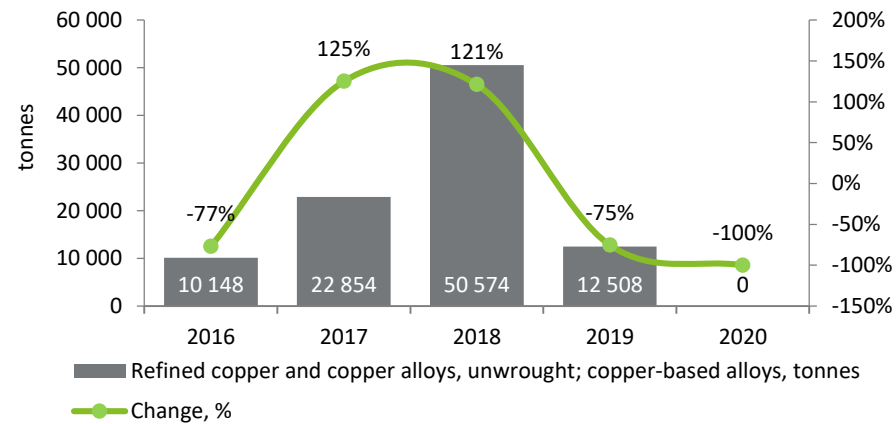


 Consumption statistics are only kept in Kazakhstan for certain products (goods) and raw materials due to production and customs statistics using different units of measurement

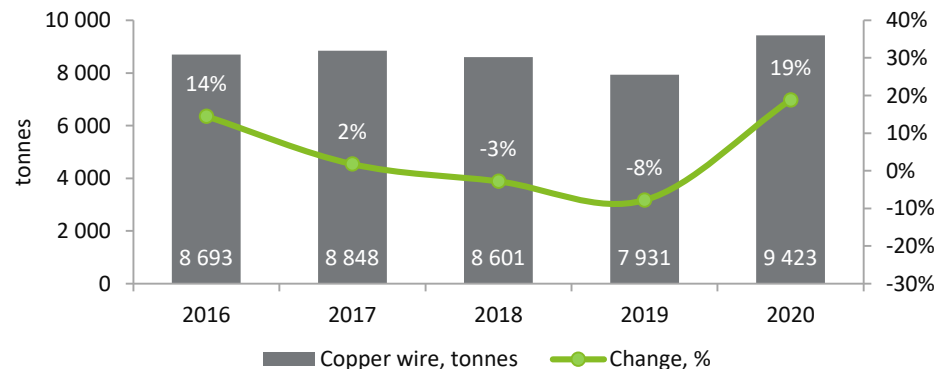
Changes in copper ore and concentrate consumption in Kazakhstan



Changes in the consumption of untreated refined copper and copper alloys in Kazakhstan



Changes in copper wire consumption in Kazakhstan



- Copper ore and concentrate consumption in Kazakhstan has been growing thanks to production increases, and in 2020, it increased by 1% to 142,266 thousand tonnes. CAGR in the last 5 years was 11%.
- Untreated copper and copper alloy consumption fluctuated in the last five years. The volume of refined copper and copper alloys grew sharply in the middle of that period to 50,574 tonnes and fell again by 75% in 2019 due to an increase in product exports. In 2020, domestic consumption was zero due to all product being exported.
- Demand for copper wire has been unstable. Compared to 2019, copper wire consumption increased in 2020 by 19% to 9,423 tonnes. In the last five years, the majority of copper wire production was used domestically.

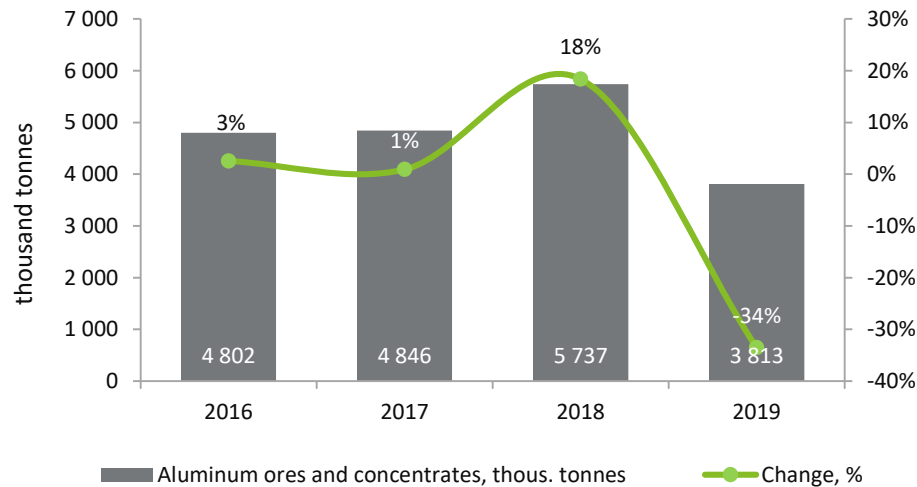
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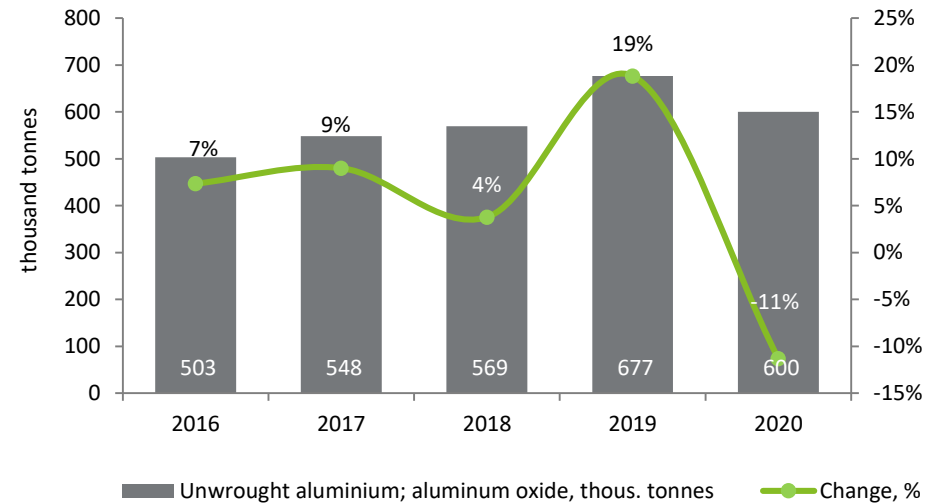
Base non-ferrous metal consumption (2/5)



Changes in aluminium ore and concentrate* consumption in Kazakhstan



Changes in untreated aluminium consumption in Kazakhstan



- Demand for aluminium ore and concentrates has varied severely in the last five years, with CAGR at -5.6%. In 2019, aluminium consumption fell 34% to 3,813 thousand tonnes due to a reduction in aluminium ore extraction. In January-April 2020, operations at the major Torgai bauxite ore group were suspended due to mine reserve depletion.
- The largest sector enterprise, which extracts and enriches bauxite at the Torgai bauxite ore group and the Red October bauxite ore group in Kostanai Oblast, is JSC Aluminium Kazakhstan, which processes all aluminium ore and concentrates produced at JSC Kazakhstan Electrolysis Plant.
- Kazakhstan produces high-grade elementary aluminium at JSC Kazakhstan Electrolysis Plant, 90% of which is then sold to Russia, Belarus, Uzbekistan, South and Central Europe. Untreated aluminium and aluminium oxide consumption grew steadily in 2016-2019, while in 2020, domestic demand for aluminium fell to 600 thousand tonnes. Average consumption in the last five years was 580 thousand tonnes.

*Data for 2020 is not available in the Kazakhstan Statistics Committee database

Source: Kazakhstan Statistics Committee

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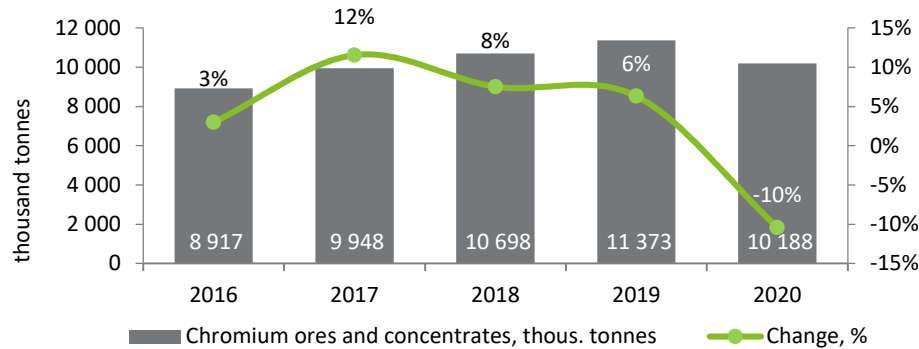
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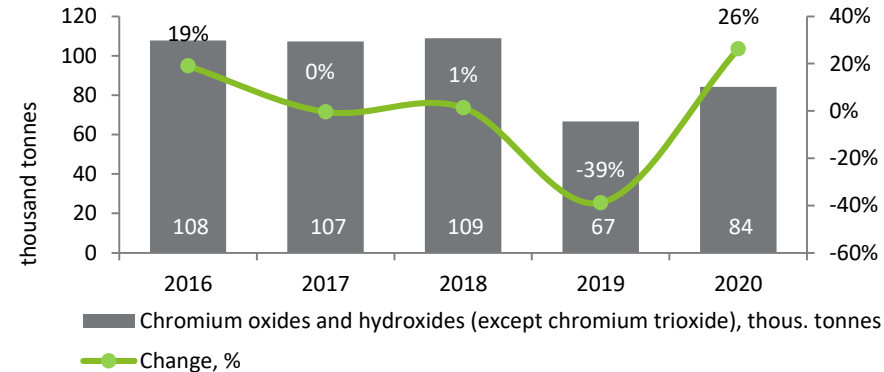
Base non-ferrous metal consumption (3/5)



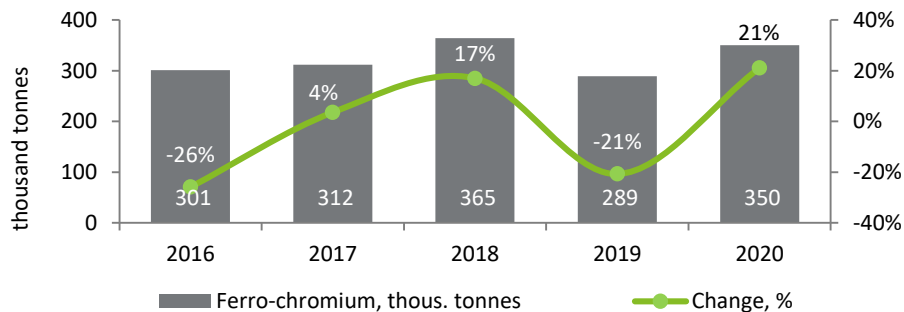
Changes in chrome ore and concentrate consumption in Kazakhstan



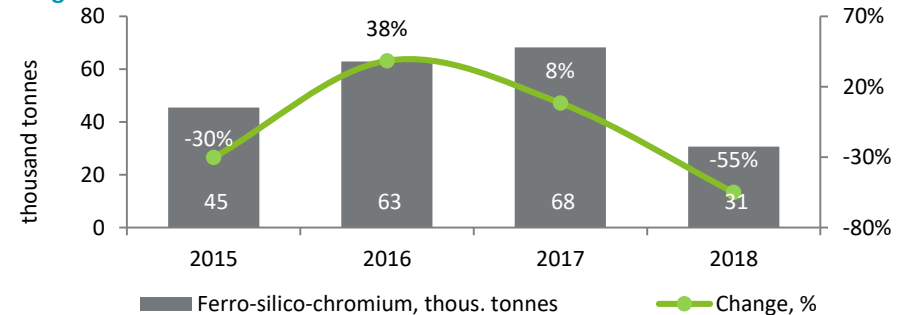
Changes in chrome oxide and hydroxide consumption in Kazakhstan



Changes in ferrochrome consumption in Kazakhstan



Changes in ferrochrome silicon in Kazakhstan



- Chrome ore and concentrate consumption in Kazakhstan was positive until 2020, when it fell 10% to 10,188 thousand tonnes. CAGR for the last five years was 3.4%.
- Chrome oxide and hydroxide consumption in Kazakhstan was unstable in 2016-2020, with the greatest decline of 39% seen in 2019 due to a significant decrease in production levels. However, chrome oxide demand again grew 26% in 2020. A similar trend was seen in ferrochrome consumption. Compared to ferrochrome and chrome oxide, silicon ferrochrome consumption fell in 2018, while the former two grew. There is no data available for ferrochrome in 2019-2020.

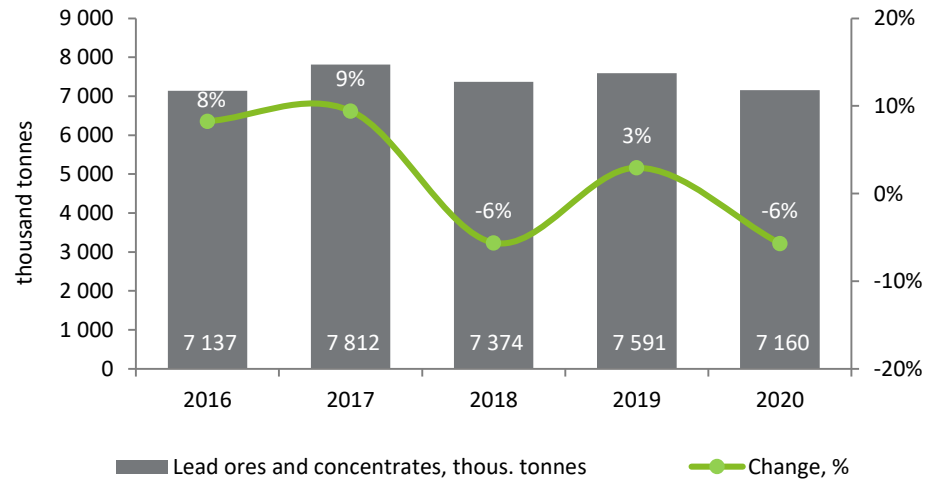
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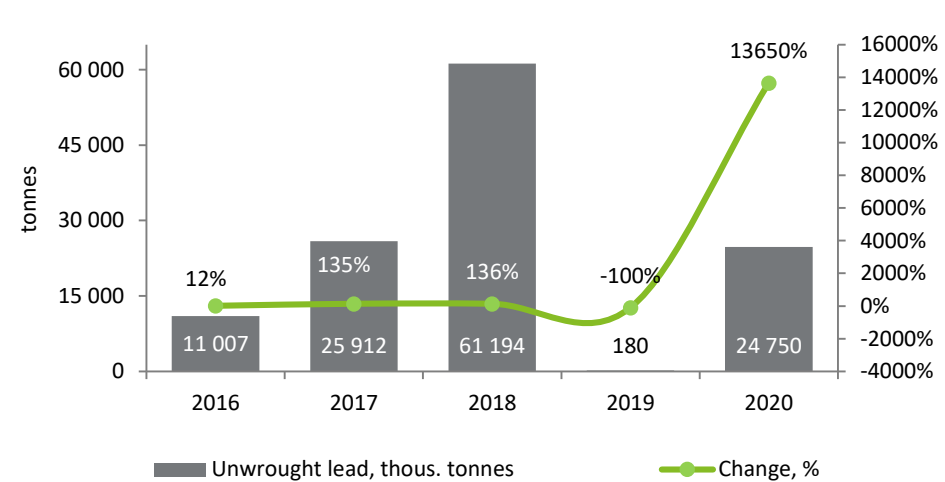
Base non-ferrous metal consumption (4/5)



Changes in lead ore and concentrate consumption in Kazakhstan



Changes in untreated lead consumption in Kazakhstan



- Lead consumption in Kazakhstan has been relatively stable, with no great changes. Average consumption in the last five years was 7,415 thousand tonnes. In 2020, demand for lead ore and concentrates fell 6% year-on-year to 7,160 thousand tonnes due to a decline in lead ore and concentrate extraction caused by pandemic quarantine measures. CAGR in the last five years was 0.1%.
- Untreated lead consumption has been volatile. In 2016-2018, untreated lead consumption increased nearly six-fold due to a decline in exports to 61,194 tonnes in 2018. Untreated lead consumption in Kazakhstan in 2020 was 24,750 tonnes, which is 137 higher than in 2019. The cause of the consumption drop in 2019 was increased exports. CAGR for untreated lead in 2016-2020 was 22%.

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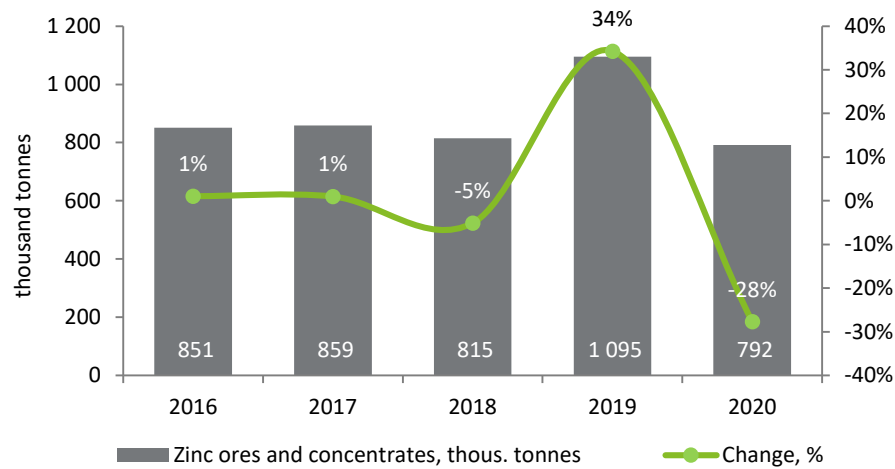
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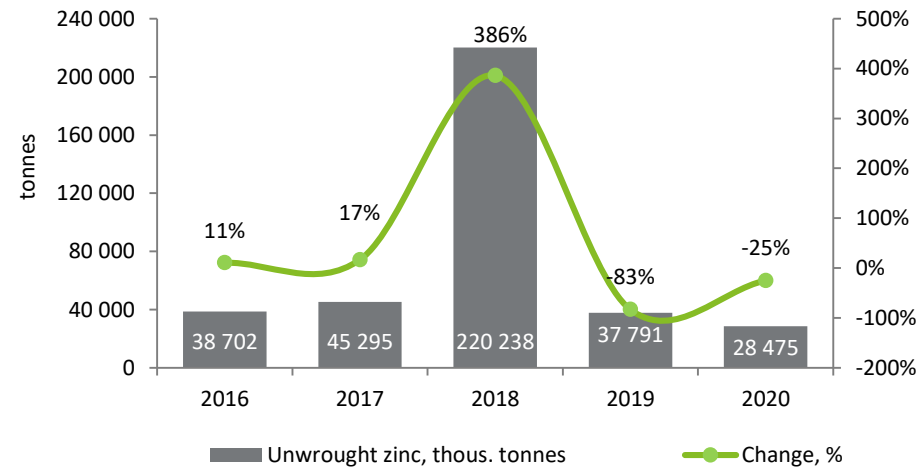
Base non-ferrous metal consumption (5/5)



Changes in zinc ore and concentrate consumption in Kazakhstan



Changes in untreated zinc consumption in Kazakhstan



- Demand for zinc ore and concentrates has been volatile in Kazakhstan. In 2019, zinc consumption increased by 34% year-on-year, while in 2020 it fell by 28% to 792 thousand tonnes. The cause of the consumption decline was the reduction in zinc ore and concentrate extraction due to pandemic quarantine measures. CAGR in 2016-2020 was -2%.
- Untreated zinc consumption in Kazakhstan in 2016-2020 was unstable. Due to a drop in demand for untreated zinc overseas, domestic consumption grew sharply in 2018 to 239,493 tonnes, which is 5 times higher than at other times. In 2019, consumption fell by 84% and in 2020 - 25% to 37,791 and 28,475 tonnes, respectively.

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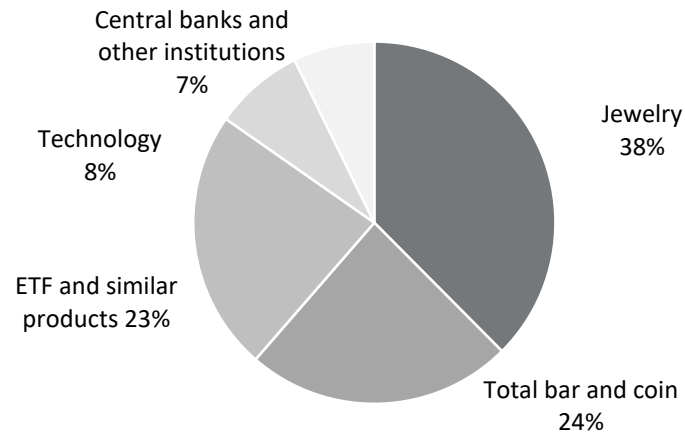
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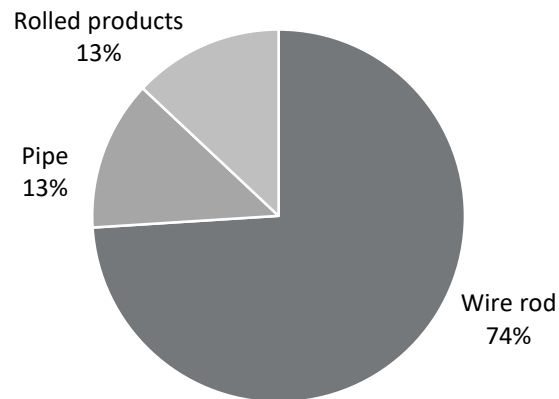
Range of uses for non-ferrous metals (1/5)



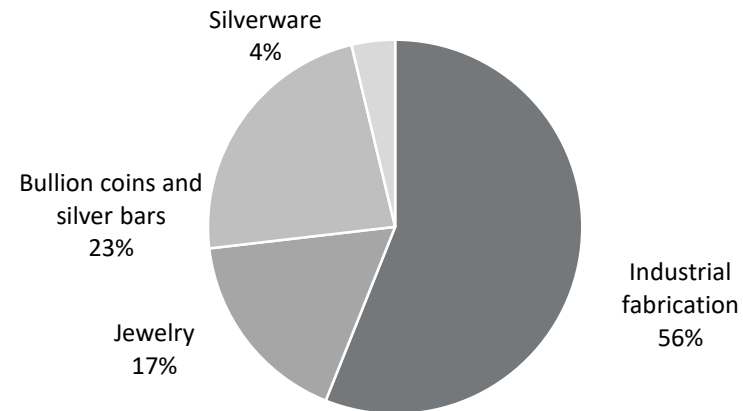
Range of uses for gold



Range of uses for copper



Range of uses for silver



- Gold is mostly used to produce jewellery. It is also used to produce bars and coins, ETFs and similar products.
- Silver is often used in industrial production and is a good electricity and heat conductor for all metals, which is why it is used in industrial production, including in electrical appliances, as conductors, in switches, contacts and fuses. Silver is very malleable, requires little maintenance and is relatively long-lasting. It is often used to produce jewellery.
- Thanks to its thermal conductivity, ductility and corrosion resistance, copper is widely used in various industrial sectors. Up to 75% of refined copper in the world is used to produce electrical devices, including cables and wires.

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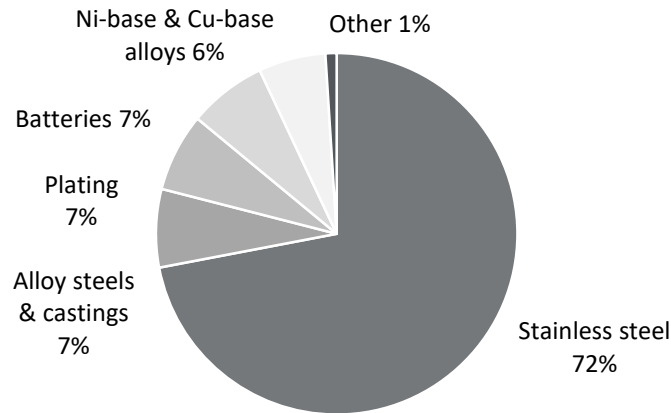
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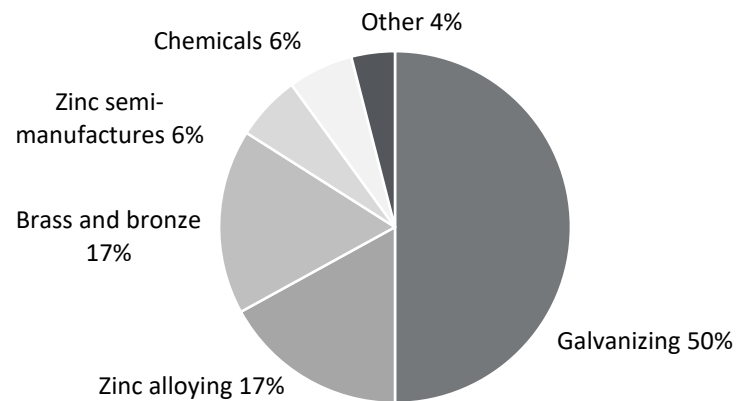
Range of uses for non-ferrous metals (2/5)



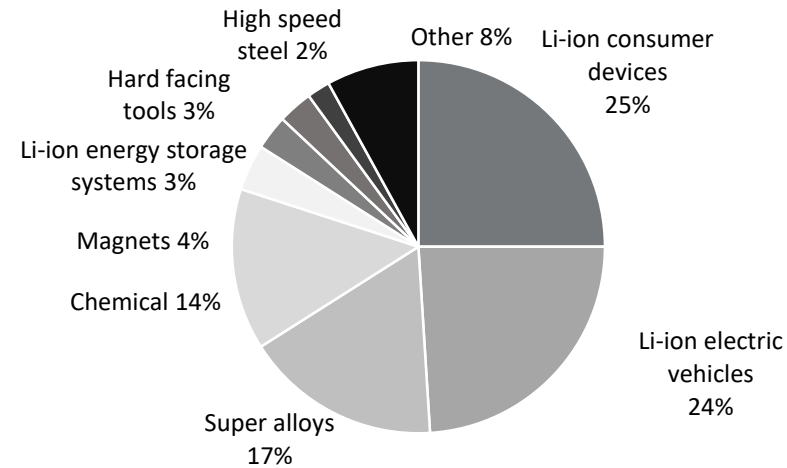
Range of uses for nickel



Range of uses for zinc



Range of uses for cobalt



- Nickel is mostly used in metallurgy to produce heavy-alloyed stainless steel. By adding nickel in iron fusion, metallurgists generate durable and ductile alloys that are highly corrosion resistant and resistant to high temperatures.
- Today, the majority of portable devices are powered by cobalt-based lithium-ion batteries. Cobalt is also used as a chemical reaction accelerator in petrochemistry, heavy industry and other processes.
- Zinc is mostly used to protect steel from corrosion using galvanisation (zinc plating). Zinc is also an important component of various alloys, including brass.

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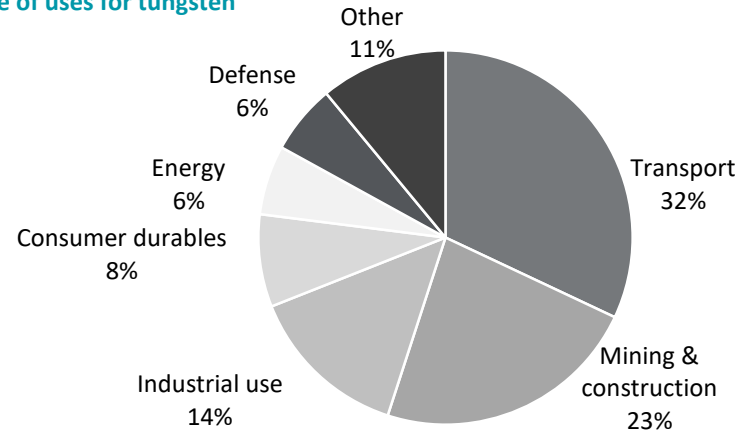
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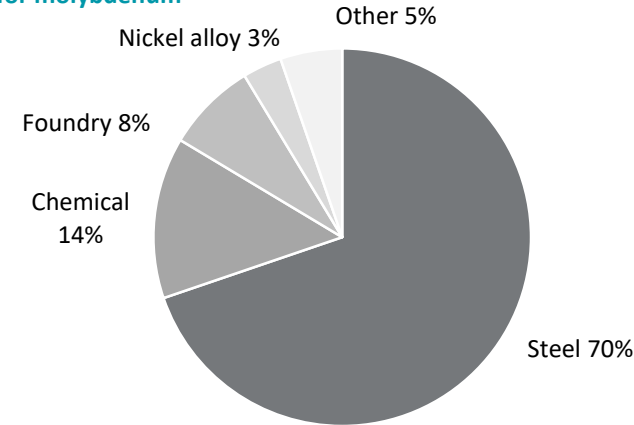
Range of uses for non-ferrous metals (3/5)



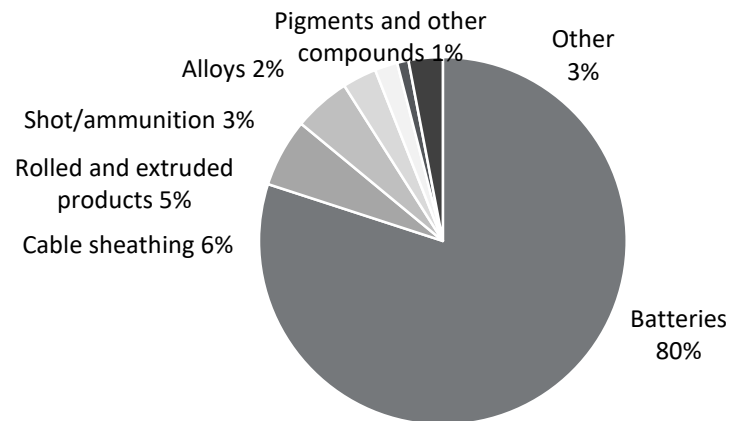
Range of uses for tungsten



Range of uses for molybdenum



Range of uses for lead



- The transportation segment accounts for 32% of tungsten consumption. Tungsten is also used in mining, metallurgy and construction.
- The finished product molybdenum accounts for approximately 70% of the molybdenum steel segment in 2020. Molybdenum is also used as a chemical agent, in paints and other chemicals.
- Lead is mostly used in motor and emergency vehicle lead-acid batteries (for example in hospitals), and also in computer batteries and fork lifters. It is also used in remote access power and load balancing systems, and in glass and plastic industry compounds and to protect from radiation.

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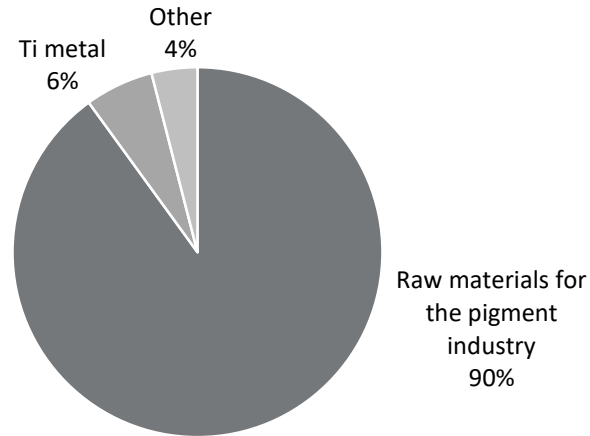
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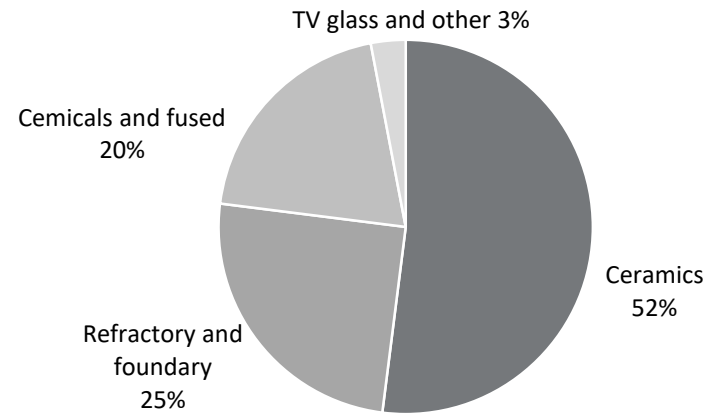
Range of uses for non-ferrous metals (4/5)



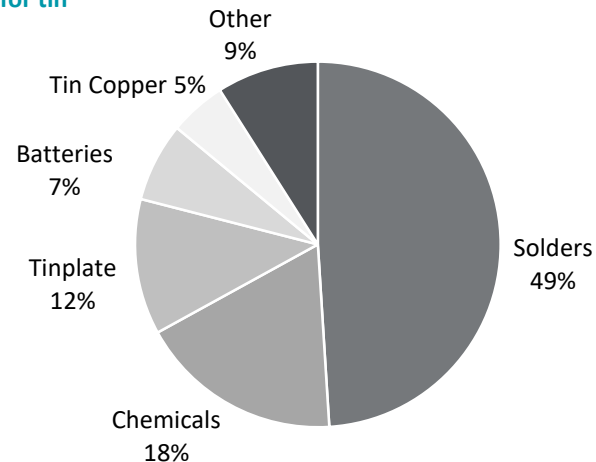
Range of uses for titanium



Range of uses for zirconium



Range of uses for tin



- Over 90% of global titanium reserves are used as a raw material in the pigment industry, which manufactures products for the paint, paper and plastic industries.
- Zirconium is mostly used to produce ceramics such as slabs, bathroom fixtures, kitchen utensils and others.
- Brazing alloy is used in soldering to combine blanks that have a melting temperature lower than the joinable metals (tin, lead, cadmium and others). Brazing alloy is the most common use for tin. In 2020, in some electronics' sectors, tin consumption increased due to the increase in remote working and schooling. Despite the emergence of new markets for network connections in battery-driven vehicles and other infrastructure due to climate change, the long-term potential for the use of brazing alloy remains very positive.

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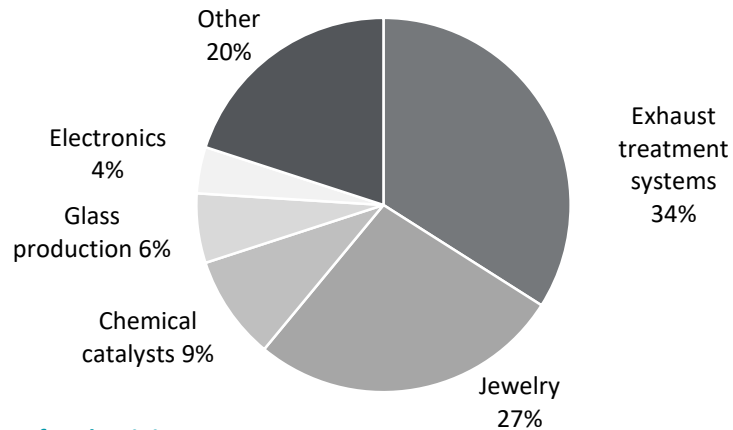
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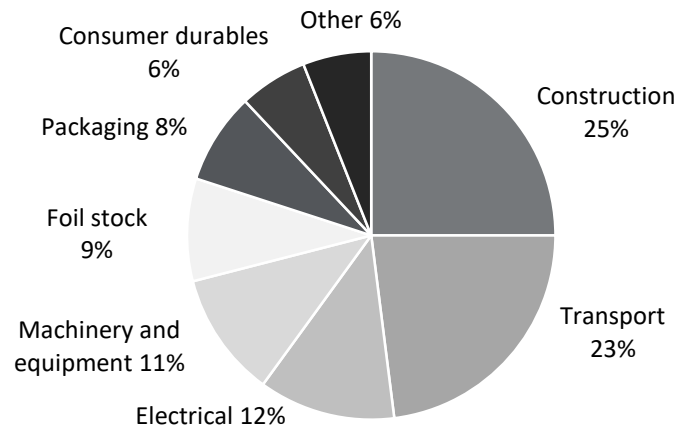
Range of uses for non-ferrous metals (5/5)



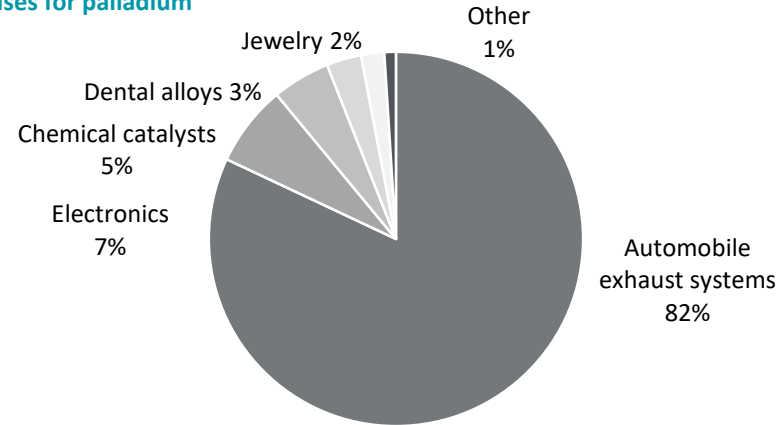
Range of uses for platinum



Range of uses for aluminium



Range of uses for palladium



- Platinum is used in exhaust gas cleaning systems. In 2020, the jewellery industry was the second largest user of platinum. Platinum is used as a catalytic agent (often in an alloy with rhodium and also as platinum black, which is a fine platinum powder created by restoring platinum compounds).
- In 2020, vehicle exhaust systems accounted for the greatest quantity of palladium. Palladium is used in electronics due to its high abrasion and corrosion resistance. Palladium and palladium alloys are used to coat contacts resistant to sulphides. It is also often used as a catalytic agent, predominantly to hydrogenate fat, in oil cracking and organic fusion.
- Roughly 50% of aluminium semi-finished products in 2020 were used in the transportation and construction sectors. Aluminium is also used in alloys with low metal content and may be found in vehicle and aircraft parts, and beverage cans. Aluminium packaging is used for all forms of medicines, such as tablets, capsules, creams and ointments, liquids and powders.

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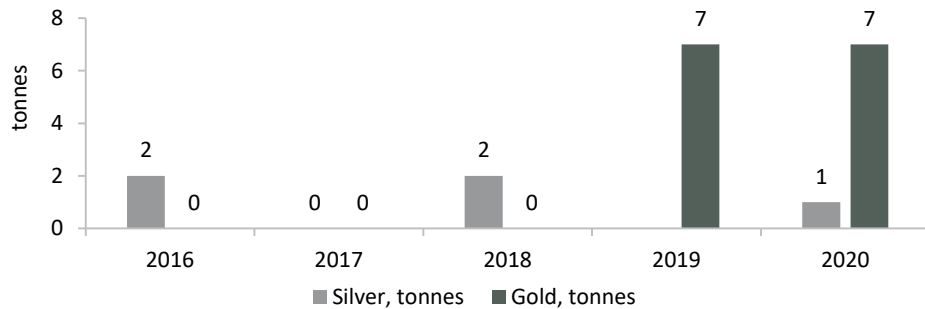
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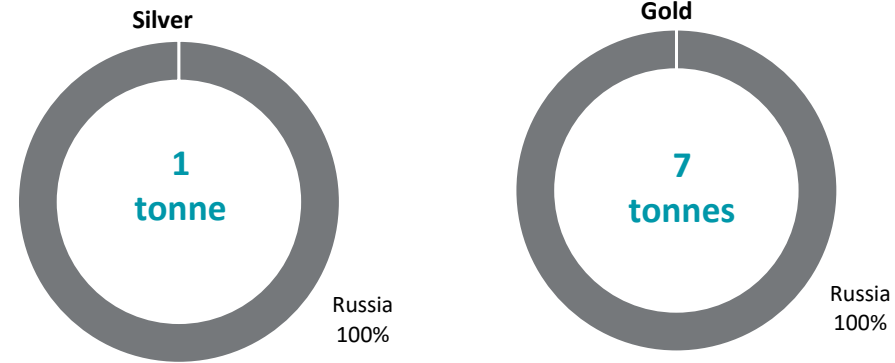
Silver, gold, platinum and palladium imports



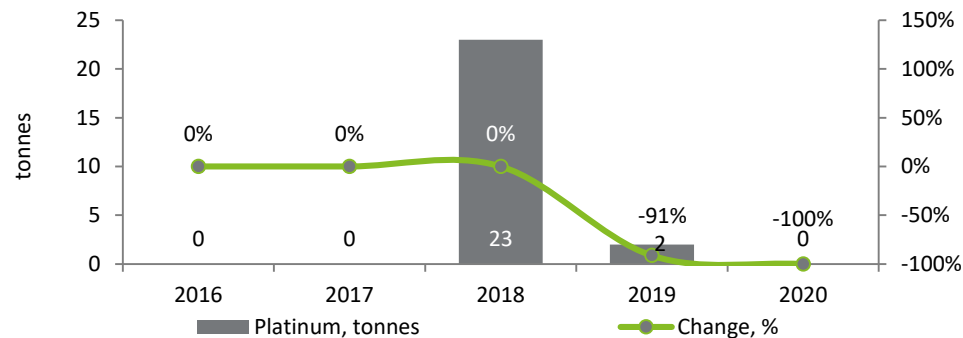
Changes in silver and gold imports



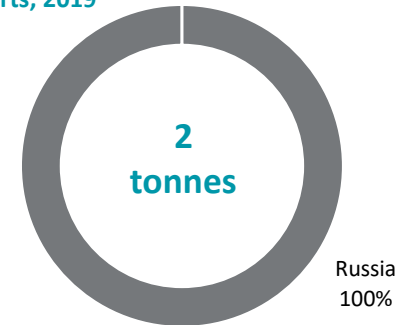
Structure of silver and gold imports, 2020



Changes in platinum imports



Structure of platinum imports, 2019



- In 2020, Kazakhstan imported 1 and 7 tonnes of silver and gold, respectively. In 2020, Russia was responsible for all silver and gold imports.
- Kazakhstan last imported platinum in 2019. Platinum imports into Kazakhstan amounted to 2 tonnes in 2019. In 2019, Russia was the only importer.
- Kazakhstan has not imported palladium in the last 5 years, .

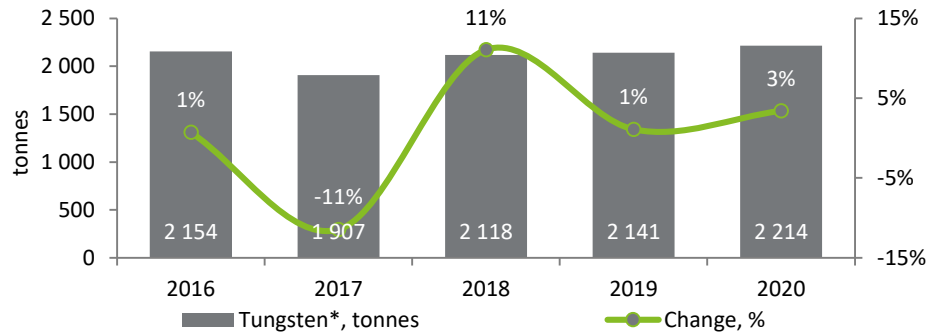
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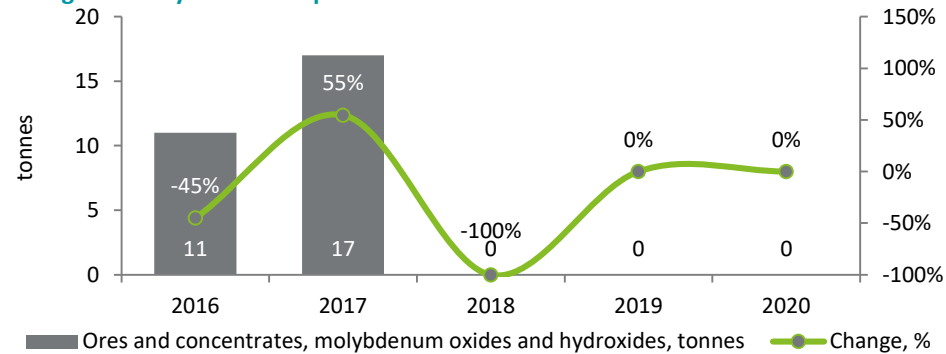
Tungsten* and molybdenum imports



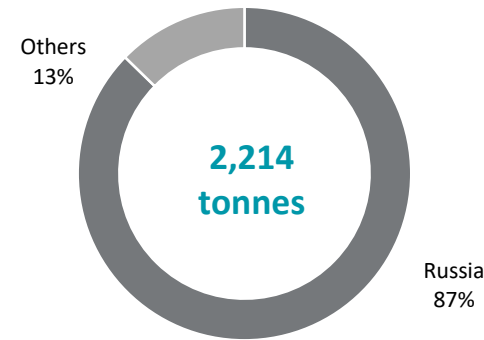
Changes in tungsten imports



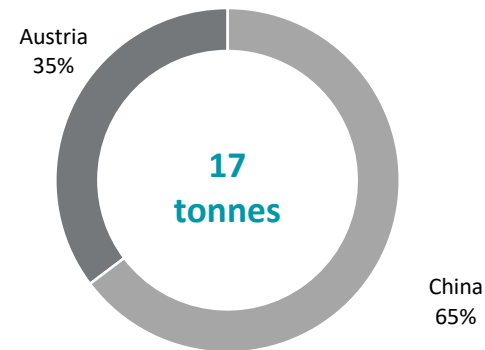
Changes in molybdenum imports



Structure of tungsten imports, 2020



Structure of molybdenum imports, 2017



- In 2020, Kazakhstan imported 2,214 tonnes of tungsten. The main exporter of tungsten in 2020 was Russia - 87%.
- In 2017, molybdenum imports increased 55% to 17 tonnes. The main molybdenum exporters were China (65%) and Austria (35%). There have been no molybdenum imports in the last 3 years.

*oxide and hydroxide, carbides, whether or not chemically defined, tungsten and articles thereof, including waste and scrap

Source: ITC

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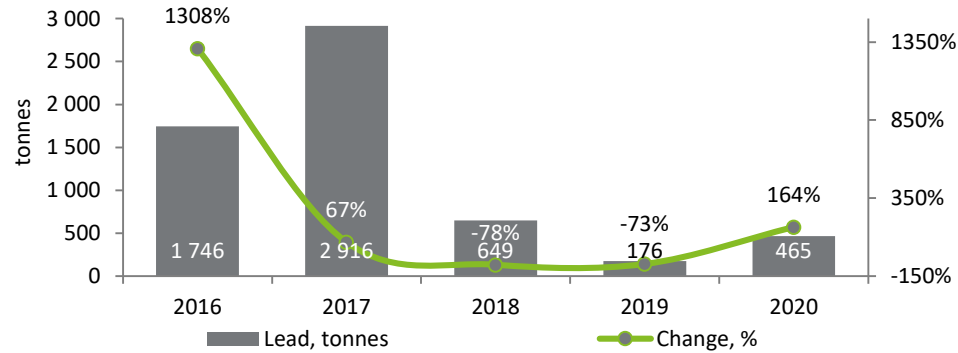
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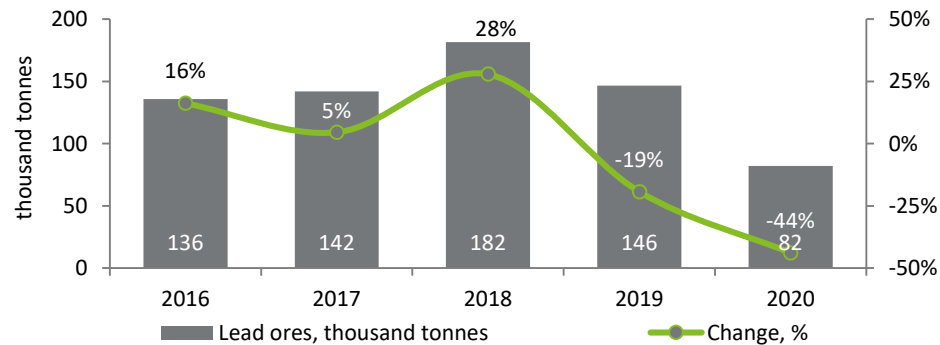
Lead and lead ore imports



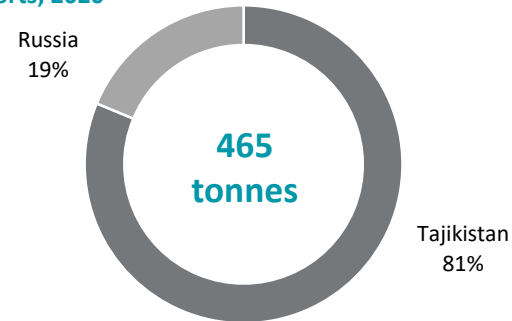
Changes in lead imports



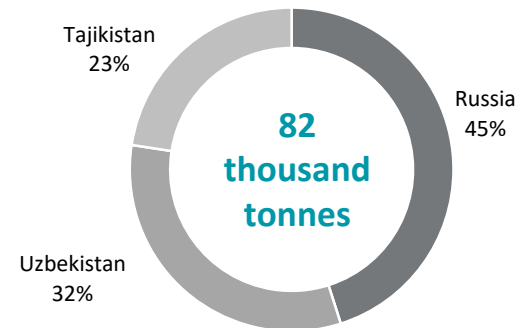
Changes in lead ore imports



Structure of lead imports, 2020



Structure of lead ore imports, 2020



- In 2020, Kazakhstan imported 465 tonnes of lead. Lead import CAGR in the last 5 years was -28%. In 2020, Tajikistan (377 tonnes or 81%) and Russia (88 tonnes or 19%) were responsible for all lead imports.
- In 2020, lead ore imports fell 44% to 82 thousand tonnes. Lead ore import CAGR in the last 5 years was -12%. In 2020, lead ore imports originated from Russia (45%), Uzbekistan (32%) and Tajikistan (23%).

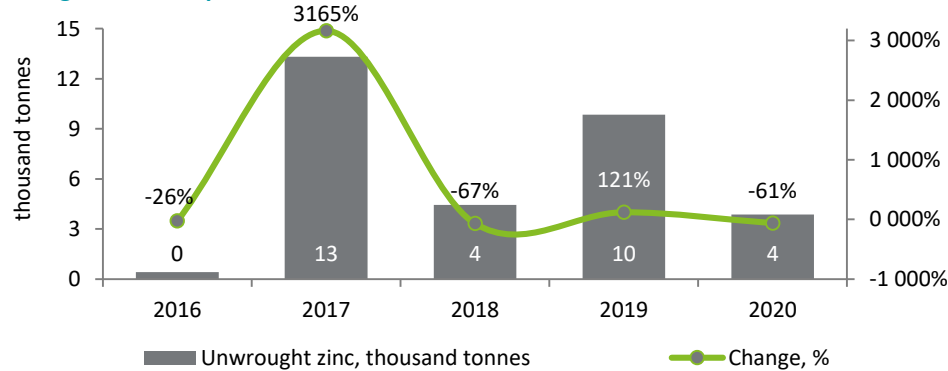
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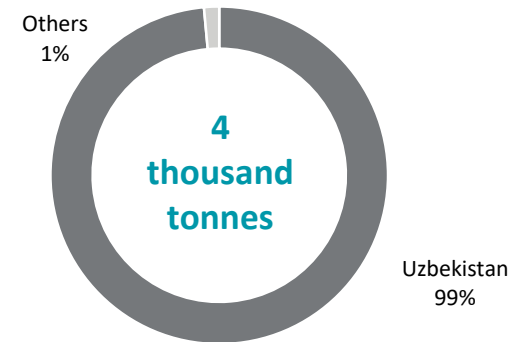
Zinc and miscellaneous zinc dust, powder and flake imports



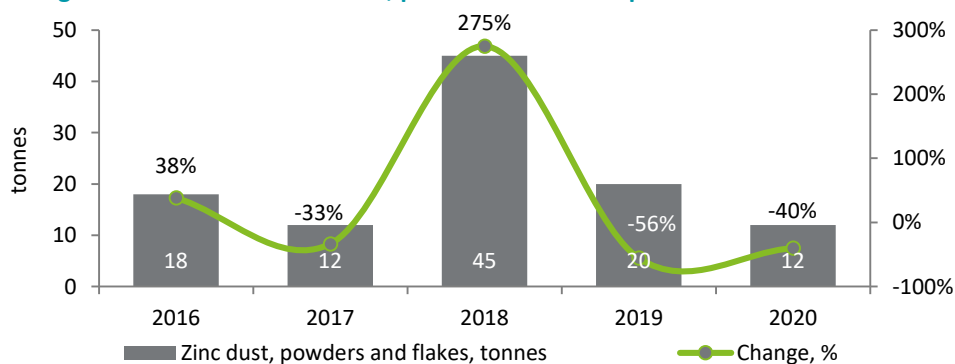
Changes in zinc imports



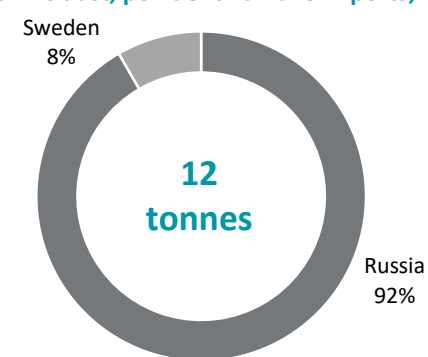
Structure of zinc imports, 2020



Changes in miscellaneous zinc dust, powder and flake imports



Structure of miscellaneous zinc dust, powder and flake imports, 2020



- Zinc imports have been unstable over the last five years, with the figure dropping significantly from 13 thousand tonnes in 2017 to 4 thousand tonnes in 2020. Almost all imports in 2020 were from Uzbekistan (3,813 tonnes or 99%).
- In 2020, Kazakhstan imported 12 tonnes of miscellaneous zinc dust, powders and flakes. CAGR for imports of miscellaneous zinc dust, powders and flakes in the last 5 years was -10%. In 2020, all imports came from Russia (92%) and Sweden (8%).

Source: ITC

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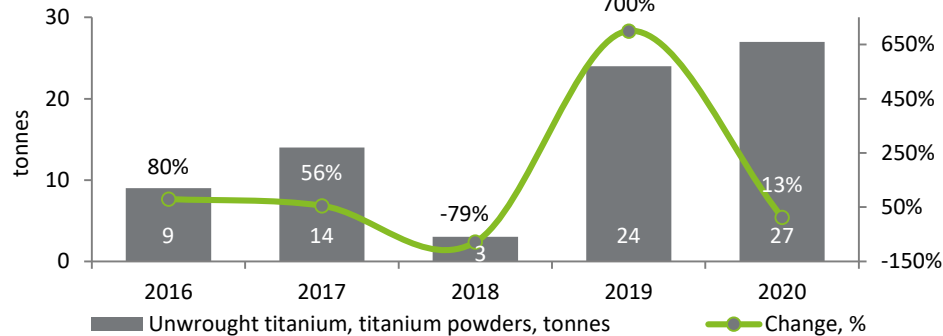
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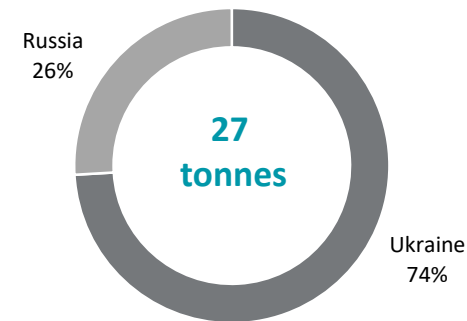
Titanium and titanium product, and titanium dioxide imports



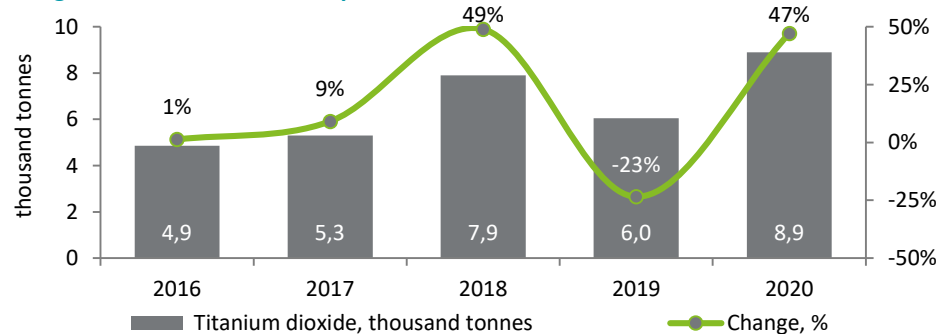
Changes in titanium and titanium product imports



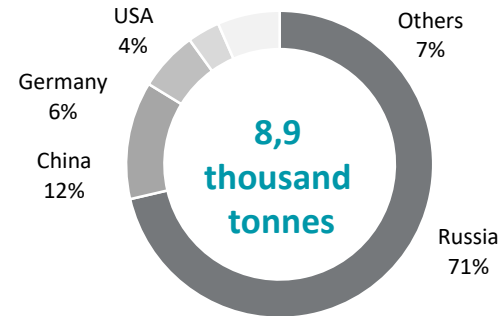
Structure of titanium and titanium product imports, 2020



Changes in titanium dioxide imports



Structure of titanium dioxide imports, 2020



- Imports of titanium and titanium product were unstable in the last five years, the figure increasing significantly from 3 tonnes in 2018 to 27 tonnes in 2020. In 2020, imports amounted to 27 tonnes. In 2020, the main exporters of titanium and titanium products were Ukraine (20 tonnes or 74%) and Russia (7 tonnes or 26%).
- In 2020, titanium dioxide imports increase 47% to 8.9 thousand tonnes. Titanium dioxide import CAGR for the last 5 years was 16%. In 2020, titanium dioxide imports came from Russia (71%), China (12%), Germany (6%) and the USA (4%).

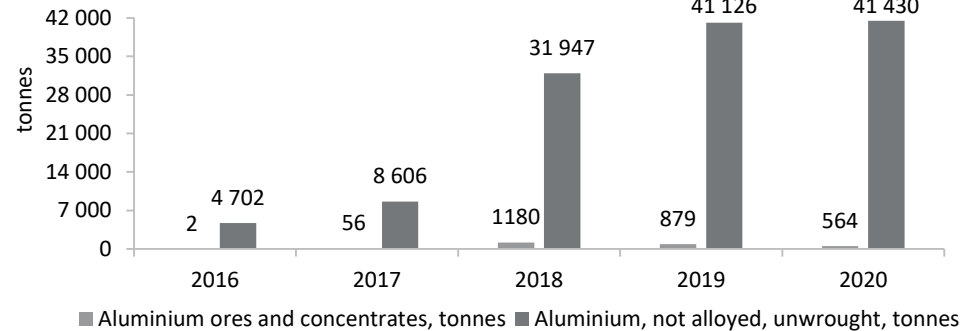
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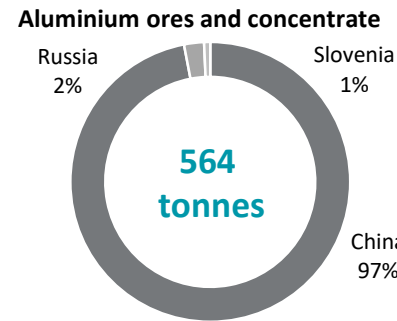
Aluminium and zirconium ore and concentrate imports



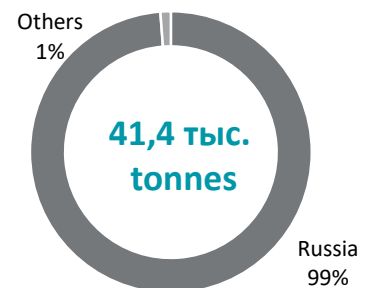
Changes in aluminium imports



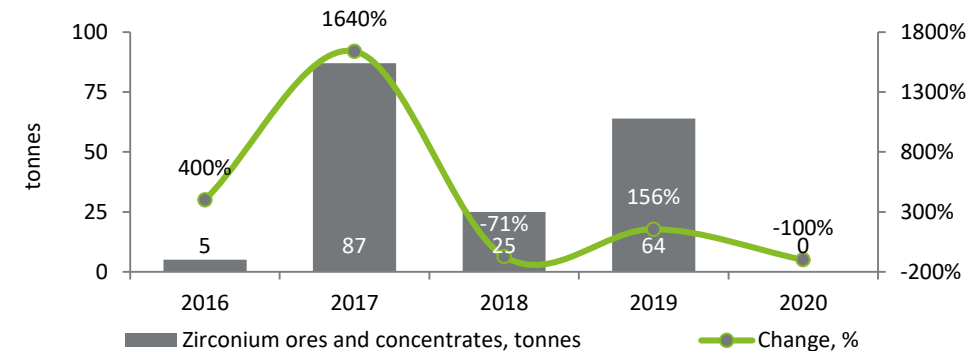
Structure of aluminium imports, 2020



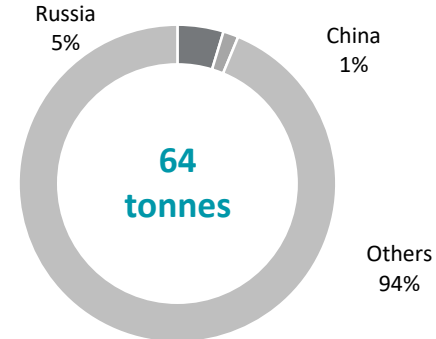
Aluminum, not alloyed, unwrought



Changes in zirconium ore and concentrate imports



Structure of imports of zirconium ores and concentrate, 2019



- In 2020, aluminium ore and concentrate imports amounted to 41 thousand tonnes, while unalloyed aluminium imports amounted to 564 tonnes. The main exporters of aluminium into Kazakhstan were Russia and China.
- The volume of zirconium imports in 2019 was 64 tonnes, an increase of 156% compared to 2018. The main zirconium exporters were Russia and China. In 2020, there were no imports of this type of product.

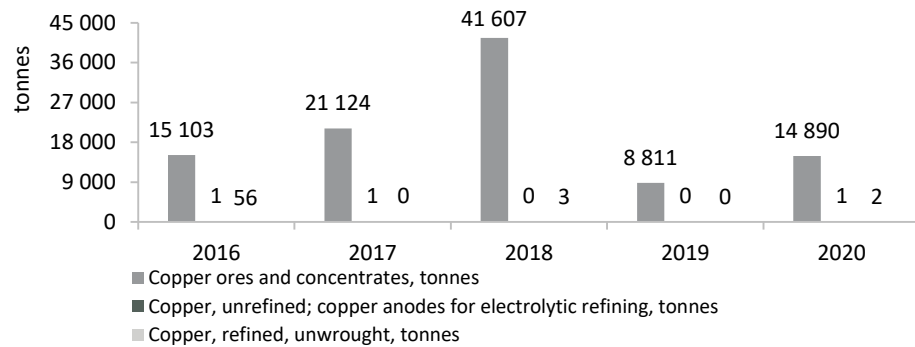
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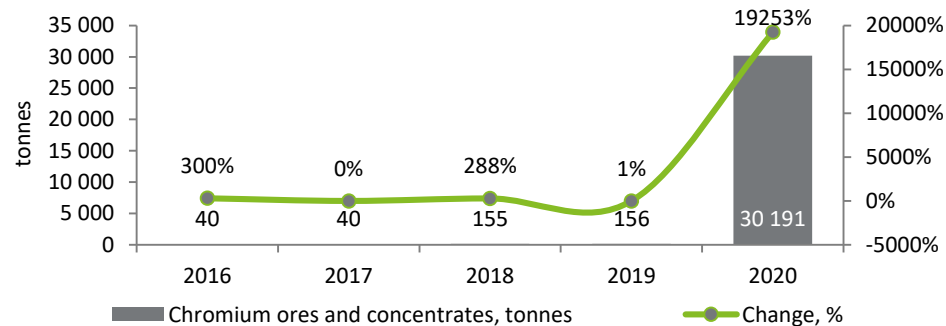
Copper and chrome ore and concentrate imports



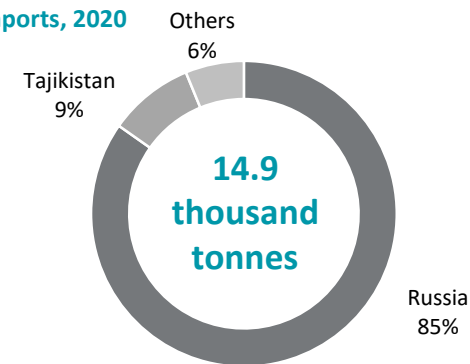
Changes in copper imports



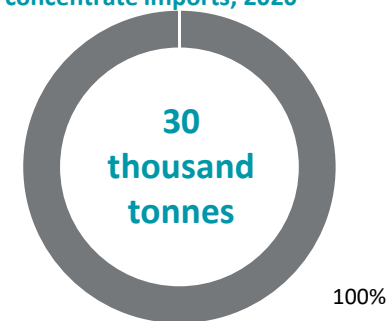
Changes in chrome ore and concentrate imports



Structure of copper imports, 2020



Structure of chrome ore and concentrate imports, 2020



- Copper concentrate and ore imports peaked in 2018 at 41.6 thousand tonnes. In 2019, the figure decreased almost 5 times compared to 2018. In 2020, the main exporters of copper were Russia (85%) and Tajikistan (9%).
- In 2020, chrome ore and concentrate imports increased 19,253% compared to 2019 to 30.2 thousand tonnes. The only exporter of chrome ore and concentrate into Kazakhstan was Russia. In 2019, the Chelyabinsk Electrometallurgical Plant began to export chrome ore after signing a contract with the Aktobe Chromium Compound Plant to supply 50 thousand tonnes of raw materials.

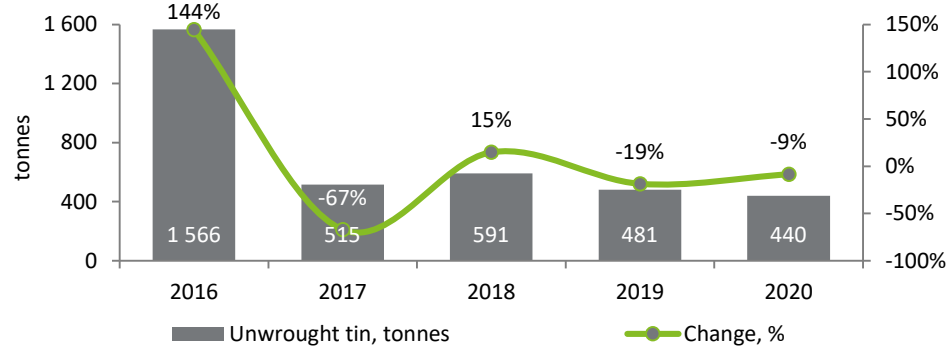
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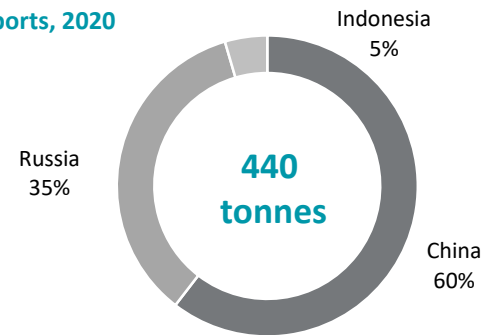
Tin, nickel and cobalt imports



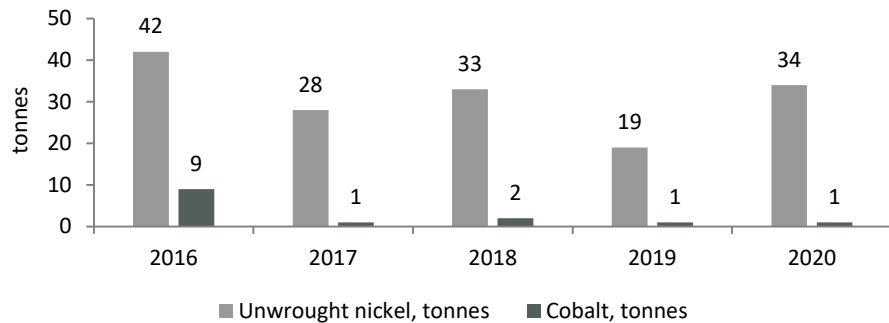
Changes in tin imports



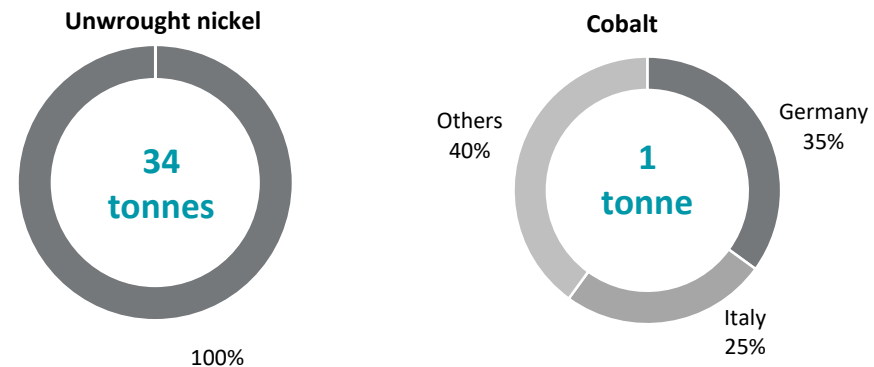
Structure of tin imports, 2020



Changes in nickel and cobalt imports



Structure of nickel and cobalt imports, 2020



- Tin imports over the last five years decreased significantly from 1,566 tonnes in 2016 to 440 tonnes in 2020. In 2020, tin imports amounted to 440 tonnes, a decrease of 9% compared to 2019. The main tin exporters in 2020 were China (266 tonnes or 60%), Russia (154 tonnes or 35%) and Indonesia (20 tonnes or 5%).
- In 2020, nickel imports amounted to 34 tonnes, an increase of 79% compared to 2019. Nickel import CAGR for the last 5 years was -5%. In 2020, nickel was mainly imported from Russia (22 tonnes or 65%) and Australia (12 tonnes or 35%). Kazakhstan imported 1 tonne of cobalt in 2020. The main exporters of cobalt in 2020 were Germany - 35% and Italy - 25%.

Source: ITC

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Main competitors and their advantages (1/3)



The following is a list of companies displaying a number of advantages compared to local companies, importing non-ferrous metals into Kazakhstan. Overseas production capacity is significantly higher, allowing producers to benefit from economies of scale, ensuring pricing flexibility, especially after modernisation. Overseas products tend to come with a brand, well-developed marketing strategy and well-developed transportation and logistics network.

No.	Company	Location	Product	Additional information
1	RUSAL	Russia, Moscow	A major aluminium producer with a low carbon footprint	https://rusal.ru/
2	Arconic	Russia, Samara	Producer of aluminium and aluminium products	https://www.arconic.com/
3	SIBPLAZ	Russia, Kemerovo	Producer of aluminium, zinc, lead, titanium, groups of rare metals, as well as mineral oils, oil and gas, coal, anthracite, coke and nickel.	https://www.sibplaz.ru/
4	Electrozinc	Russia, Vladikavkaz	Produces zinc, cadmium, sulphuric acid and zinc-aluminium alloys	https://electrozinc.ugmk.com/ru/
5	Chelyabinsk Zinc Plant	Russia, Chelyabinsk	Producer of zinc	https://www.zinc.ru/
6	Ural Mining and Metallurgical Company	Russia, Sverdlovsk Oblast	Producer of copper	https://www.ugmk.com/
7	Karabashcopper	Russia, Karabash	Producer of copper	http://karabash-go.ru/
8	Mednogorsk Copper-Sulphur Plant	Russia, Orenburg Oblast	Producer of copper, zinc and sulphuric acid	https://www.ugmk.com/
9	Uralelectromed	Russia, Sverdlovsk Oblast	Producer of copper, zinc and precious metals	https://www.elem.ru/ru/
10	Russian Copper Company	Russia, Yekaterinburg	Producer of copper	https://rmk-group.ru/ru/
11	Polymetallic	Russia, Saint-Petersburg	Mining of silver, gold and copper	https://www.polymetalinternational.com/
12	Nordgold	Russia, Moscow	Gold mining company	https://www.nordgold.com/
13	Chukotka Mining and Geological Company	Russia, Moscow	Gold mining company	http://kinrossgold.ru/
14	Chelyabinsk Electrometallurgical Plant	Russia, Chelyabinsk	Producer of chrome	https://www.chemk.ru/
15	Tungsten JSC	Russia, Moscow Oblast	Producer of tungsten	https://wmc.ru/
16	Aluminium Corporation of China (Chinalco)	China, Beijing	One of the largest aluminium producers in the world	https://www.chinalco.com.pe/
17	China Hongqiao Group	China, Huixian	One of the largest aluminium producers in the world	http://en.hongqiaochina.com/

Source: open sources

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Main competitors and their advantages (2/3)



No.	Company	Location	Product	Additional information
18	Henan Yuguang Zinc Industry Co.	China, Jiyuan	Producer of zinc	http://www.ygzn.com.cn/
19	China Nonferrous Metals Company Limited	China, Beijing	Producer of lead and zinc	http://www.cnmc.com.cn/
20	Western Mining Company Limited	China, Xining	Producer of zinc and copper	http://www.westmining.com/
21	Zijin Mining Group Ltd	China, Longyan	Mining of copper, lead, zinc, silver and tungsten	https://www.zijinmining.com/
22	KazMetService	Uzbekistan, Tashkent	Producer of zinc	http://kzmc.uz/
23	Almalyk Mining and Metallurgical Plant	Uzbekistan, Tashkent Oblast	Producer of zinc concentrate, copper concentrate and lead concentrate	https://sfi.uz/
24	Urasia Kyrgyzstan	Kyrgyzstan, Issyk-Kul region	Uranium mining	https://www.osoo.kg/
25	Iluka Resources	Australia, Perth	Producer of zirconium	https://iluka.com/
26	Chepetsk Mechanical Plant	Russia, Glazov	Producer of uranium metal, zirconium, niobium, calcium	http://www.chmz.net/
27	Richards Bay Minerals	South Africa, KwaZulu-Natal province	Producer of titanium dioxide and zirconium	http://rbm.co.za/
28	L+S Präzisionsguß GmbH	Germany, Wermsdorf	Producer of molybdenum and vanadium	https://www.lsguss.de/
29	ELG Haniel GmbH	Germany, Duisburg	Producer of molybdenum, vanadium and tantalum	https://www.elg.de/
30	U.S. Vanadium Holding Company	USA, Arkansas	Produces and sells a range of specialty vanadium chemicals including the highest purity vanadium pentoxide (V2O5)	https://usvanadium.com/
31	AMG VANADIUM	USA, Pennsylvania	Producer of aluminium, titanium and vanadium	https://amg-v.com/
32	Newmont Company	USA, Colorado	Producer of gold, silver, lead, copper and zinc	https://www.newmont.com/
33	KGHM Polska Miedz S.A.	Poland, Lubin	Produces copper, silver, gold, rhenium, nickel, platinum group metals and molybdenum.	https://kghm.com/
34	Zeeland Aluminium Company (ZALCO)	The Netherlands, Vlissingen	Producer of aluminium	https://zalco.nl/
35	Edgetech Industries LLC	USA, Florida	Producer of tungsten, molybdenum and titanium	https://www.edgetechind.com/

Source: open sources

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Main competitors and their advantages (3/3)



No.	Company	Location	Product	Additional information
36	China Molybdenum Company Limited (CMOC)	China, Luoyang	The largest producer of molybdenum in China. One of the largest producers of tungsten in the world, the second largest producer of cobalt and niobium, the leading producer of copper in the world	https://en.cmoc.com/
37	Xiamen Tungsten Co., Ltd.	China, Fujian	The company is one of the largest enterprises in China producing and exporting tungsten and molybdenum	http://www.xiamentungsten.com/
38	Jiangxi Tungsten Industry Group Co.	China, Nanchang	The company is a major tungsten concentrate producer in China.	http://www.jwvx.com.cn/
39	China Tungsten & Hightech Materials Co., Ltd.	China, Zhuzhou	The company produces hard alloys and non-ferrous metals such as tungsten, molybdenum, niobium and tantalum, as well as related products and equipment.	http://www.minmetalstungsten.com/
40	Anglo American Platinum	South Africa, Johannesburg	The world's largest producer of platinum, accounting for about 38% of the world's annual shipments. Also produces palladium, rhodium, iridium, ruthenium and osmium	https://www.angloamericanplatinum.com/
41	Impala Platinum	South Africa, Johannesburg	The company produces platinum and platinum group metals, as well as nickel, copper and cobalt.	https://www.implats.co.za/
42	Norilsk Nickel	Russia, Moscow	The largest producer of nickel in the world, also produces palladium	https://www.nornickel.com/
43	Tsingshan Holding Group	China, Wenzhou	Producer of nickel	https://www.tssgroup.com.cn/
44	Vale Limited	Brazil, Rio de Janeiro	The world's leading nickel miner	http://www.vale.com/
45	Jinchuan Group Co., Ltd.	China, Gansu province	Produces nickel, copper, cobalt, platinum, palladium, gold, silver and selenium	http://www.jinchuan-intl.com/
46	Yunnan Tin Group (Holding) Company Limited (YTC)	China, Kunming	The largest tin producer and exporter in China and the world	http://en.ytc.cn/
47	PT Timah	Indonesia, Pangkalpinang	Producer of tin	https://timah.com/
48	Minsur	Peru, Lima	A mining company engaged in the extraction, foundation and refining of tin and copper	https://www.minsur.com/

Source: open sources

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Potential product import substitution in Kazakhstan



Exports and imports of non-ferrous metals in 2020, USD million

Item	Exports	Imports	Net position
Copper	1,853.6	16.3	1,837.3
Uranium	1,718.4	104.6	1,613.8
Ferrochrome	1,364.3	0.5	1,363.8
Silver	613.8	0.6	613.2
Untreated zinc	620.4	8.5	611.9
Aluminium	444.8	71.7	373.1
Titanium and articles thereof	123.3	0.2	123.1
Other ferrochromes	102.5	0.1	102.4
Lead	91.3	0.6	90.6
Chromium ores and concentrates	52.2	7.9	44.4
Other oxides and chlorides of chromium	43.3	0.0	43.3
Ferrosilicochromium	25.8	-	25.8
Tungsten	28.1	5.5	22.7
Chromium trioxide	19.9	0.0	19.9
Zirconium ores and concentrate	8.2	0.0	8.2
Molybdenum	5.6	0.0	5.6
miscellaneous zinc dusts, powders and flakes	0.2	0.0	0.2
Platinum	-	-	-
Palladium	-	-	-
Cobalt	-	0.1	-0.1
Nickel	0.0	0.6	-0.6
Magnesium	1.8	2.6	-0.8
Tin	-	7.9	-7.9
Titanium dioxide	0.5	15.2	-14.7
Lead ores	24.6	86.5	-61.9
Gold	6.5	333.9	-327.4
Total	7,149.1	663.2	6,485.9

- In 2020, Kazakhstan was a net non-ferrous metal exporter, exporting mainly products of low conversion rate from copper, uranium and ferrochromium.
- Metal (ferrous and non-ferrous) imports in 2020 decreased by 11% to US\$ 4.1 billion. In 2020, ferrous metal products are responsible for the majority of metal and metal product imports. The total share of the ferrous metallurgy sector was 80% of total imports.
- Non-ferrous metal imports made up 17% of total imports of metals and metal products, while powders and non-ferrous metals accounted for only 3% of total imports.
- Due to the specifics of Kazakhstan's commodity-heavy economy and the lack of high-tech non-ferrous metal processing, Kazakhstan is dependent on the import of relevant products from non-ferrous metals, the potential volume of import substitution is about US\$ 710 million.

Structure of metal and metal product imports into Kazakhstan, 2020

Item	Imports (thousand USD)	Share of imports
Total metal and metal product imports (including ferrous and non-ferrous)	4,126,485	100.0%
Imports of ferrous metals	1,012,226	24.5%
Imports of ferrous metal products	2,298,717	55.7%
Imports of non-ferrous metals	105,850	2.6%
Imports of non-ferrous metal products	709,692	17.2%
Copper products	56,227	1.4%
Nickel products	23,680	0.6%
Aluminium products	239,527	5.8%
Lead products	3,396	0.1%
Zinc products	2,306	0.1%
Tin products	100	0.0%
Other base metal products	384,456	9.3%

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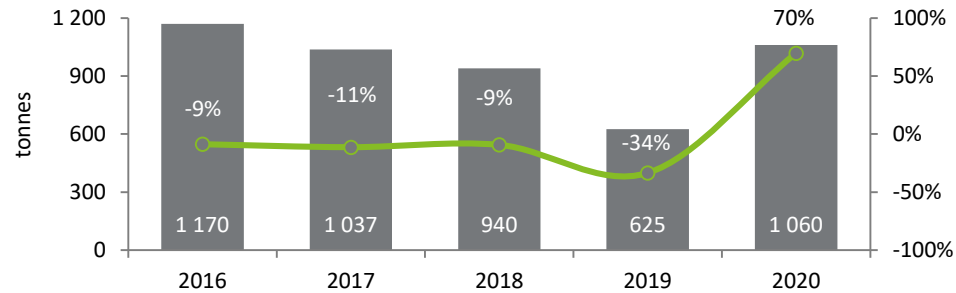


Silver, gold, platinum, palladium and copper exports



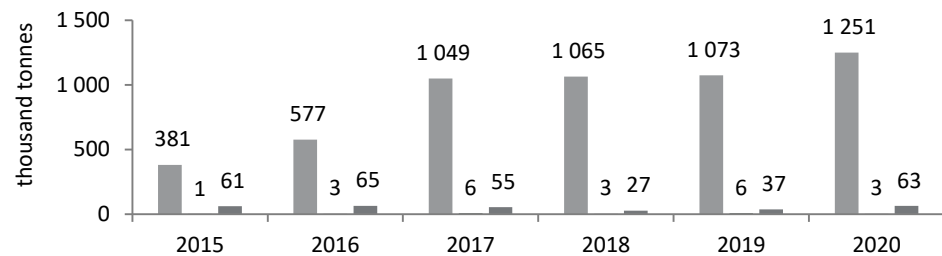
The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

Changes in unwrought silver exports



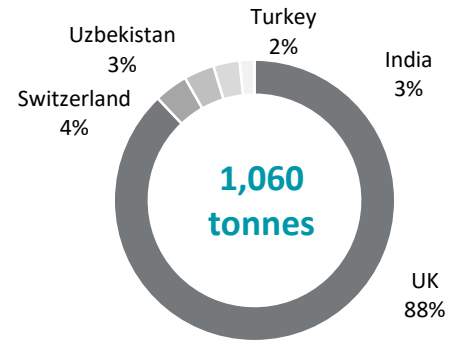
■ Silver, unwrought or in semi-manufactured forms, tonnes ● Change %

Changes in copper exports

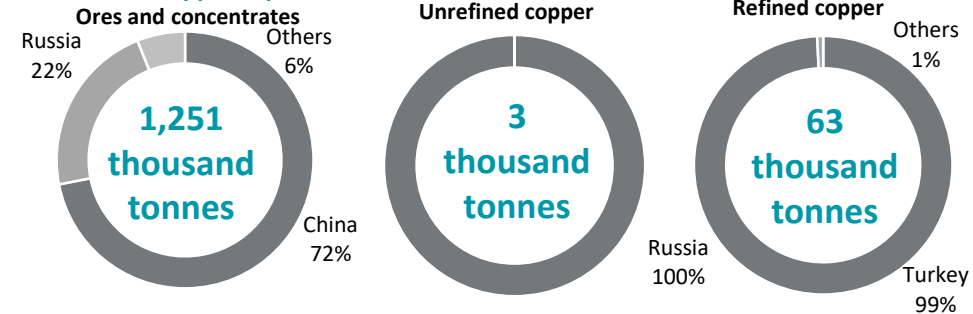


■ Copper ores and concentrates
 ■ Copper, unrefined; copper anodes for electrolytic refining
 ■ Copper, refined, unwrought

Structure of unwrought silver exports, 2020



Structure of copper exports, 2020



- In 2020, Kazakhstan exported 1,060 tonnes of silver to the UK, Switzerland, Uzbekistan, India and Turkey.
- In 2020, Kazakhstan exported 1,317 tonnes of copper ore and concentrate, unrefined and refined copper mostly to China, Russia and Turkey.
- Over the last 5 years, Kazakhstan has not exported gold, platinum and palladium.

Source: ITC

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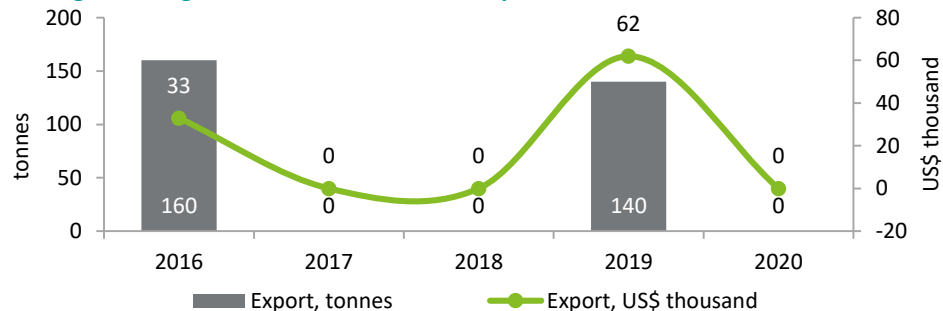


Tungsten, molybdenum and tin exports

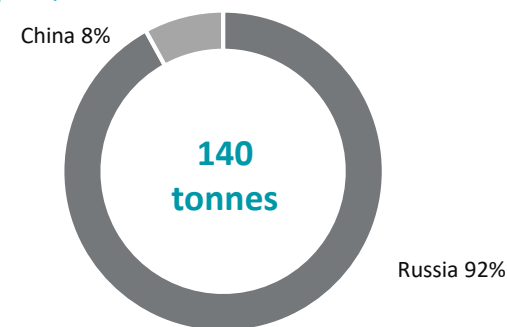


The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

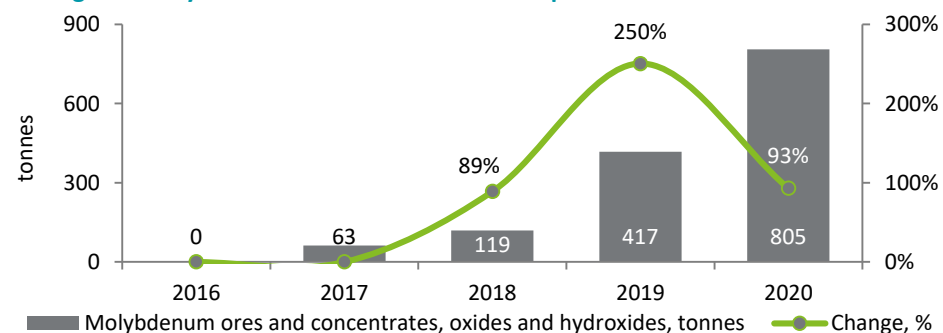
Changes in tungsten concentrate and ore exports



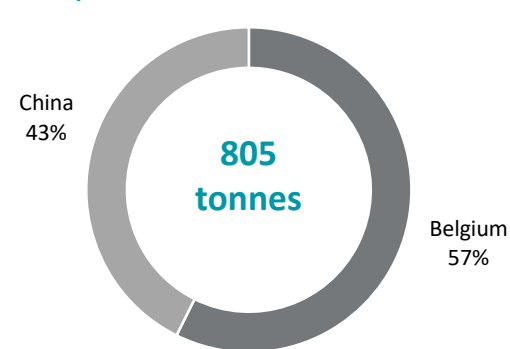
Structure of tungsten exports, 2019



Changes in molybdenum concentrate and ore exports



Structure of molybdenum exports, 2020



- According to the Statistics Committee, the country does not produce tungsten concentrate and existing deposits are at the development stage. Tungsten ore and concentrate exports from Kazakhstan are volatile. In 2017, 2018 and 2020, there were no exports, while in 2016 and 2019, exports amounted to 160 and 140 tonnes, respectively. Export destinations in 2019 included neighbouring countries such as Russia - 129 tonnes and China - 11 tonnes. In 2016, almost all concentrate tungsten exports were to Russia (140 tonnes) and the remaining 20 tonnes were sent to Uzbekistan.
- In 2020, molybdenum exports amounted to 805 tonnes, an increase of 93% compared to the previous year. In 2020, molybdenum was exported to Belgium and China.
- Over the last 5 years, Kazakhstan has not exported tin.

Source: ITC

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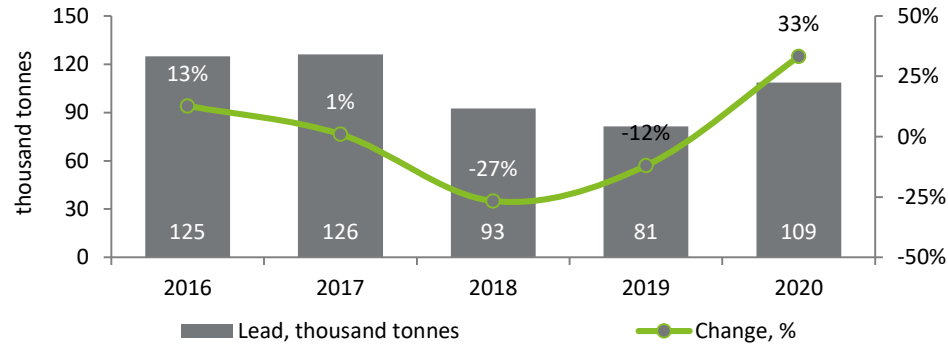


Lead and lead ore, cobalt and nickel exports

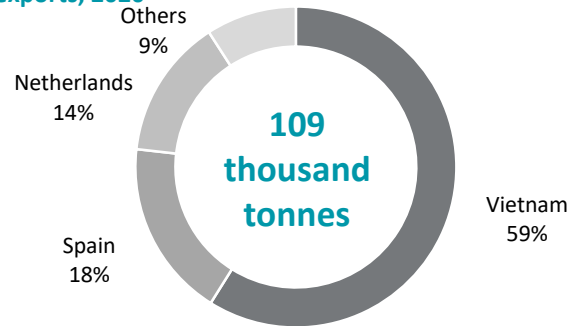


The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

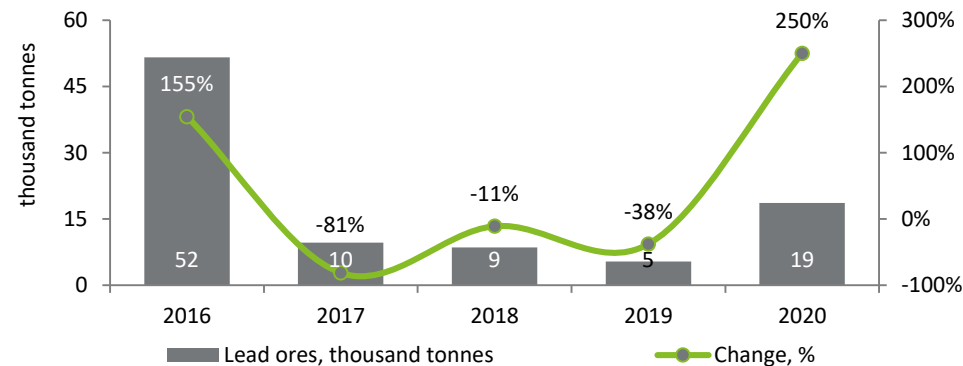
Changes in lead exports



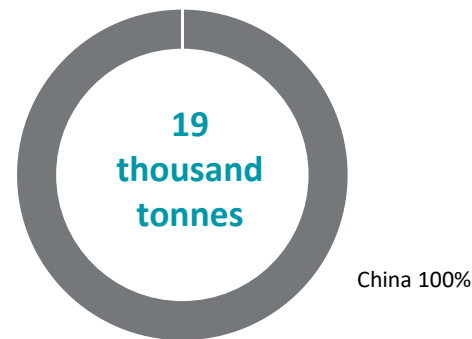
Structure of lead exports, 2020



Changes in lead ore exports



Structure of lead ore exports, 2020



- In 2020, lead exports amounted to were 109 thousand tonnes, an increase of 33% over the prior year. Exports peaked over the last 5 years in 2017, amounting to 126 thousand tonnes. In 2020, the main importers of lead from Kazakhstan were Vietnam - 59%, Spain - 18% and the Netherlands - 14%.
- In 2020, lead ore exports amounted to 19 thousand tonnes, an increase of 250% over the prior year. China is the only lead ore importer.
- Over the last 5 years, Kazakhstan has not exported cobalt and nickel. A one-off export of 22 tonnes of nickel was recorded in 2020.

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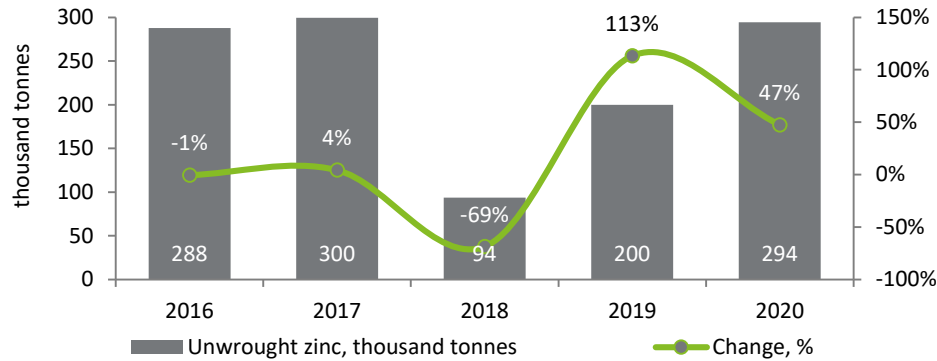


Zinc and miscellaneous zinc dust, powder and flake exports

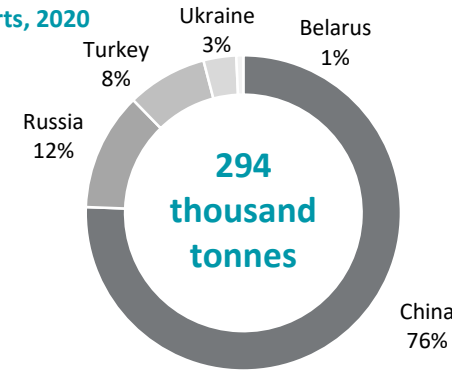


The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

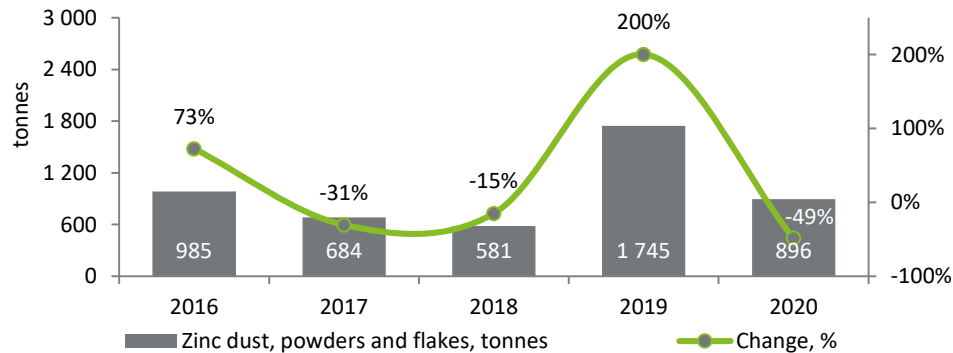
Changes in zinc exports



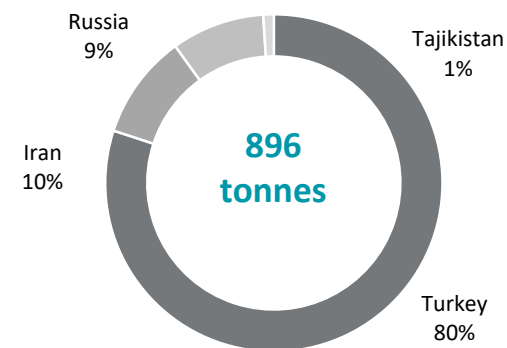
Structure of zinc exports, 2020



Changes in miscellaneous zinc dust, powder and flake exports



Structure of miscellaneous zinc dust, powder and flake exports, 2020



- In 2020, Kazakhstan exported 294 thousand tonnes of zinc. The main importers of zinc from Kazakhstan in 2020 were China - 76%, Russia - 12% and Turkey - 8%.
- In 2020, Kazakhstan exported 896 tonnes of miscellaneous zinc dust, powders and flakes to Turkey, Iran, Russia and Tajikistan.

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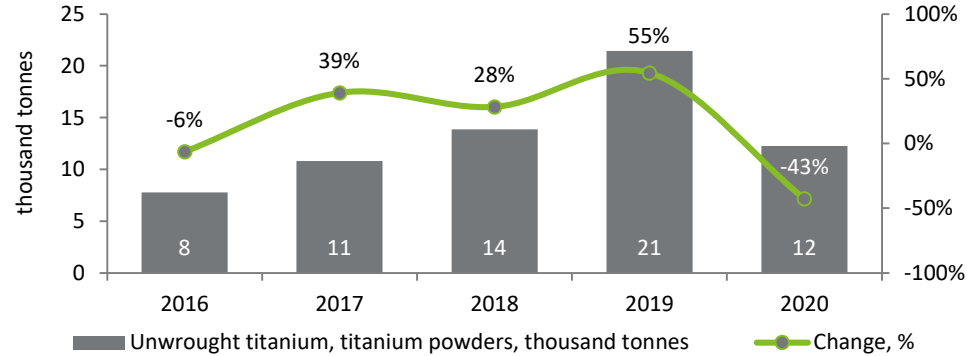


Titanium and titanium product and titanium dioxide exports

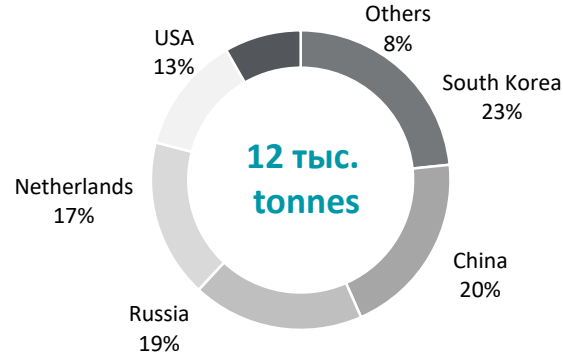


The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

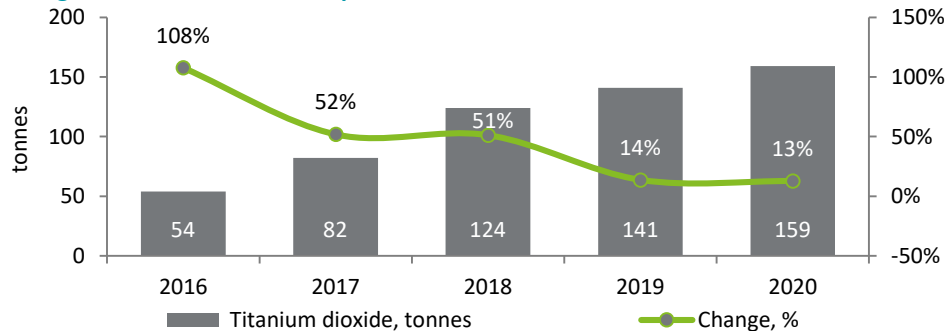
Changes in titanium and titanium product exports



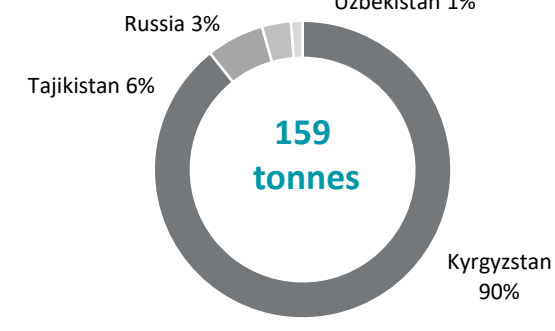
Structure of titanium and titanium product exports, 2020



Changes in titanium dioxide exports



Structure of titanium dioxide exports, 2020



- Titanium exports have been volatile over the last five years, with a significant decline from 21 thousand tonnes in 2019 to 12 thousand tonnes in 2020. In 2020, titanium exports amounted to 12 thousand tonnes. In 2020, the main titanium importers were South Korea (2.9 thousand tonnes or 23%), China (2.5 thousand tonnes or 20%), Russia (2.3 thousand tonnes or 18%), the Netherlands (2, 1 thousand tonnes or 17%), and the USA (1.6 thousand tonnes or 13%). 11% of all titanium produced across the world is produced by Ust-Kamenogorsk Titanium and Magnesium Plant, whose share of the aerospace industry production is in excess of 18%.
- In 2020, titanium dioxide exports amounted to 159 tonnes, an increase of 13% over the previous year. Titanium dioxide export CAGR over the last 5 years was 31%. The main importers of Kazakhstan products are Kyrgyzstan (90%), Tajikistan (6%), Russia (3%) and Uzbekistan (1%).

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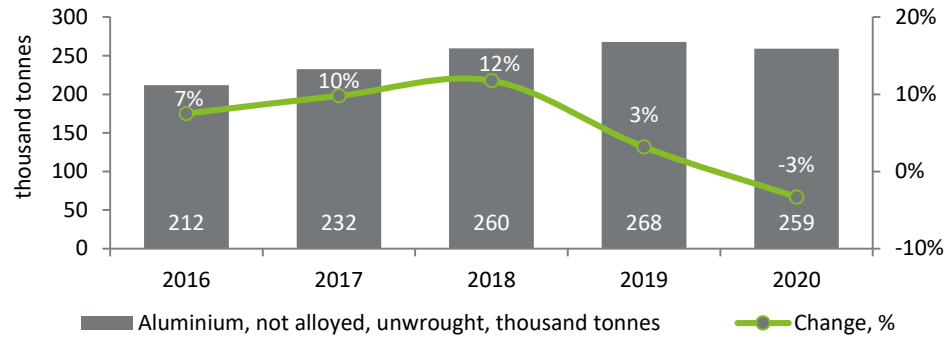


Aluminium and zirconium exports

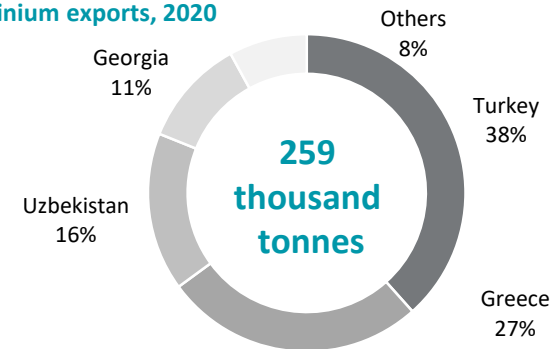


The presence of a rich resource base with high content of all major metals in the ore is a competitive advantage of Kazakhstani products.

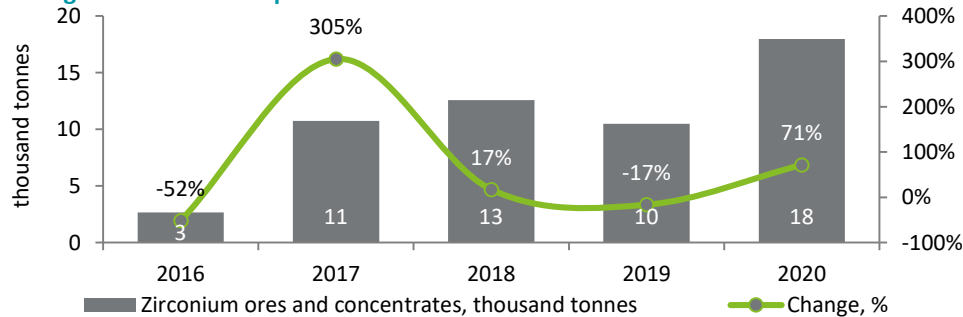
Changes in aluminium exports



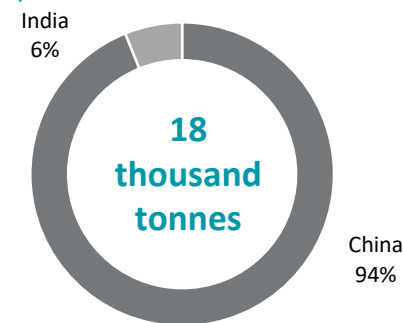
Structure of aluminium exports, 2020



Changes in zirconium exports



Structure of zirconium exports, 2020



- In 2020, aluminium exports amounted to 259 thousand tonnes, decreasing 3% compared to the previous year. In 2020, operations at the Torgai Bauxite Mining Department were suspended for three months due to a drop in the aluminium price as a result of a decrease in the cost of the main raw material, commercial alumina, which is produced at the Pavlodar Aluminium Plant. Aluminium produced in Kazakhstan is mainly exported to Turkey (38%), Greece (27%), Uzbekistan (16%) and Georgia (11%).
- In 2020, zirconium exports increased 71% to 18 thousand tonnes. Zirconium export CAGR over the last 5 years was 61.4%. In 2020, the main zirconium exporters were China (16.9 thousand tonnes or 94%) and India (1.1 thousand tonnes or 6%).

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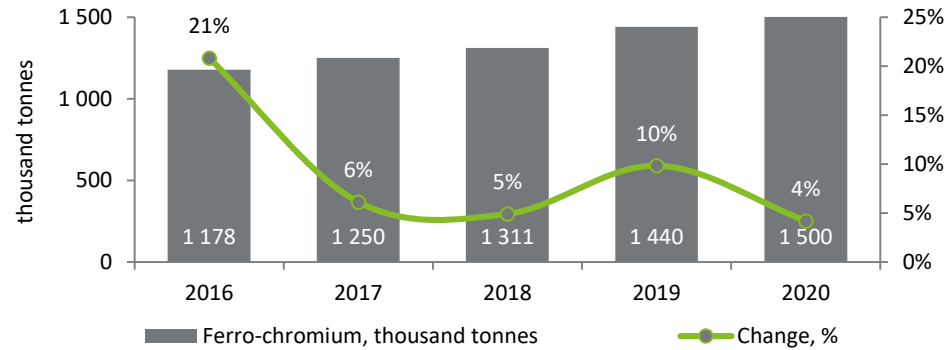


Ferrochrome and chrome ore and concentrate exports

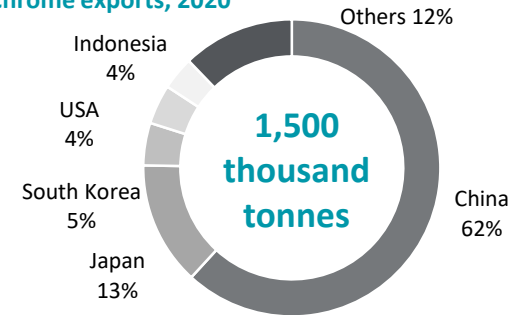


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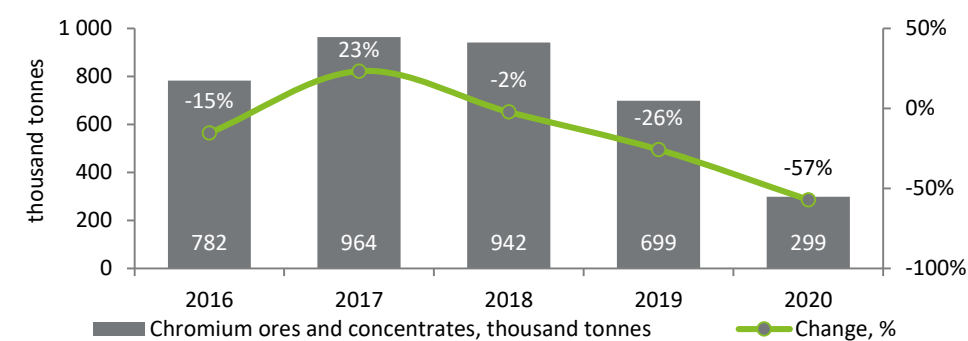
Changes in ferrochrome exports



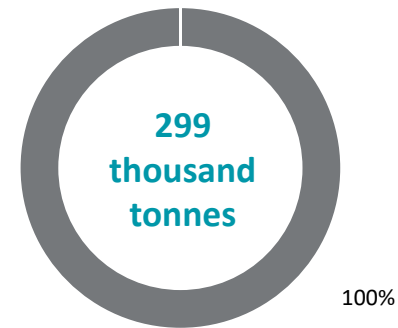
Structure of ferrochrome exports, 2020



Changes in chrome ore and concentrate exports



Structure of chrome ore and concentrate exports, 2020



- Over the last 5 years, ferrochrome exports grew steadily. Ferrochrome export CAGR over the last 5 years was 6%. In 2020, Kazakhstan exported 1,500 thousand tonnes of ferrochrome, which is a 4% increase on 2019. The main importers of Kazakhstan products in 2020 were China - 62%, Japan - 13%, South Korea - 5%, USA - 4% and Indonesia - 4%.
- In 2020, chrome ore exports amounted to 299 thousand tonnes, down 57% on the previous year. Russia is the only chrome ore importer. In 2020, the chrome ore import price increased 8% to 186 USD per tonne. Chromium ore exports from Kazakhstan to Russia decreased, while supplies from South Africa almost doubled.

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Balance of production and consumption



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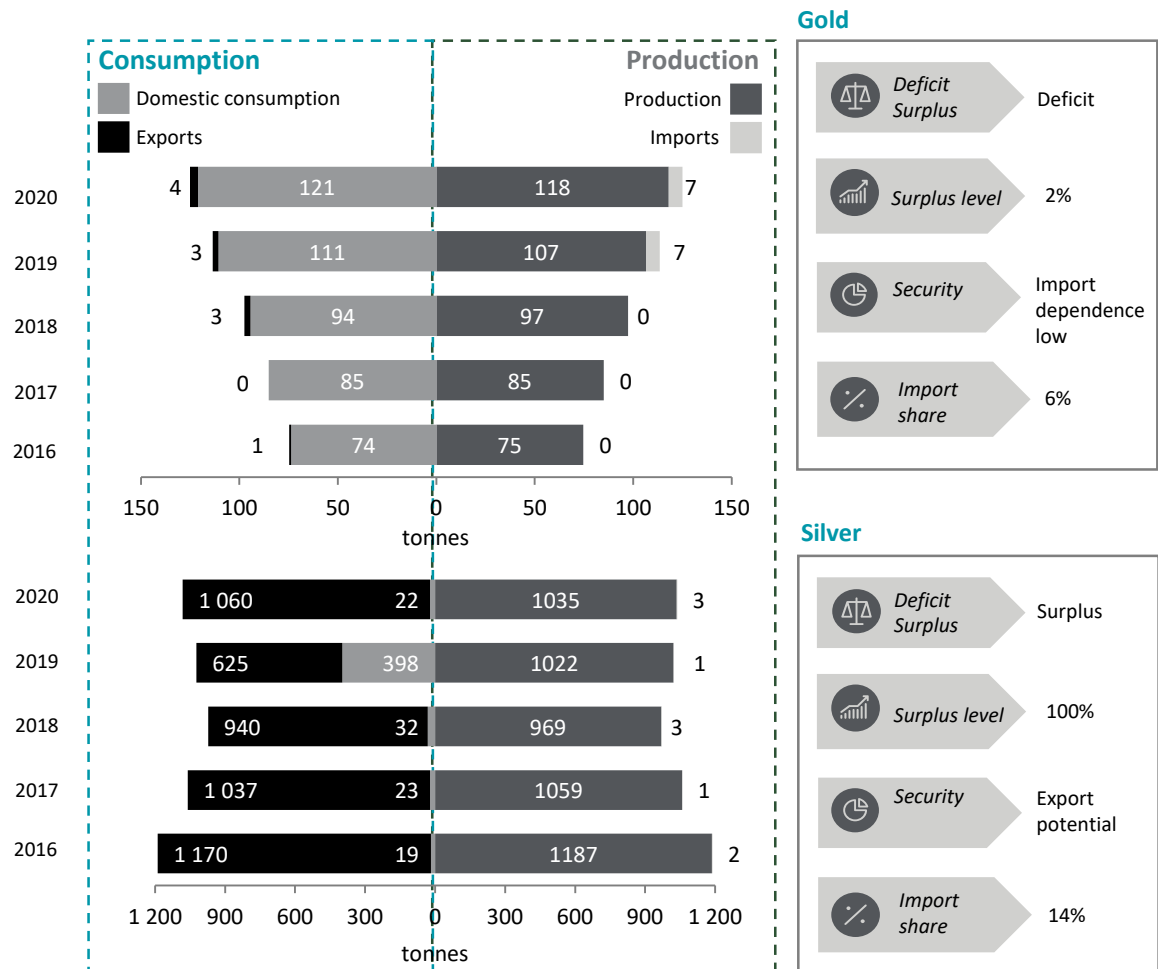
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Gold and silver



- In the period between 2016 and 2020, gold production in Kazakhstan increased annually, with CAGR of 12.1%. Domestic gold production almost met domestic demand in full. In 2020, the country produced 118 tonnes of gold against consumption of 121 tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential gold import substitution** is comparable with imports and insignificant. The niche is less attractive for investors.

- Silver production in Kazakhstan is in **surplus**, with domestic production meeting domestic demand in full. In 2020, the country produced 1,035 tonnes of silver.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential silver import substitution** is comparable with imports. The niche is less attractive for investors.

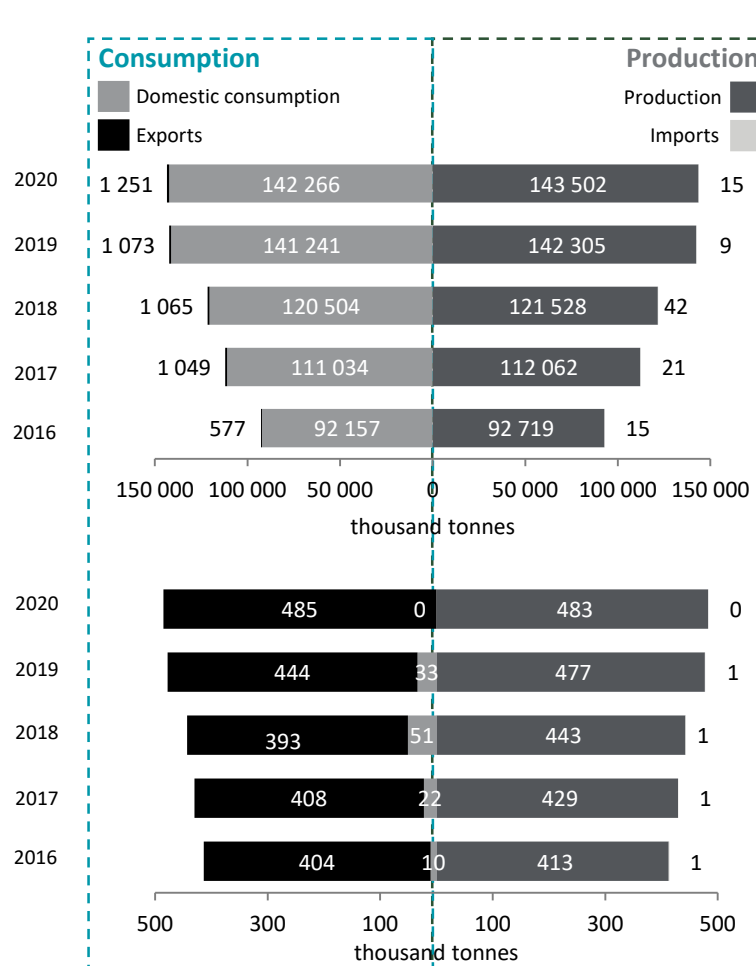
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Source: Kazakhstan Statistics Committee

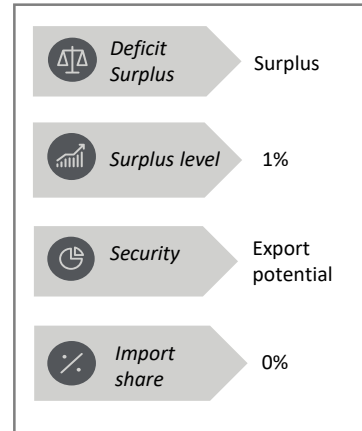
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Copper (1/2)

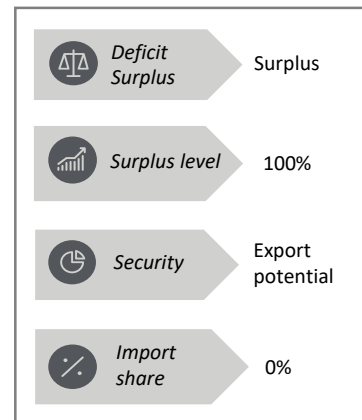


Copper ores and concentrate



- In 2016-2020, copper ore and concentrate production increased annually in Kazakhstan, with CAGR of 11.5%.
- In 2020, Kazakhstan was **not dependent** on copper imports, since existing domestic capacity was able to meet domestic demand, and as such imports have been at zero over the last 5 years.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential copper import substitution** is comparable with imports and insignificant. The niche is less attractive for investors.

Refined copper and copper alloys, untreated



- Copper production is in **surplus**, with domestic production meeting domestic demand in full. In 2020, the country produced 483 thousand tonnes of refined copper and copper alloys.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential copper import substitution** is comparable with imports. The niche is less attractive for investors.

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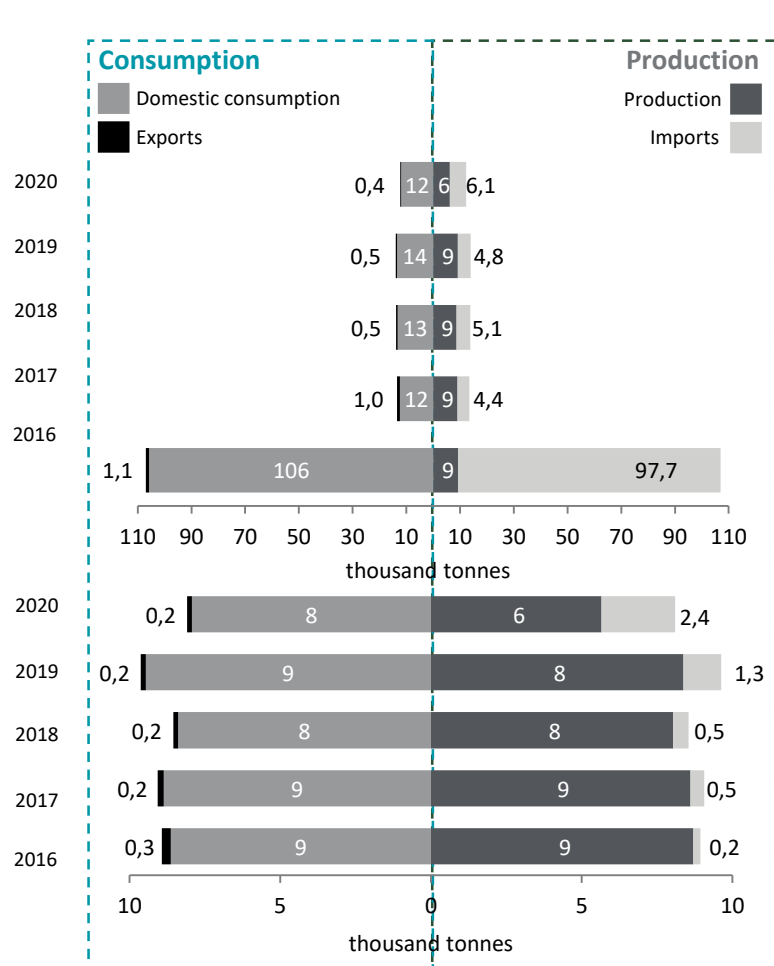
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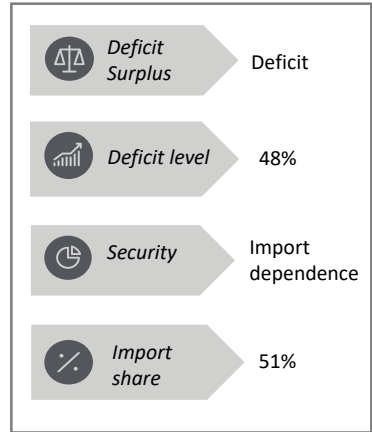
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Copper (2/2)

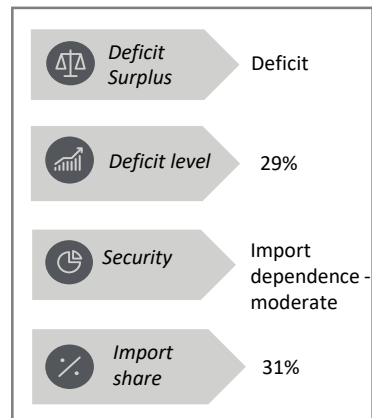


Semi-finished copper and copper alloys



- Semi-finished copper and copper alloy production is in **deficit**, since production only partially meets domestic demand.
- Imports account for 51% of demand, while the deficit level reached 48%. Available capacity is unable to meet domestic demand. The country is **import dependent**.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential import substitution** of semi-finished copper and copper alloys is comparable with imports. The niche is attractive for investors.

Copper wire



- In 2020, Kazakhstan was **dependent** on copper wire imports, since existing Kazakhstan capacity is unable to meet domestic demand.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential import substitution** of copper wire is comparable with imports. The niche is attractive for investors.

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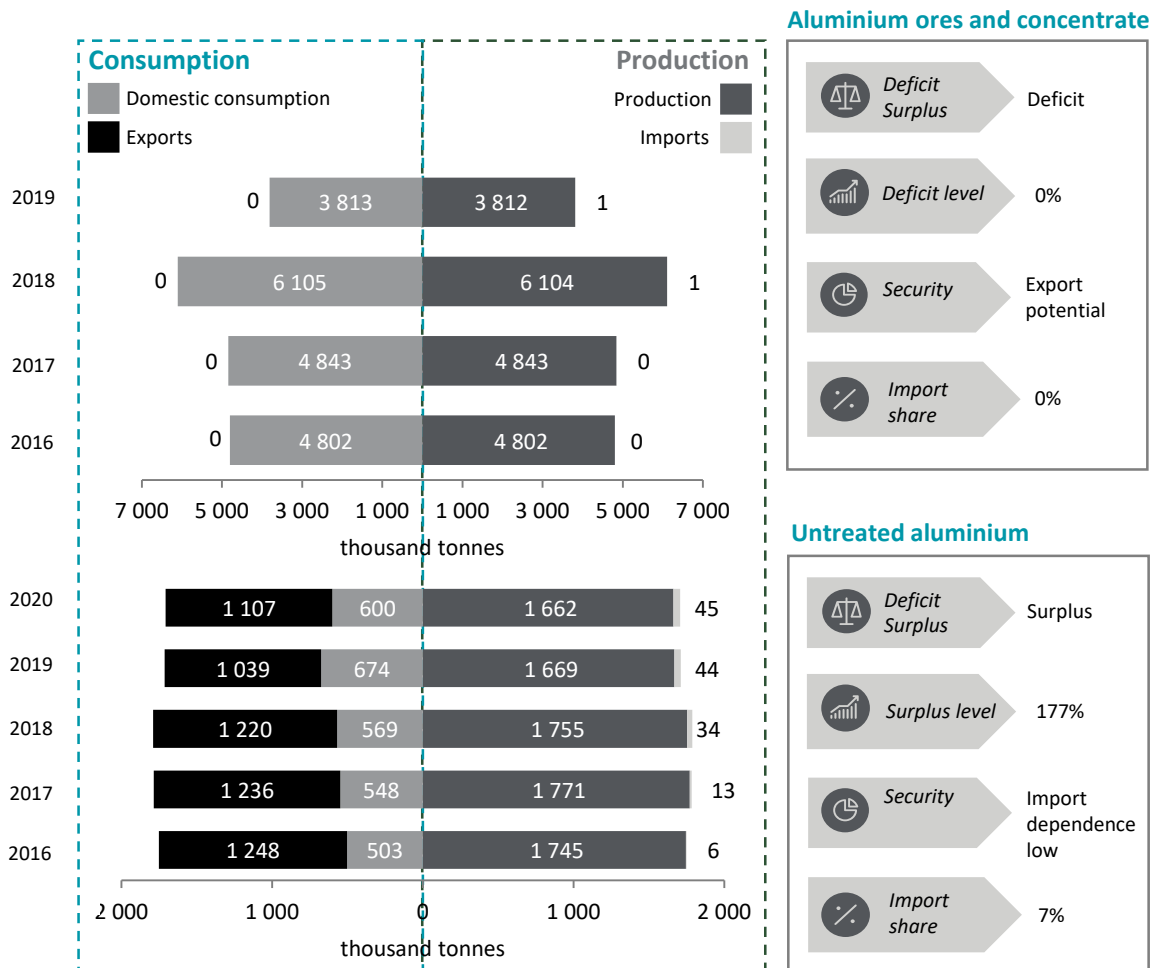
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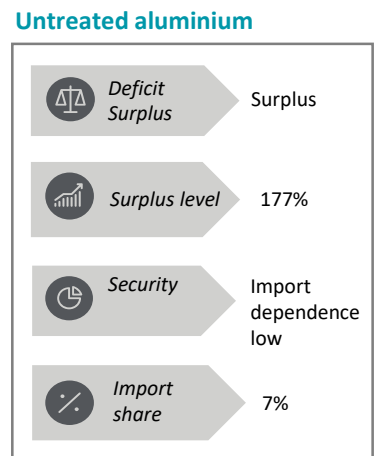
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Aluminium



- In 2016-2020, there was a **low deficit** of aluminium ores and concentrate, with domestic production almost meeting domestic demand. In 2020, the country produced 3,812 thousand tonnes of aluminium ore and concentrate with equivalent consumption.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of aluminium ores and concentrate is comparable with imports and insignificant. The niche is less attractive for investors.



- In 2020, Kazakhstan produced 1,662 thousand tonnes of untreated aluminium, only 36% was consumed. Domestic production of untreated aluminium meets the country's domestic demand.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of untreated aluminium is comparable with imports and insignificant. The niche is less attractive for investors. The production of untreated aluminium has high **export potential**, with imports accounting for only 7%.

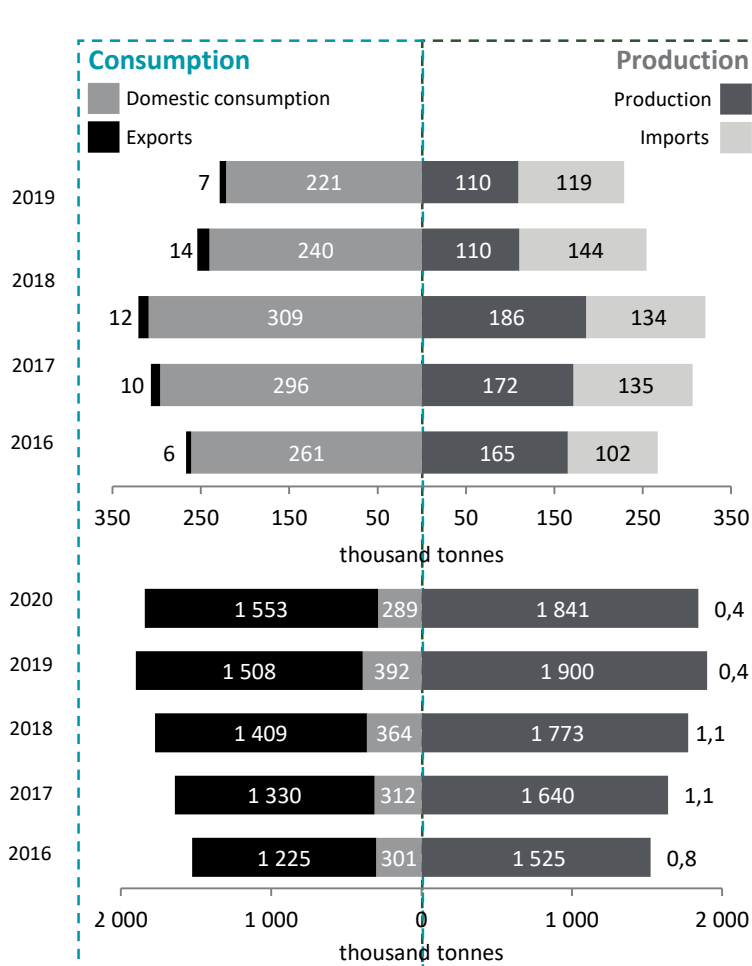
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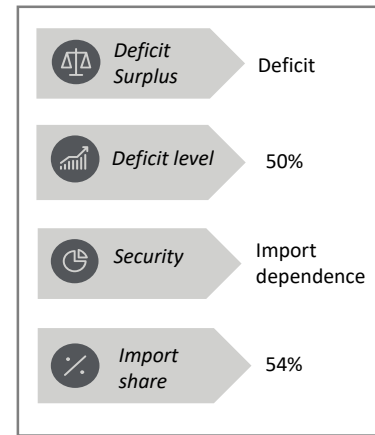
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Aluminium and chrome

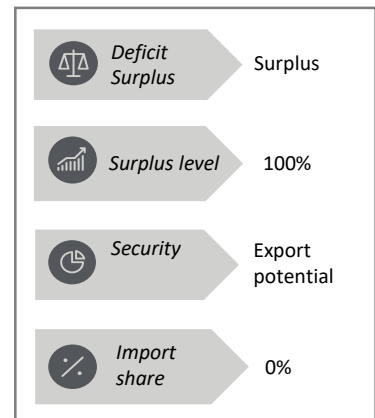


Other structures, structure parts, plates, rods, angles, profiles and similar ferrous metal or aluminum products



- The country has a **deficit** in the production of other structures, structure parts, plates, rods, angles, profiles and similar products made of ferrous metals or aluminum, since production only partially meets domestic demand. The country is **import dependent**.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential import substitution** of other structures, structural parts, plates, rods, angles, profiles and similar products made of ferrous metals or aluminum is comparable with imports. The niche is attractive for investors.

Ferrochrome



- In 2016-2020, Kazakhstan recorded a ferrochrome production **surplus**: domestic production met domestic demand. In 2020, the country produced 1,841 thousand tonnes of ferrochrome with consumption of 289 thousand tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of ferrochrome is comparable with imports and insignificant. The niche is less attractive for investors.

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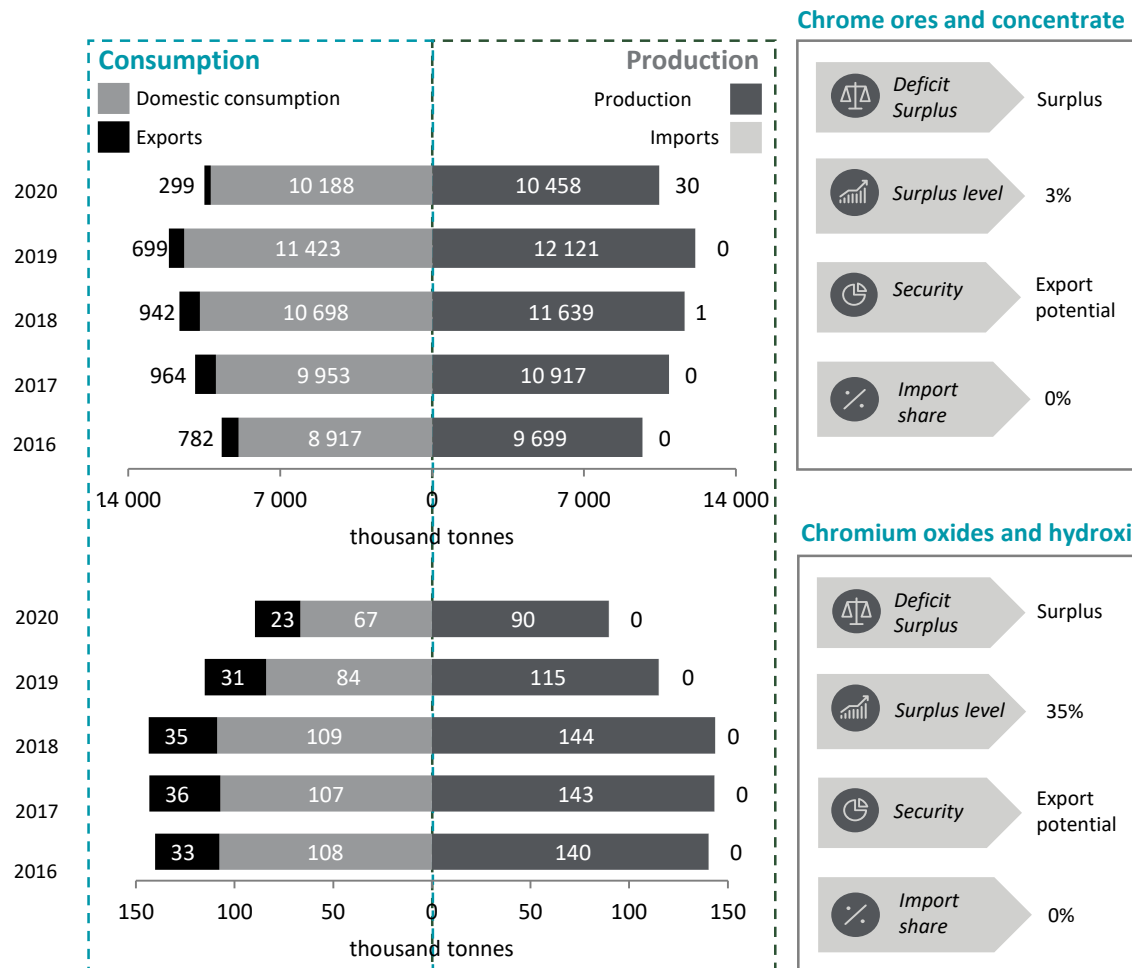
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Chrome



- In 2020, Kazakhstan was not dependent on chrome ore and concentrate imports, since existing capacity met domestic demand. As such, the import share has been zero for the last 5 years.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of chrome ore and concentrate is comparable with imports and insignificant. The niche is less attractive for investors.

- Kazakhstan has **surplus** production of chromium oxide and hydroxide; domestic production meets domestic demand in full. In 2020, the country produced 90 thousand tonnes of finished products with consumption of 67 thousand tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential import substitution** of chromium oxide and hydroxide is comparable with imports. The niche is less attractive for investors.

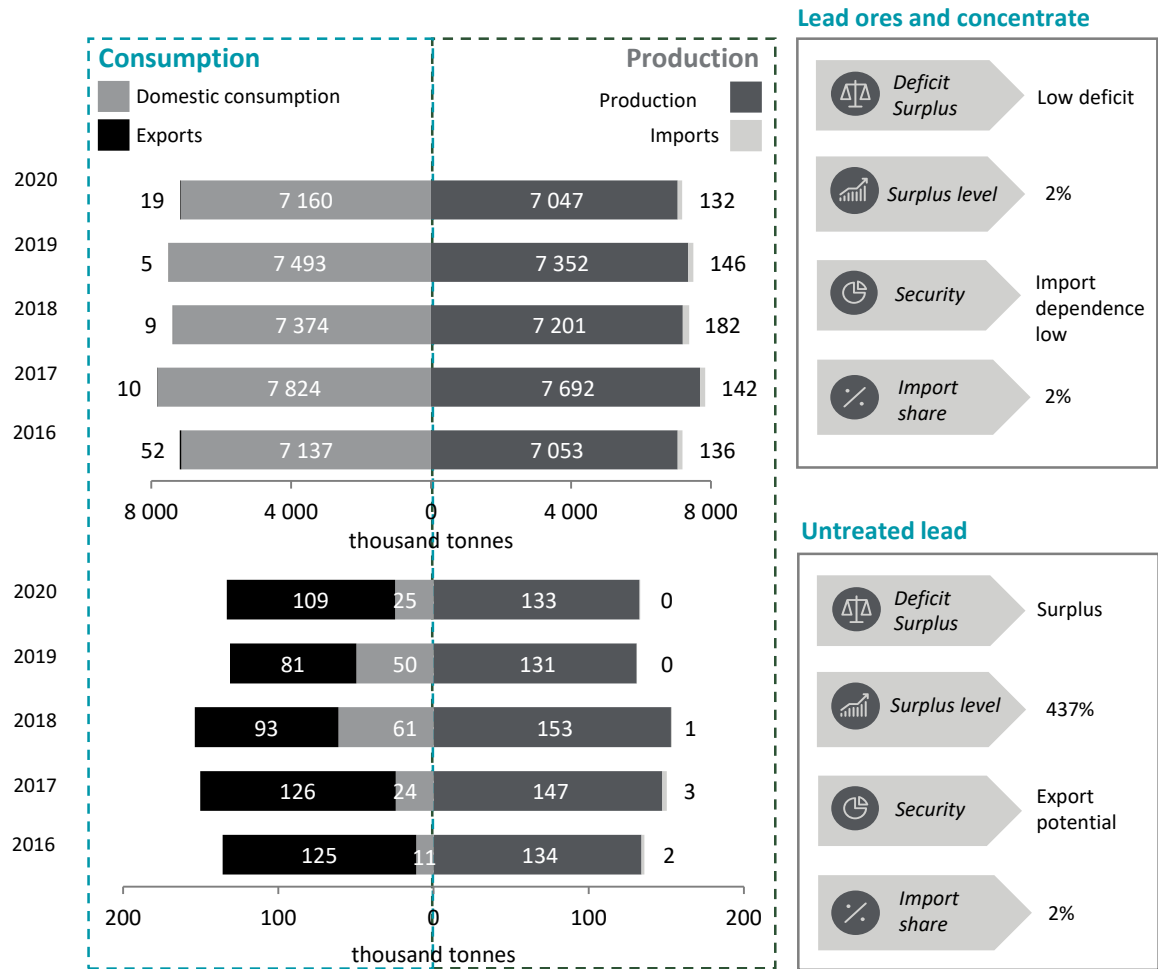
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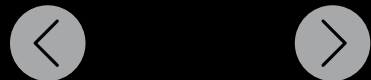
Lead



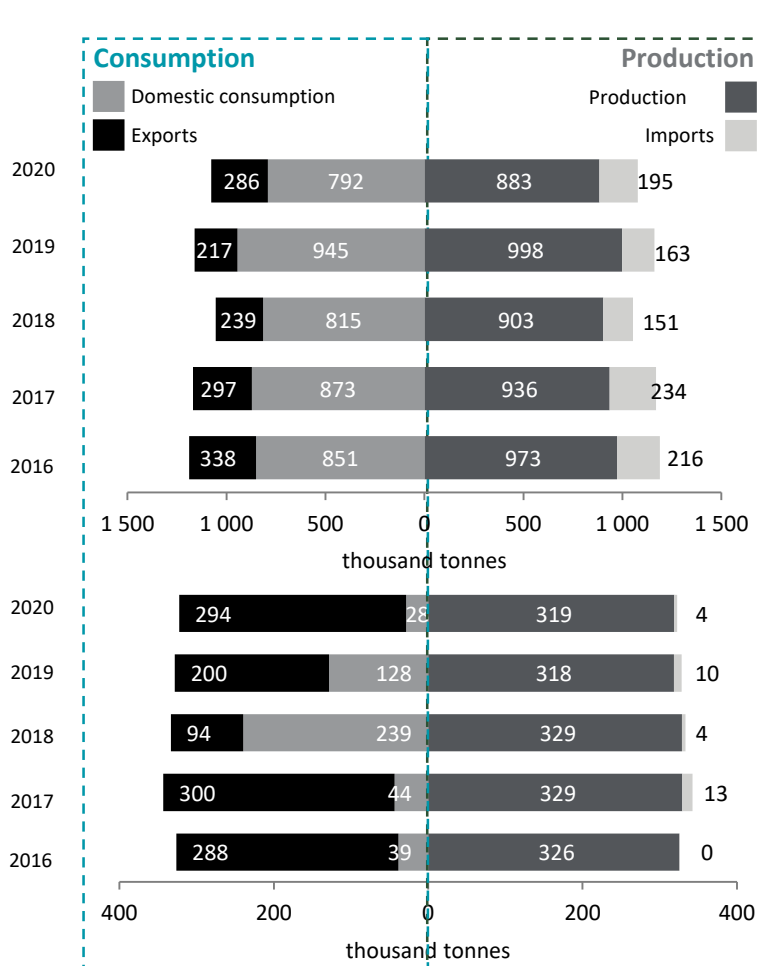
- In 2016-2020, Kazakhstan recorded a **low deficit** of ores and lead concentrate: domestic production almost met domestic demand. In 2020, the country produced 7,047 thousand tonnes of lead ore and concentrate with consumption of 7,160 thousand tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of lead ore and concentrate is comparable with imports and insignificant. The niche is less attractive for investors.

- In 2020, Kazakhstan was not dependent on untreated lead imports, since existing capacity was able to meet domestic demand. The import share amounted to 2%.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of untreated lead is comparable with imports and insignificant. The niche is less attractive for investors.

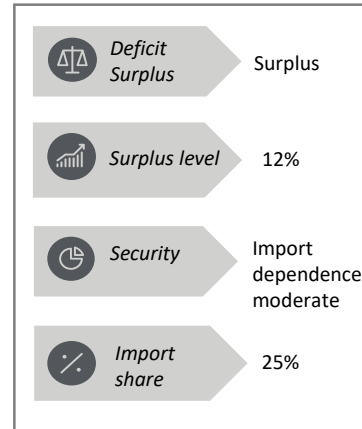
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Zinc

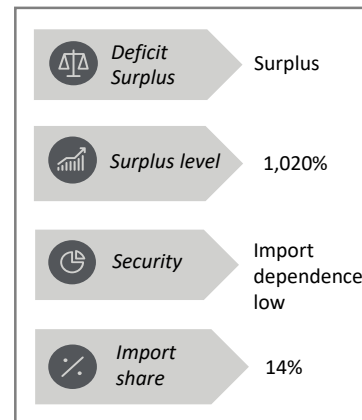


Zinc ores and concentrate



- Zinc ore and concentrate production in Kazakhstan **meets** domestic demand. In 2020, the country produced 883 thousand tonnes of finished product with consumption of 792 thousand tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, **potential import substitution** of zinc ore and concentrate is comparable with imports and insignificant.

Untreated zinc



- Kazakhstan has recorded **surplus** untreated zinc production; domestic production meets domestic demand. In 2020, it produced 319 thousand tonnes of untreated zinc with consumption of 28 thousand tonnes.
- Given the current domestic production specialisation and in the event of the introduction of state policy aimed at rationalising the import of goods and services by stimulating domestic producers of similar goods, and creating new production enterprises in the country, **potential import substitution** of untreated zinc is comparable with imports. The niche is less attractive for investors.

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Base non-ferrous metal pricing



1 Prices for goods

The value of non-ferrous metals is determined on exchanges, such as the London Metal Exchange (LME), the Shanghai Futures Exchange, the Brazil Commodity and Futures Exchange and others. The main trading platform for non-ferrous metals is the LME. Even though the majority of metal sales are made through direct supply contracts or intermediaries, metal prices are either fixed in long-term agreements or linked to LME quotes. Six base non-ferrous metals are traded on the LME: aluminium, copper, zinc, nickel, lead, titanium and silver, as well as aluminium alloys.

Precious metal prices are set and paid according to official LBMA gold and silver quotes, which are exposed to price fluctuations, depending on market supply and demand, and other factors.

2 Factors affecting pricing

Market prices for non-ferrous metals are affected by a number of factors that are not dependent on commodity manufacturers.

- Non-ferrous metals are produced from complex ore incorporating a number of substances. For example, nickel production is linked to cobalt production, which is a by-product in the production process.
- The complexity of non-ferrous metal production as ore contains only small quantities of base metals. For example, a kilogram of tin ore contains roughly 1 g of pure tin, which gives rise to the high tin price.
- Direct and future supply and demand for non-ferrous metals.
- There is also a close link between the financial and raw materials' markets. For example, if the financial market declines, investors turn to the commodities' or raw materials' markets.
- Financial institutions operating on global trading platforms can influence price fluctuations directly. Often, exchange trading exceeds the real volume of goods bought and sold on physical markets, and in doing so, provoking price fluctuations.

3 Domestic price formation

According to the Ministry of Industry and Infrastructure Development, the non-ferrous metal price in Kazakhstan will be based on the following formula: LME price less logistics costs to international ports, which, in accordance with LME rules, are paid by the seller.

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Kazakhstan introduced a six-month ban on the export of ferrous and non-ferrous metal scrap and waste on 7 October 2021 in a Minister of Industry and Infrastructure Development Order *On the Transportation of Ferrous and Non-Ferrous Metal Scrap and Waste*. The measure was introduced to combat the illegal and shadow circulation of scrap in Kazakhstan.

01

A six-month ban on the export of the following by motor transport has been introduced:

- ferrous and non-ferrous scrap and waste - EAEU FEA TN codes 7204, 740400, 760200, 7802000000;
- depleted lead batteries, battery waste and scrap - EAEU FEA TN codes 8548101000, 8548102100, 8548102900, 8548109100;
- retired pipes, rails, railway bed and rolling stock elements - EAEU FEA TN codes 7302, 7303, 7304, 7305, 7306, 8607;

02

Except for:

- steel alloy waste and scrap, including corrosion-resistant steel - EAEU FEA TN codes 7204211000, 720421900 0 and other steel - EAEU FEA TN code 7204290000;
- retired rolling stock elements imported into Kazakhstan for repair and re-exported, and exported from Kazakhstan for repair and re-imported - EAEU FEA TN codes 8607191001, 8607191009, 8607199009, 8607211009, 8607219009, 8607300000, 8607998000, 8607290000, 8607120000.

03

For former rolling stock elements imported into Kazakhstan for repair and re-exported, and exported from Kazakhstan for repair and re-imported:

- 1) the relevant parties, between 1-5 business days before the proposed date goods are due to be transferred across the Kazakhstan border, should submit contracts to repair rolling stock elements, a goods' declaration (if required) and ABP within 5 business days after the goods in question are imported into Kazakhstan, to the Industrial Development Committee.
- 2) the Industrial Development Committee, within 3 business days from the date it receives documents from the relevant parties, notify the State Revenue Committee of the relevant parties, goods, date and border checkpoint used to transfer the goods.

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Global non-ferrous metal prices



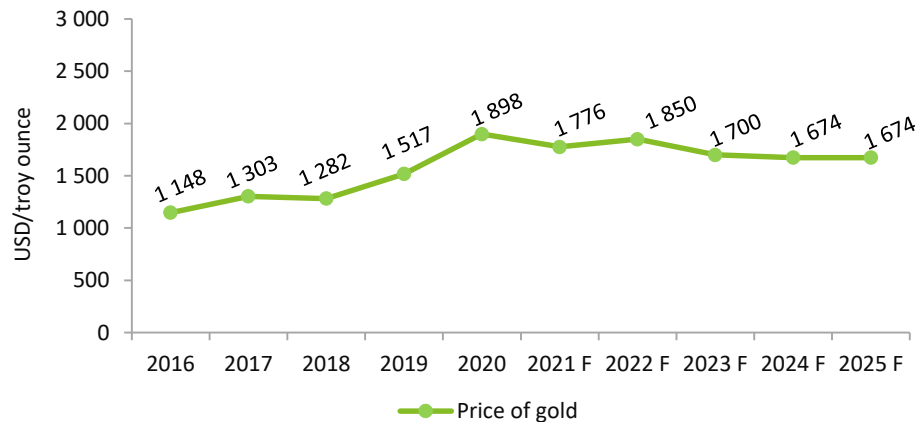
Global prices for precious metals such as gold, silver, platinum and palladium are expressed in USD per troy ounce or ounce

Units of measurement

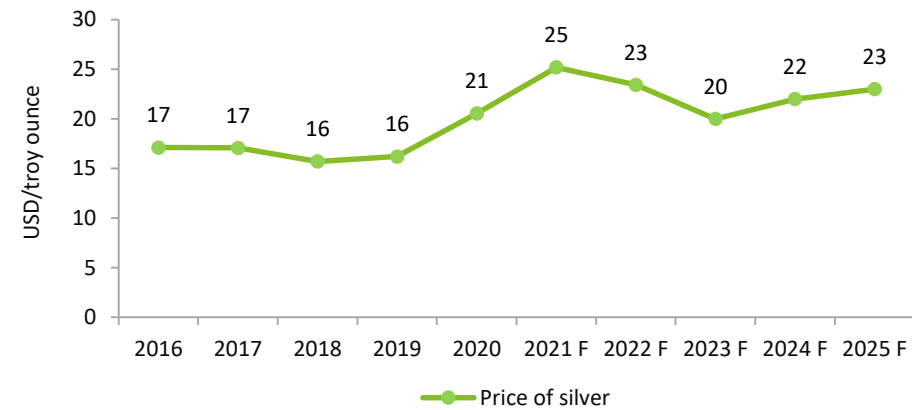
Equivalent to

1 troy ounce	31.1 g
1 ounce	28.3 g
1 tonne	32,151 ounces
1 tonnes	32,667 troy ounces

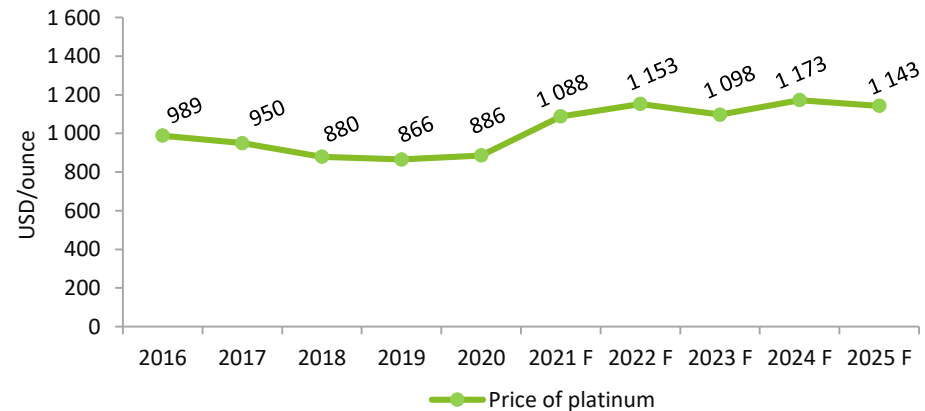
Changes in gold prices in 2016-2025, USD/troy ounce



Changes in silver prices in 2016-2025, USD/troy ounce



Changes in platinum prices in 2016-2025, USD/ounce



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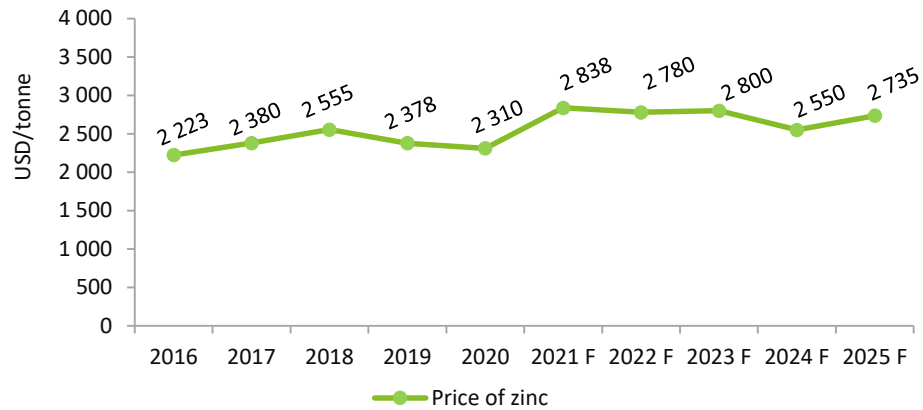
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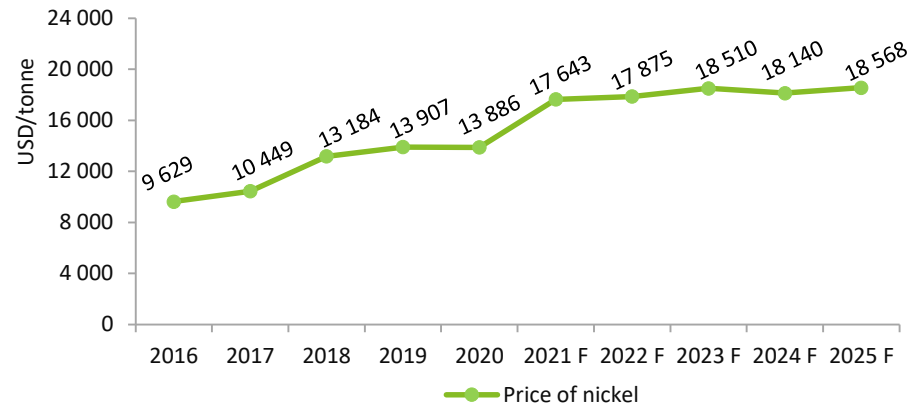
Global non-ferrous metal prices



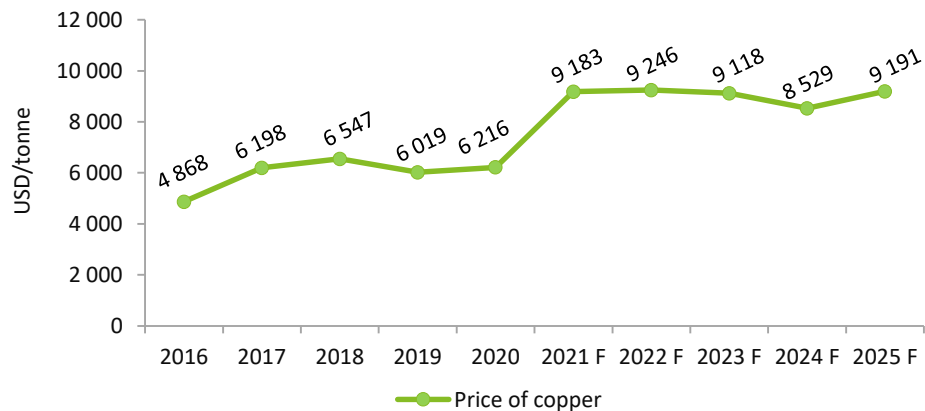
Changes in zinc prices in 2016-2025, USD/tonne



Changes in nickel prices in 2016-2025, USD/tonne



Changes in copper prices in 2016-2025, USD/tonne



Changes in aluminium prices in 2016-2025, USD/tonne



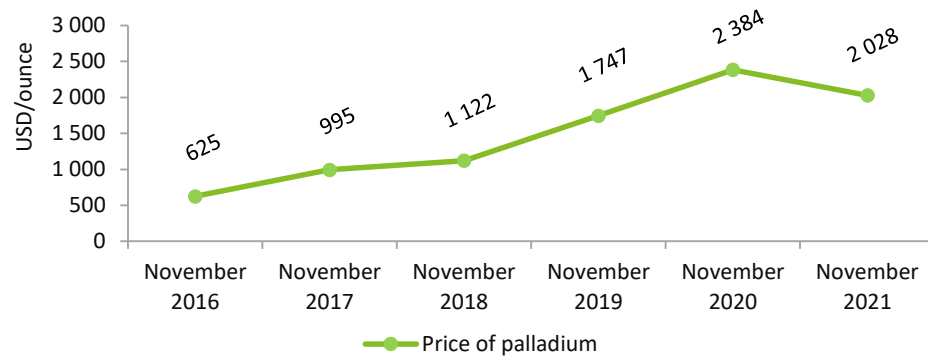
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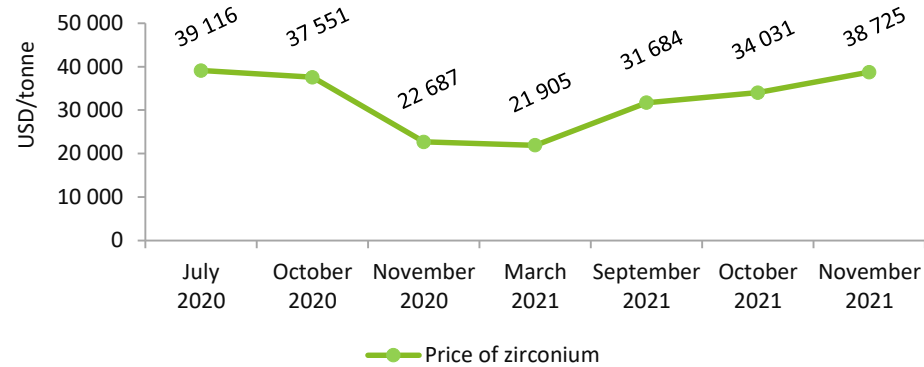
Global non-ferrous metal prices



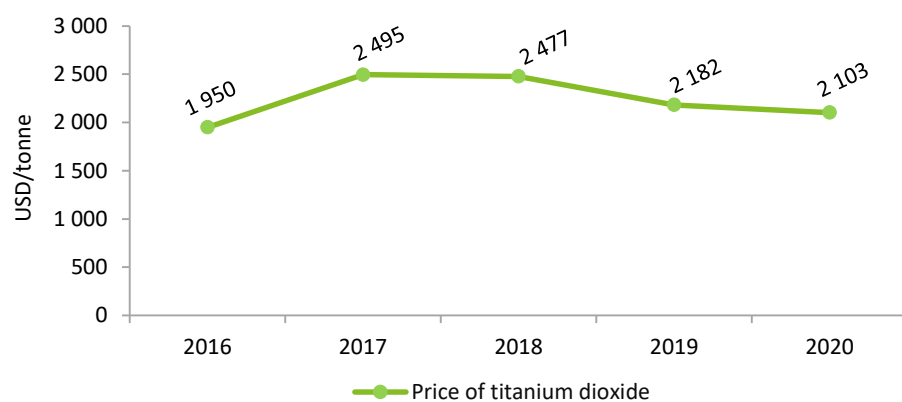
Changes in palladium prices in 2016-2021, USD/ounce



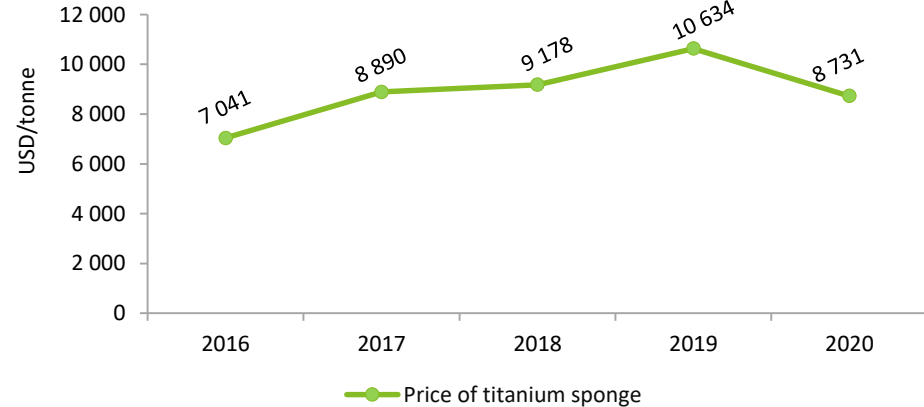
Changes in zirconium prices in 2016-2020, USD/tonne



Changes in titanium dioxide prices in 2016-2020, USD/tonne



Changes in titanium sponge prices in 2016-2020, USD/tonne



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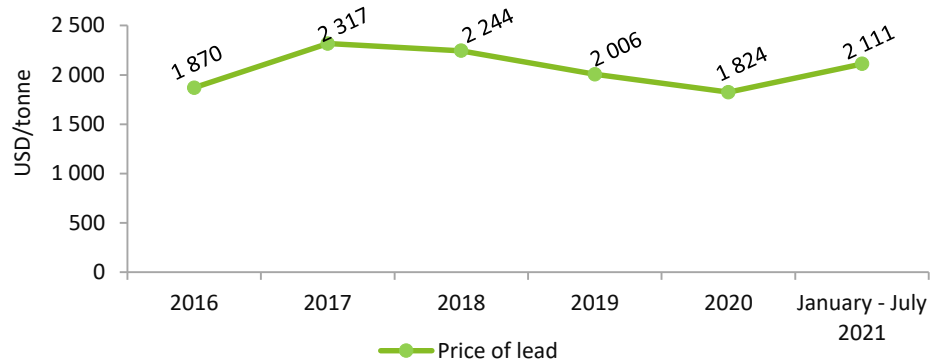
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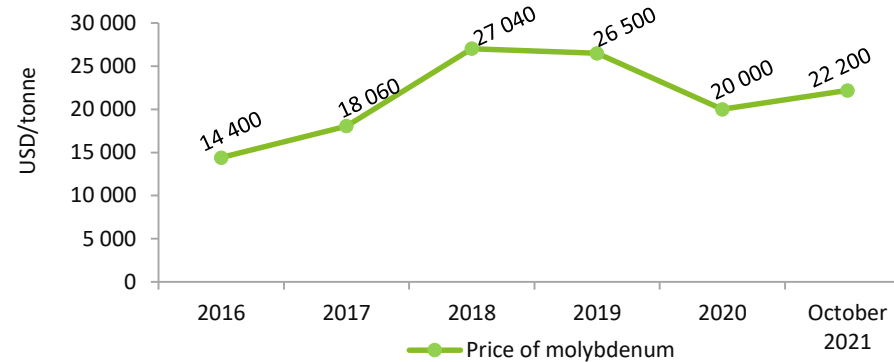
Global non-ferrous metal prices



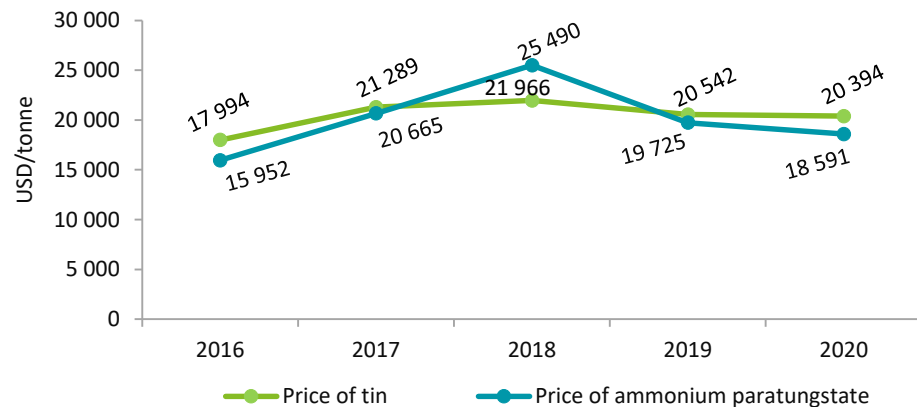
Changes in lead prices in 2016 - 2021, USD/tonne



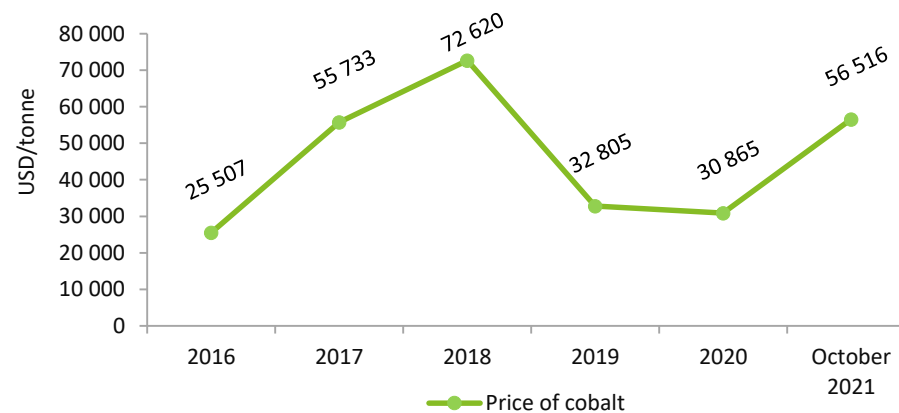
Changes in molybdenum prices in 2016-2021, USD/tonne



Changes in tin and ammonium paratungsten prices in 2016-2020, USD/tonne



Changes in cobalt prices in May-October 2021, USD/tonne



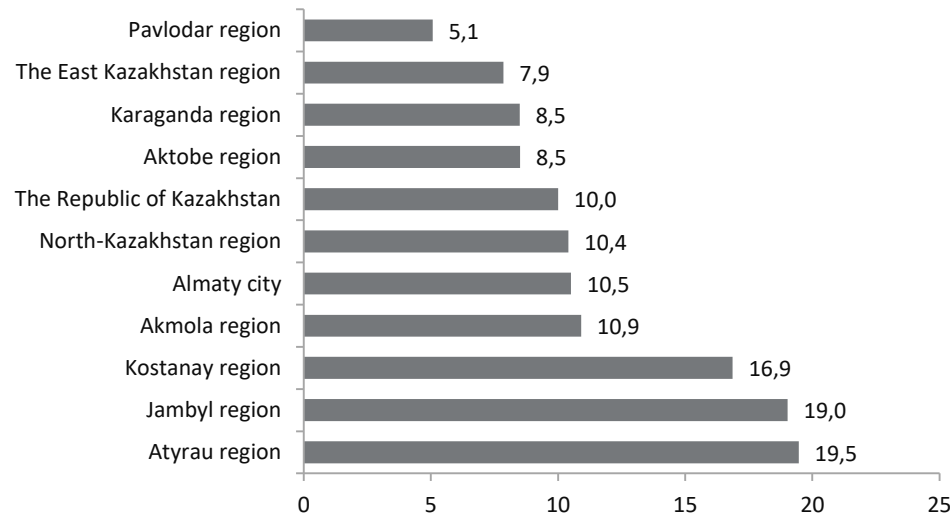
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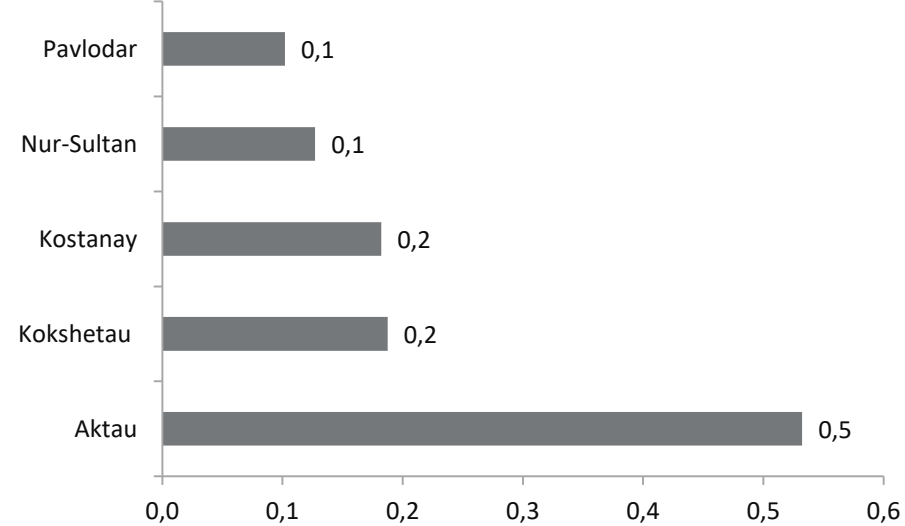
State regulation of utilities tariffs



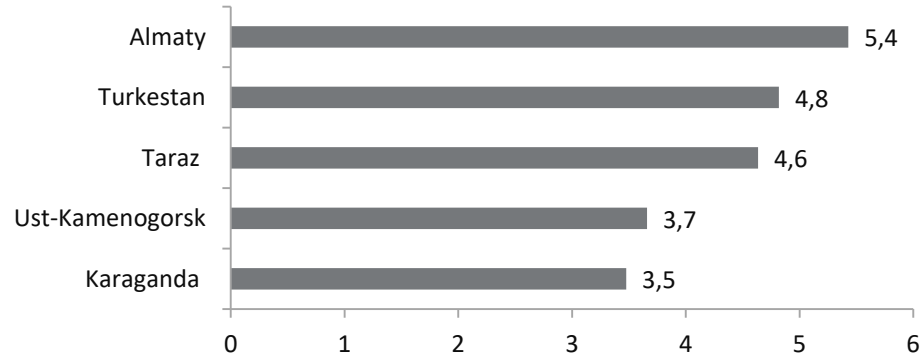
Thermal power price across Kazakhstan in September 2021, USD/Gcal



Cold water price across Kazakhstan in September 2021, USD/Gcal



Electricity price across Kazakhstan in September 2021, USD/100 KWH



- Kazakhstan operates a state tariff policy for natural monopolies, and has also introduced state price regulation and controls for compliance with pricing procedures and obligations of entities on socially significant markets. Communal services are subject to tariff regulation.
- As at September 2021, the average price per Gcal of thermal power in Kazakhstan was 11.6 USD.
- In September 2021, the average price per 100 KWH of electricity was 4.2 USD, while the price per m³ of cold water was 0.2 USD.

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Sector support from the “Business Road Map 2025” Programme



- The Business Roadmap 2025 Program for business support and development aims to meet the goal of the public message of the President of Kazakhstan "Kazakhstan-2050 Strategy: a new political course of the established state" dated 14 December 2012. The program implements instruments of state support in the form of subsidies for part of the interest rate on loans / financial leasing agreements and loan guarantee agreements.
- The Programme provides for state grants and training for entrepreneurs aimed at supporting and developing small and medium-sized businesses in Kazakhstan.
- The objectives of the Programme are to ensure the sustainable and balanced growth of regional entrepreneurship, and maintain existing and create new permanent jobs.
- The Programme incorporates three directions:
 - support for new entrepreneur business initiatives in monotowns, small towns and rural settlements
 - industry support for entrepreneurs operating in priority sectors of the economy
 - non-financial measures to support entrepreneurship
- The Programme priority sector list includes crop production.
- 1 billion USD has been allocated to implement the Programme until 2025.

Programme conditions

Eligible entities	Entrepreneurs/entities involved in industrial and innovative activities implementing and/or planning to implement their own projects in priority sectors of the economy
Loan rate	up to 14% per annum
Purpose of the projects	Investments, replenishment of working capital, refinancing; replenishment of working capital is allowed on a renewable basis
Guarantee amount	up to 2.4 million USD and up to 50% of the guarantee amount
Loan amount	up to 16.7 million USD
Subsidy period	up to 5 years

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Sector support from the SIIDP 2020-2025 Programme



- The goal of this Programme is to develop Kazakhstan’s competitive manufacturing industry in domestic and foreign markets (Government Resolution No. 1050 dated 31 December 2019). During the Programme implementation period, the major focus is on the realisation of key export-oriented projects.
- Baiterek National Managing Holding is one of the main operators implementing Programme objectives such as increasing production volumes and expanding the range of processed goods in demand in domestic and foreign markets, as well as promoting technological development and digitalisation of manufacturing industries.
- Specifically, Baiterek continues as the operator of all repayable financial support measures through subsidiaries, and its powers include raising funds from external and internal debt and capital markets to provide preferential loans to manufacturers.

Project financing and lease financing through the SIIDP Programme

- 1) Lending through financial institutions will continue with interbank lending schemes through the Development Bank of Kazakhstan and Damu Entrepreneurship Development Fund.
- 2) Development Bank of Kazakhstan provides long-term financing by mixing 50/50 budget funds and commercial funds for a period of 20 years, with end borrower rates of up to 8%, with company participation in at least 20% of the project amount.
- 3) Interest rates on loans provided by financial institutions are subsidised, and loan liabilities are guaranteed (operator – Damu Fund) with nominal interest of up to 15% per annum within the framework of Government Resolution No. 820 dated 11 December 2018.

Programme financing, million USD

Index	2020	2021	2022	2023	2024	2025
National budget	353.3	513.3	256.9	256.7	241.7	239.2
Total	353.3	513.3	256.9	256.7	241.7	239.2

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Sector support within the framework of the “Saving Simple Things” Programme



- The goal of the “Saving Simple Things” Programme is to saturate the domestic market with domestic goods, raise the competitiveness of the manufacturing industry, and, above all, release a wide range of consumer goods.
- The credit facility is made available to business projects implemented in priority sectors of the economy in accordance with an approved list of goods for credit financing of priority projects, which includes the food industry. Within the Programme framework, the state subsidises bank loan interest rates.
- The Project operator is Damu. According to the operator, 171 projects were subsidised for 168.5 million USD in 2019 (subsidies paid amounted to 2.9 million USD). In 2020, 169 projects were subsidised for 229.8 million USD (subsidies paid amounted to 6.5 million USD).
- According to the Atameken National Chamber of Entrepreneurs, approved projects include the production of consumer goods such as furniture (kitchen furniture, couches, garden chairs, beds, drawers and others); clothing (jackets, suits, blouses, shoes, overalls, etc.); food products (pasta, bakery products, meat and sausages, dairy products, confectionery, etc.); chemicals (fertilizers) and building materials (bricks, cement), as well as service facilities (construction of kindergartens, preschool institutions, sanatoriums, hotels, rehabilitation centres and recreational compounds) and others.

Programme conditions

Eligible entities	private businesses (small, medium-sized and large businesses)
Interest rate	15% per annum
Subsidy amount	up to 9% of the nominal interest rate
Project purpose	investments and replenishment of working capital; replenishment of working capital is allowed on a renewable basis
Maximum amount per borrower	unlimited
Subsidy period	for investment – 10 years, without further extension to replenish working capital – 3 years, without further extension
Loan refinancing	not stipulated
Current loans	loans issued by banks after government resolution No. 820 dated 11 December 2018 entered into force are allowed

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State support within the framework of the Entrepreneurial Code



Investment project
create new or expand current production

Priority investment projects
an investment project worth at least 14.5 million USD in priority activities

Special investment project

- project realised by SEZ/free warehouse members
- motor vehicle assembly project

The Kazakhstan Entrepreneurial Code determines the legal, economic and social conditions and guarantees for ensuring freedom of business in Kazakhstan, as well as a mechanism to protect investor interests.
Production of **base noble and non-ferrous metals** is recognised as an investment priority project.

Investment concessions in Kazakhstan

	Investment project	Priority investment project	Special investment project
Customs duty exemptions	✓	✓	✓
State land grants	✓	✓	
Investment subsidies		✓	
Import VAT exemptions	✓	✓	✓
Income tax exemptions		✓	✓
Land tax exemptions		✓	✓
Property tax exemptions		✓	✓
Free access to hiring foreign nationals		✓	✓

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Sector support within the framework of the Entrepreneurial Code



Entities investing or planning to invest in priority activities according to Government Resolution No. 13 dated 14 January 2016 may receive state support stipulated by the Kazakhstan Entrepreneurial Code and state programmes.

State support stipulated by the Kazakhstan Entrepreneurial Code No. 375-V dated 29 October 2015

The Entrepreneurial Code stipulates the following investment preferences depending on investment project classification.

Priority investment project (create new production)

- Customs duty exemptions
- State grants
- Tax exemptions
- Investment subsidies

Priority activities within the framework of the Entrepreneurial Code

Section	Group	Class of subclass
24.4	Production of base noble and non-ferrous metals	Noble (precious) metal production
		Aluminium production
		Lead, zinc and tin production
		Copper production
		Miscellaneous non-ferrous metal production

Priority investment project (expand existing production)

- Customs duty exemptions
- State grants
- CIT exemptions

Investment project:

- Customs duty exemptions
- State grants
- Import VAT exemptions

Special investment project

- Customs duty exemptions
- Import VAT exemptions

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QazIndustry is the single coordinator providing assistance to industrial enterprises at all stages - from technological solutions and new production lines to certification, export and the implementation of digital technology. The entity provides state financial support free of charge for Kazakhstan producers. These include innovative grants to commercialise technology, upgrade technology used by enterprises and industries, and reimburse certain types of costs to enterprises aimed at increasing work performance and promoting exports.



Participation in overseas exhibitions, fairs and festivals

- registration fees;
- lease exhibition floor space;
- prepare (lease), assemble/dismantle exhibition stands and additional equipment;
- develop, design and create exhibition floor space; economy class air tickets for two employees;
- develop, design, translate and prepare advertising materials;
- accommodation for two employees.

Advertising for goods

- in the media (printed, television, radio and internet);
- in public places (banners, expanders, light boxes, audio and video transmission, advertising on outside surfaces and in vehicle passenger compartments);
- prepare audit and video films and advertising materials; lease advertising structures and surfaces.

Supply goods

- Size: 50%. Amount: up to 1/5 of the budget. Historical period: 12 months
- Rail, air and sea; transport management

Support branches, representative offices, retail floor space and warehouses

- lease/sublease office floor space;
- lease retail floor space and warehouses.

Commodity compliance procedures

- established technical regulations and standard, including organisational standards, or contractual terms or confirmation of the right to sell goods overseas (certificates, permits, registration certificates and other documents)

Specialised catalogue

- draft, translate into foreign languages and publish

Registration procedures

- trademarks (brand);
- on e-trading sites.

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Improve corporate competency

Size: 40%

Amount: up to 71.4 thousand USD

Historical period: 24 months

- train engineering staff, including senior management (Kazakhstan and overseas);
- hire overseas personnel under employment contracts (including product promotion)

Improve corporate performance

Size: 40%

Amount: up to 142.8 thousand USD

Historical period: 24 months

- draft documentation and/or implement progressive management and production technology (automatic control systems and software); energy saving and green technology; project management standards;
- Lean Manufacturing elements (Kaizen, TPM, Six Sigma, 5 S, Kanban and others);
- introduce Industry 4.0 technology (elements).

Improve production processes

Size: 40%

Amount: up to 142.8 thousand USD

Historical period: 24 months

- technical and energy audits, and IT consulting; advice on resolving issues around forming, reorganising and operating corporate management systems; production promotional design;
- engineering plans and solutions, finding new structures, technology and equipment; assemble, install and launch equipment; virtual equipment commissioning; engineering and construction development; digital and virtual engineering solutions; prepare prototypes and/or digital modelling; and equipment maintenance;
- industrial product testing; implement additional reality in production.

Comprehensive industrial and innovative project plans

- Size: 40%. Amount: up to 142.8 thousand USD. Historical period: 24 months
- develop a comprehensive industrial and innovative action plan to acquire long-term lease financing and etc.

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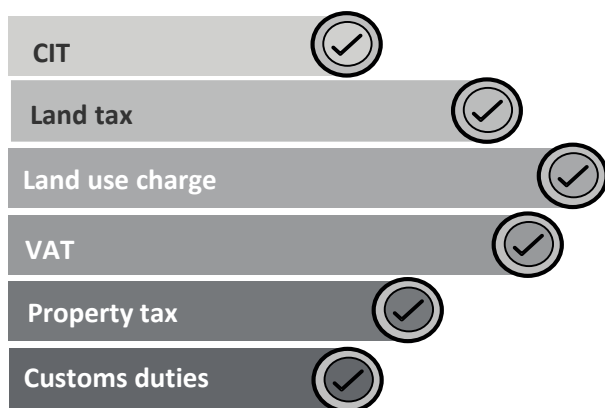
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Free economic zones



- A special economic zone (“SEZ”) is a part of Kazakhstan territory where special tax rules apply and infrastructure facilities are in place to perform priority activities.
- According to Minister of Investment and Development Order No. 142 dated 27 February 2018, agricultural and forestry machinery is included in a list of priority activities broken down into special economic zones. The list of priority activities includes the following SEZ:
 - Astana-New City;
 - Seaport Aktau
 - Saryarka;
 - Khorgos – Eastern Gates;
 - Astana-Technopark;
 - Turkistan.
- According to the Tax Code, SEZ members are exempt from:



The following are also provided:

- Land for 10 years
- Overseas nationals can be hired according to a simplified procedure

To receive tax concessions, SEZ members should meet all of the following simultaneously:

01 Be registered as a taxpayer with the tax authorities in the SEZ

02 Have no structural divisions outside of the SEZ

03 No less than 90% of its aggregate annual income should be generated from the sale of goods of own production/services (in the relevant priority areas for the given SEZ)

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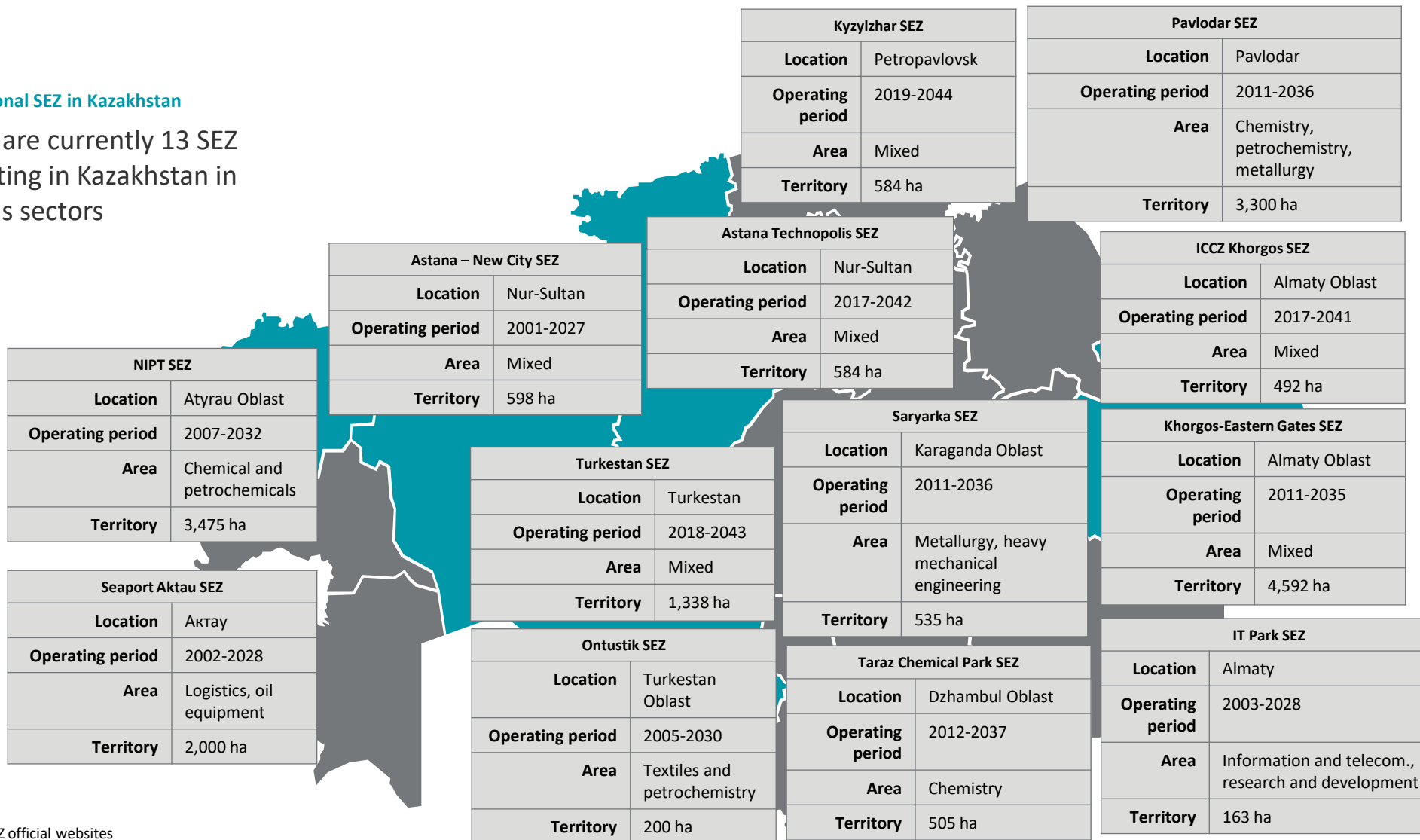


Free economic zones



Operational SEZ in Kazakhstan

There are currently 13 SEZ operating in Kazakhstan in various sectors



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State stimulation measures from KazakhExport



KazakhExport is an export insurance company that provides insurance support for exporters of non-primary goods and services. The main mission of KazakhExport is to support the growth of exports of non-primary goods, works, services in priority sectors of the economy and the formation of the practice of financial, insurance and non-financial support of Kazakhstani enterprises.

Advantages of the organization – possibility to export on terms of deferred payment, reduction of losses in case of an insured event of political nature, reduction of non-payment risks, protection of Kazakhstan investments abroad from political risks, expansion of opportunities and improvement of credit terms, effective instrument for "safe entry" strategy to new markets.

Business support is provided by:

insurance of exporter's credit, exporter's short-term accounts receivable;
insurance of exporters' losses related to performance of works/provision of services

providing insurance protection to banks against the risk of exporters' failure to perform their obligations under foreign currency forward contracts, as well as against the risk of non-payment by a Kazakhstani company for its obligations under the Guarantee.

financing of foreign companies for the purchase of Kazakhstani goods through Kazakh second-tier banks within the framework of the letter of credit form of settlements

Types of reimbursable insured events:

- Non-payment by a foreign counterparty (Importer) under an export contract;
- Failure of the Importer or Exporter to fulfill its obligations to a financial institution;
- Exporter's failure to fulfill obligations under export contract and others.

Reimbursable insurance payments:

- The amount - within the sum insured in the amount of the loss less the unconditional deductible and, depending on the terms of the contract, can range from 75% to 90%;
- KazakhExport makes the insurance payment within 30 days after the waiting period (120 days for commercial risks and 180 days for political risks).

pre-export financing of Kazakhstani exporters through Kazakhstani second-tier banks in order to replenish working capital and fulfill obligations under export contracts

obtaining insurance protection from the credit institution against the risk of non-payment by the importer of its obligations under the credit agreement.

compensation of the importer's advance payment, in case of non-fulfillment of the exporter's obligations under the contract;
investment insurance, that is, compensation for losses of a Kazakhstani investor, in case of non-fulfillment by a foreign company of its obligations.

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State stimulation measures from QazTrade



QazTrade is an organization that studies and identifies current issues of the nationwide trade system and participates in the implementation of the country's trade policy. The company also provides financial and consulting assistance to Kazakhstani enterprises to promote domestic goods in foreign markets.

Among the services of the organization – assistance in promoting domestic processed goods, services to foreign markets, consulting services to improve competitiveness and find potential export markets, as well as partial reimbursement to enterprises of certain types of costs aimed at improving productivity and export promotion.

Business support from QazTrade includes the following:



Independent assessment of the export potential of enterprises and their goods



Consulting work to assist in finding a potential partner/buyer abroad



Analysis of the potential importer's market and conducting a marketing campaign to promote the product



Preparation of recommendations to improve the conduct of export activities



Formation of a package of necessary documents for export of goods and services



Analytical support for inquiries by countries, regions of Kazakhstan and industries



In-depth and comprehensive analysis of foreign industry and country markets



Study of trade barriers to enter foreign markets and development of proposals for their elimination

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Non-ferrous metal market

- The base noble and non-ferrous metal market was valued at 1,564 billion USD in 2020 and is expected to reach 1,939 billion USD by 2026 with CAGR at 3.8% in 2021–2026. The Asia-Pacific region was the largest in the global non-ferrous metal production and processing market, accounting for 73% in 2020. Western Europe was the second largest, accounting for 10%.

Leading non-ferrous metal producers

- One of the largest non-ferrous metal producers is China, which produces all base non-ferrous metals. Chile and the USA are the leading copper producers; aluminium – China and India; gold – the USA and China; chrome – Canada; uranium – Kazakhstan; lead and zinc – China and Peru.

Increased demand for non-ferrous metals

- It is expected that quick urban population growth will stimulate demand for non-ferrous metals until 2025. A large quantity of people living in rural areas are migrating to the cities, and it is expected that the creation of new products and market growth will affect operational supply chains for the production and processing of non-ferrous metals during the forecast period. The main restriction is uncertainty in supplier ability to meet market demand. In the future, lengthy delays and production downtime due to a lack of supply chain transparency will remain a key problem for metal and mineral producers.

COVID-19 impact on the non-ferrous metal market

- The COVID-19 pandemic has had a negative impact on the non-ferrous metallurgy sector globally. As a result, there have been declines in demand, supply disruptions, transportation difficulties and breaches in employment relations. In March 2020, global aluminium, copper, lead, nickel and zinc prices on the LME fell 10-20%. However, the non-ferrous metallurgy market rebounded once quarantine measures were relaxed.
- Currently, due to underestimated producer demand, the decline in non-ferrous metal supply has led to a deficit and growth in global non-ferrous metal prices.

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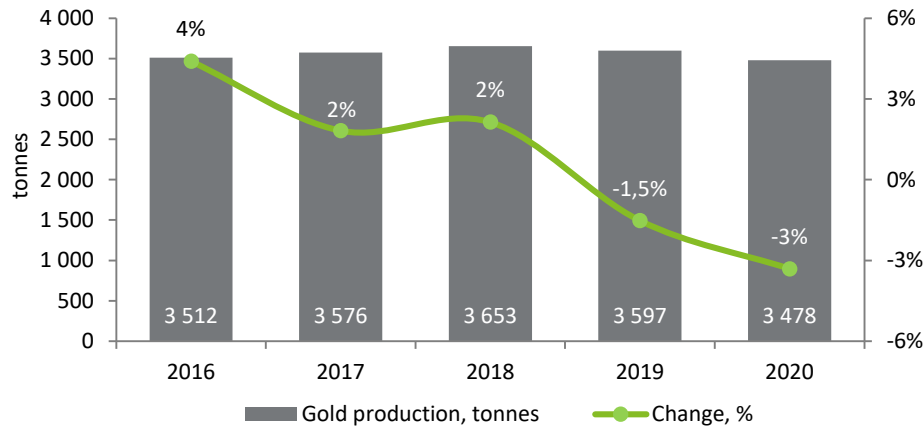
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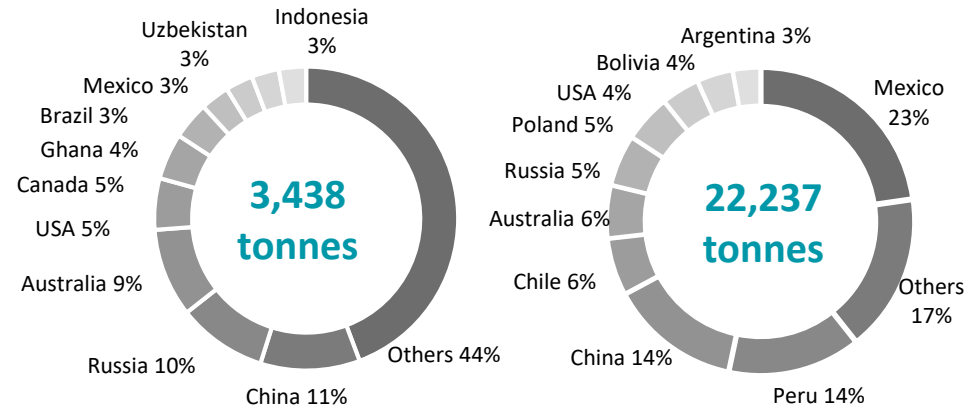
Global gold and silver production



Changes in global gold production in 2016 – 2020, tonnes



Structure of gold and silver production by country in 2020 (respectively)



Changes in global silver ore production in 2016 – 2020, tonnes



- Gold production grew greatest in 2016-2018, after which it fell by 4.8% to 3,478 tonnes in 2020. Silver ore production fell 6% in 2020 to 22,237 tonnes. The decline was mostly due to pandemic-related disruption. In 2020, mine production fell 4% compared to the same period in the previous year.
- The pandemic was also the reason for the decline in silver production, leading to the introduction of restrictions in leading silver production countries such as Peru, Mexico and China. In addition, ore reserve depletion has become a serious problem for the sector.
- The main gold producing countries in 2020 were China (11%), Russia (10%) and Australia (9%). Gold is also produced in the USA, Canada, Ghana, Brazil and others.
- The main silver producing countries in 2020 were Mexico (23%), Peru (14%) and China (14%). Silver is also produced in Chile, Australia, Russia, Poland and others.

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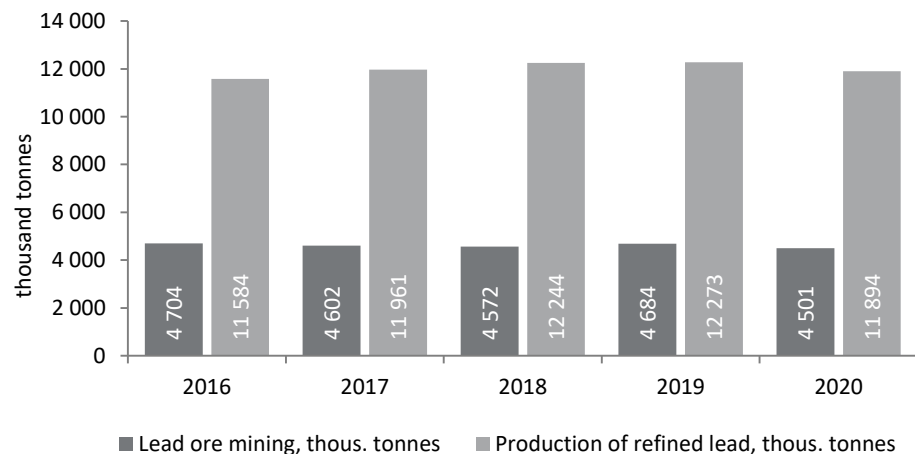
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Global lead and zinc



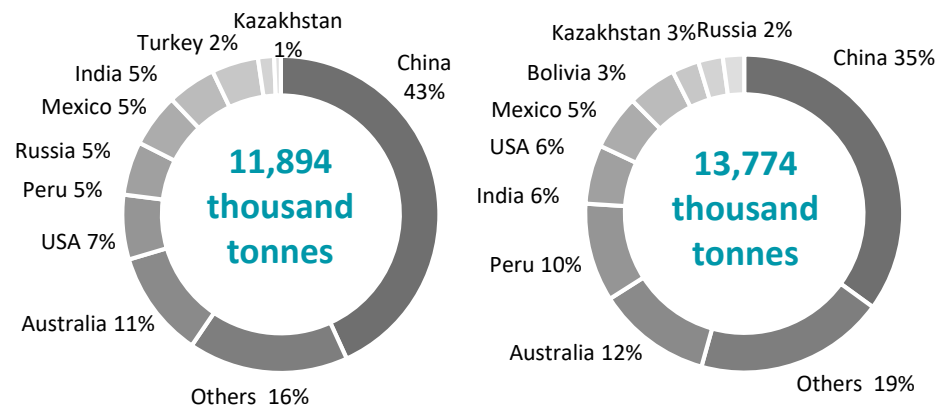
Changes in global lead production in 2016 – 2020, thousand tonnes



Changes in global zinc production in 2016 – 2020, thousand tonnes



Structure of global lead and zinc production by country in 2020 (respectively)



- Global treated lead production grew slowly in 2016-2019, after which it fell to 11,894 thousand tonnes in 2020. Lead production also fell 4% in 2019. Zinc ore production also grew until 2020 (-4%).
- According to the International Lead and Zinc Study Group, zinc production declined in 2020 due to COVID-related restrictions in the main supplier countries. Lead production also fell due to COVID-19 blocks and restrictions. Despite this, Bolivia and Peru recorded production growth of 53.6% and 9.4% respectively.
- The main lead and zinc producing countries in 2020 were China, Australia, the USA, Peru, Russia and India.
- According to production figures for 2020, the largest lead and zinc producers are the Chinese company Jiangxi Copper (322 thousand tonnes of lead) and Shenzhen Zhongjin Lingnan Nonfermet (181 thousand tonnes).

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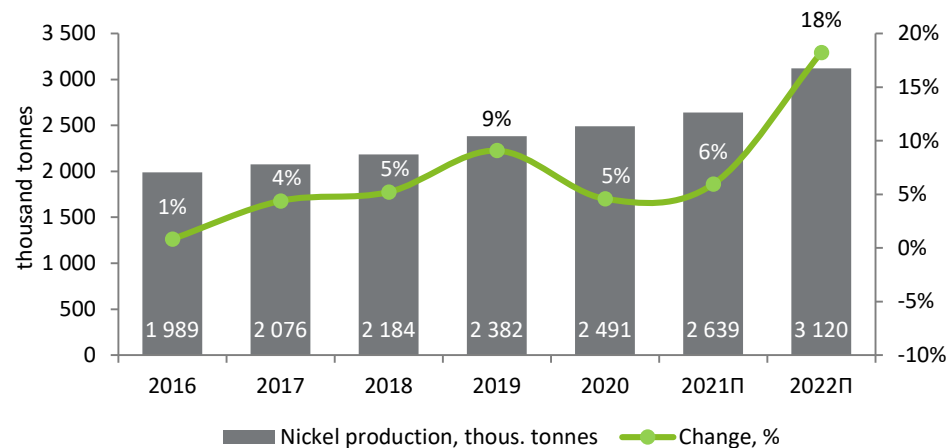
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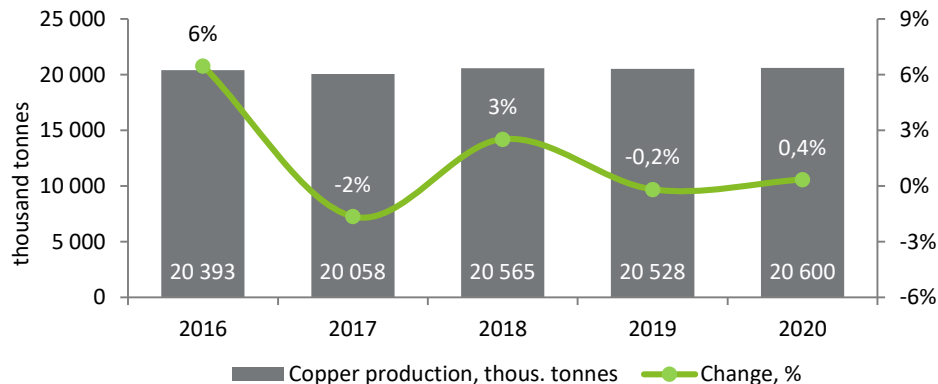
Global nickel and copper production



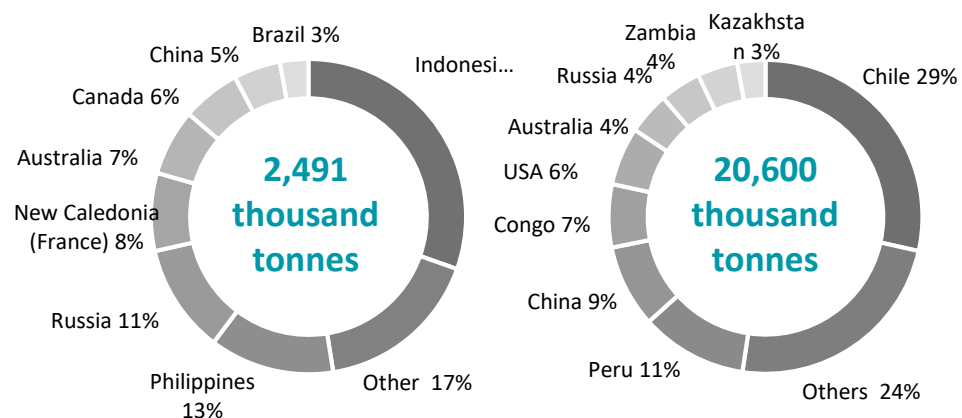
Changes in global nickel production in 2016 – 2022, thousand tonnes



Changes in global copper production in 2016 – 2020, thousand tonnes



Structure of global nickel and copper production by country in 2020 (respectively)



- Global nickel production grew between 2016 and 2020, reaching 2,491 thousand tonnes in 2020, which is 5% higher than in 2019. Copper production in 2016-2020 was somewhat volatile, falling 2% in 2017 and increasing 3% in 2018. In 2019 and 2020, the changes in copper production were minimal, amounting to 20,600 thousand tonnes in 2020.
- In 2020, the nickel market surplus was 87 thousand tonnes, or 4% of annual consumption (compared to a deficit of 28 thousand tonnes in 2019) due to record growth in nickel cast iron after the commissioning of new capacity in Indonesia. Production by the 10 leading global copper production companies fell insignificantly in 2020 by 0.2%.
- The main nickel producing countries in 2020 were Indonesia (30%), the Philippines (13%) and Russia (11%). Nickel is also produced in France, Australia, Canada, China and others.
- The main copper producing countries in 2020 were Chile (29%), Peru (11%) and China (9%). Copper is also produced in Congo, the USA, Australia, Russia, Zambia, Kazakhstan and others.

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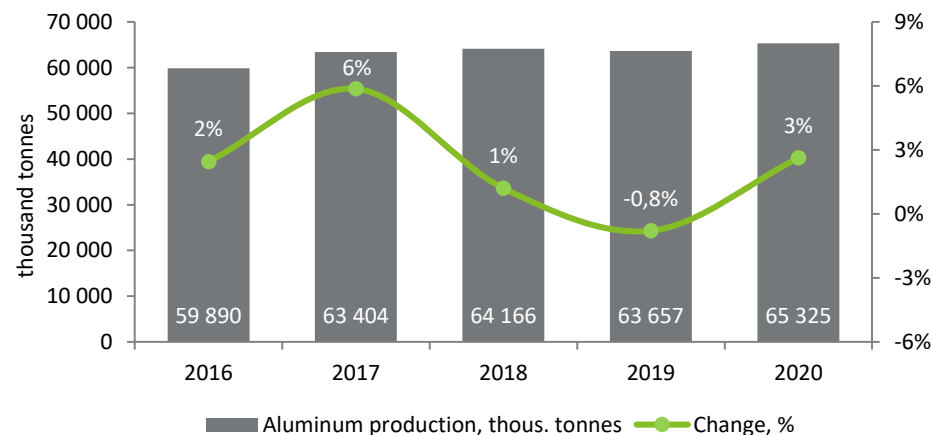
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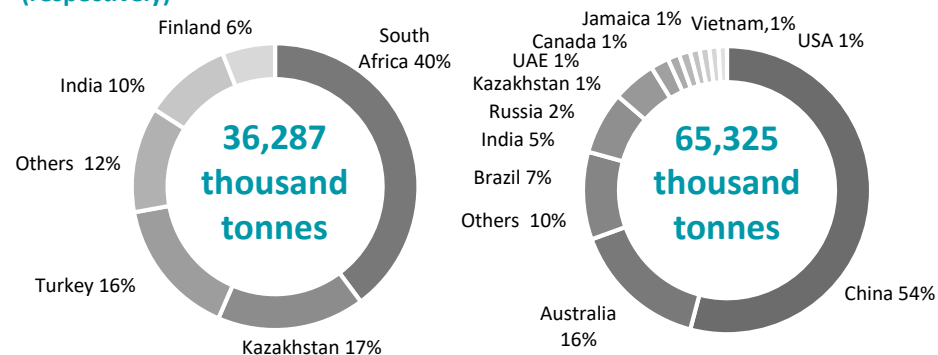
Global aluminium and chrome production



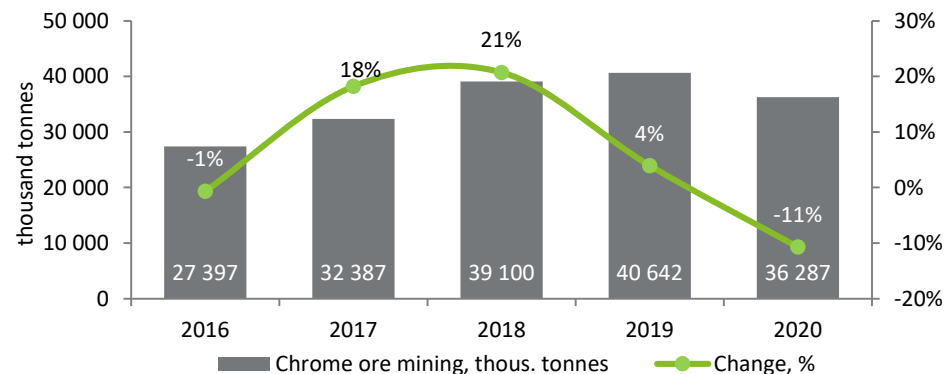
Changes in global aluminium production in 2016 – 2020, thousand tonnes



Structure of global chrome ore and aluminium production by country in 2020 (respectively)



Changes in global chrome ore production in 2016 – 2020, thousand tonnes



- At the end of 2016, chrome production costs grew in conjunction with the ferrochrome price. In 2016-2018, high prices stimulated production, which led to a structural market surplus and reduced demand. In 2019, prices fell to significantly lower than the sector base value. The main chrome ore producing countries in 2020 were South Africa (40%), Kazakhstan (17%) and Turkey (16%).
- According to the International Aluminium Institute, continued growth in aluminium demand is a reflection of growing interest in ecologically friendly solutions for transportation, construction, infrastructure, energy and food security.
- The main aluminium producing countries in 2020 were China (54%) and Australia (16%). Aluminium is also produced in Brazil, India, Russia, Kazakhstan and others.
- The largest global aluminium producer is the Chinese company Chalco (6.7 million tonnes in 2020), chrome producer – Jubilee Metals Group Plc (1.6 million tonnes per year).

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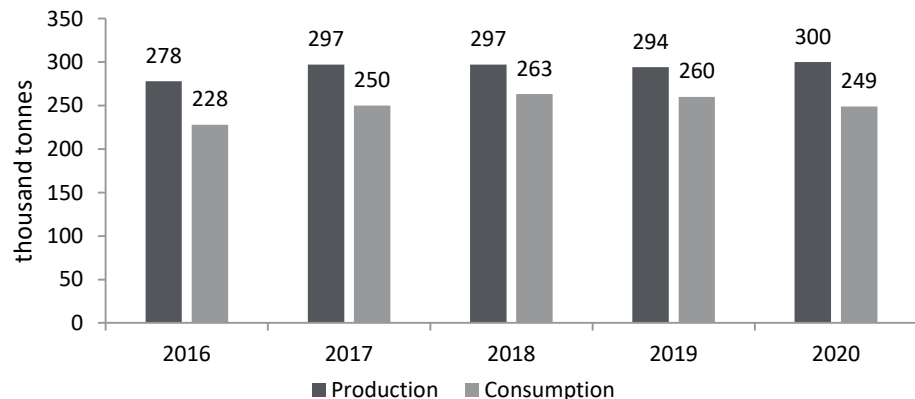


Global molybdenum and tungsten production and consumption

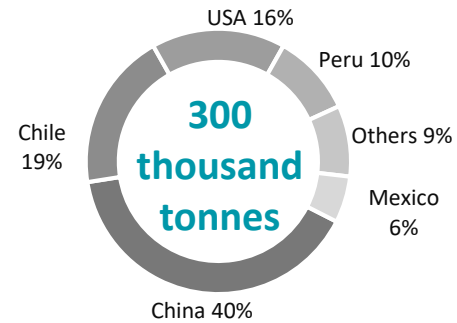


- Molybdenum production was relatively stable between 2016 and 2020, with CAGR at 1.9%. Molybdenum production increased 2% in 2020 to 300 thousand tonnes. The main producer in 2020 was China, which was responsible for 120 thousand tonnes. The next largest producers are Chile and the USA, responsible for 57 thousand tonnes and 48 thousand tonnes, respectively. Molybdenum demand in 2020 fell in line with declining steel production, a key metal consumption sector, due to surplus supply, but is currently returning to former levels.
- Global tungsten production increased slightly by 0.2% in 2020 to 84 thousand tonnes despite the COVID-19 pandemic.
- China has been the leading tungsten producer for over 10 years with an average market share of roughly 80%. Therefore, the introduction in 2017 of stricter ecological pollution controls with respect to tungsten production in China led to the closure of many enterprises and, subsequently, a global decline in production in 2017-2018. However, production increased between 2018 and 2020 with CAGR at 1.8%.

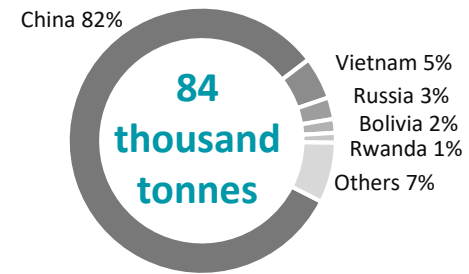
Changes and projected molybdenum consumption for 2016-2025, thousand tonnes



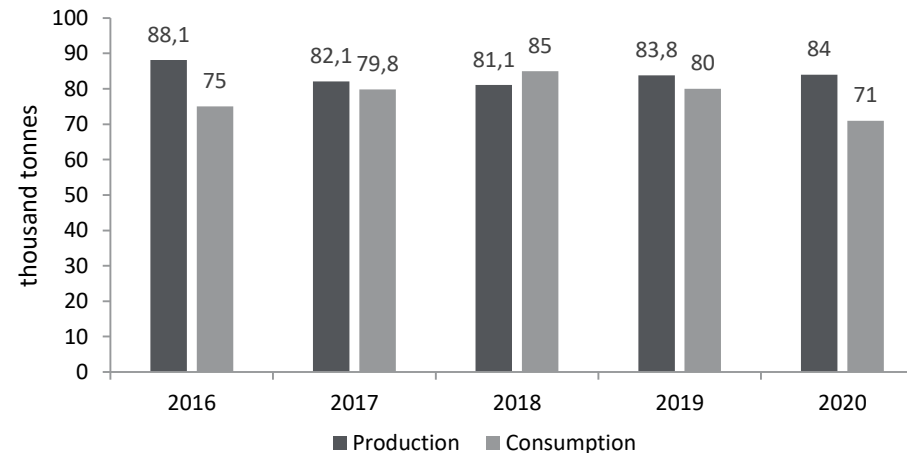
Structure of molybdenum production by country in 2020, %



Structure of tungsten production by country in 2020, %



Changes in global tungsten production and consumption in 2016-2020



Source: EMIS, Mordor Intelligence, statista, Deloitte analysis

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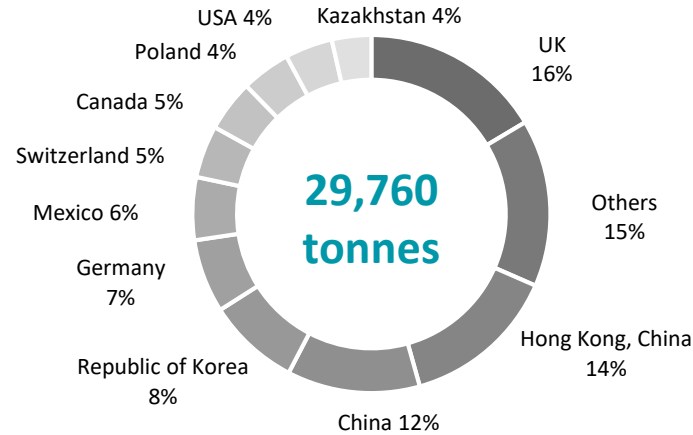
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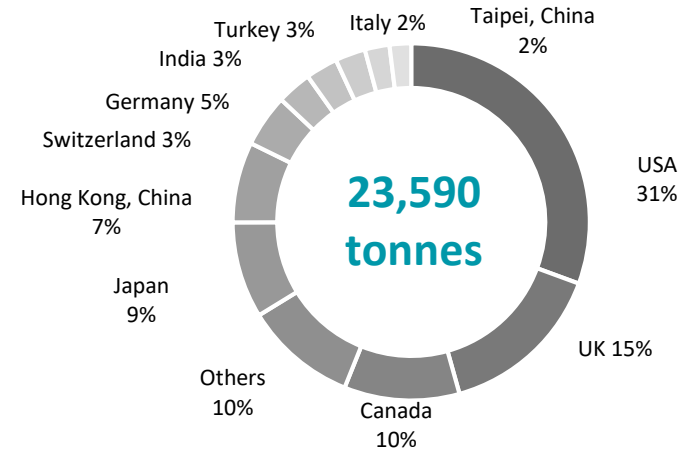
Silver and gold exports and imports



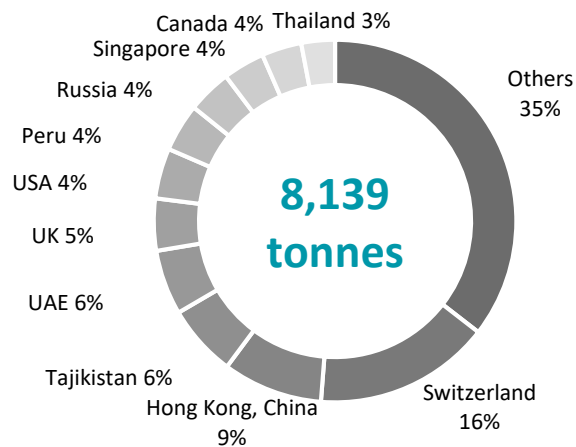
Structure of untreated silver exports by country in 2020



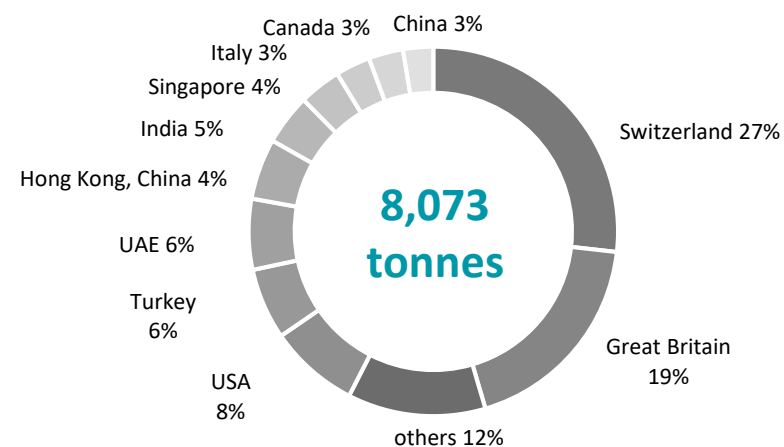
Structure of untreated silver imports by country in 2020



Structure of untreated and semi-processed gold exports by country in 2020



Structure of untreated and semi-processed gold imports by country in 2020



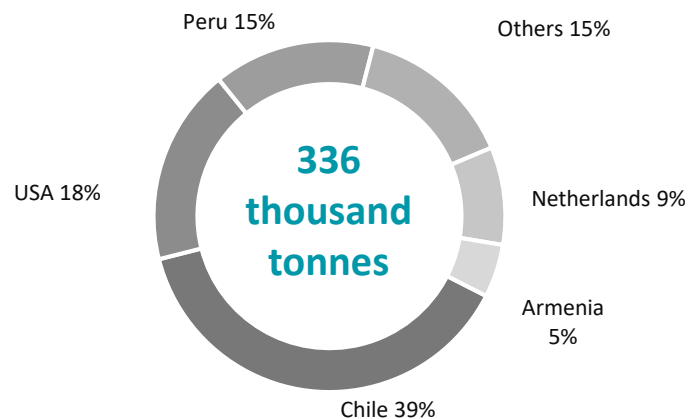
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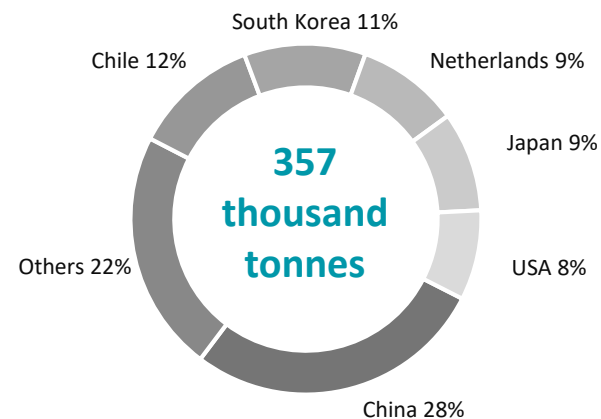
Tungsten and molybdenum exports and imports



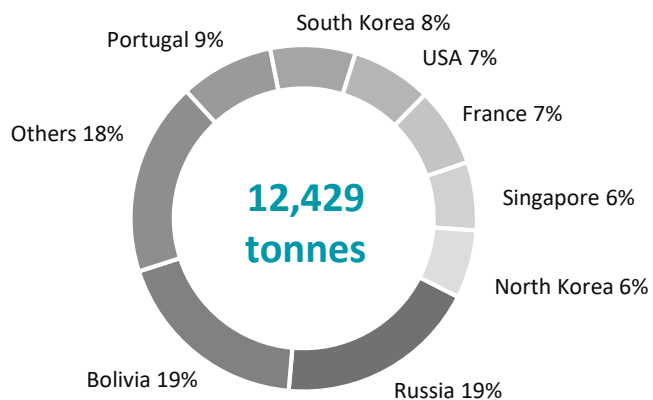
Structure of molybdenum concentrate and ore exports by country in 2020



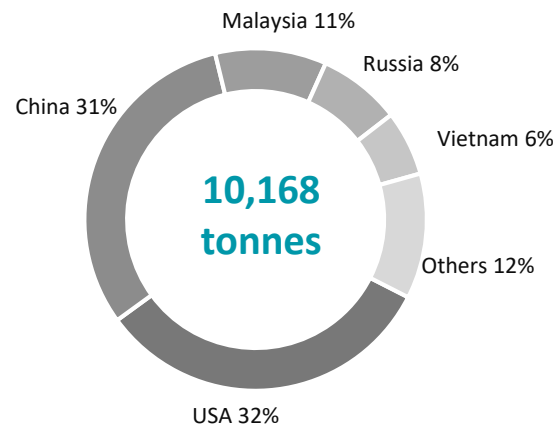
Structure of molybdenum concentrate and ore imports by country in 2020



Structure of tungsten concentrate and ore exports by country in 2020



Structure of tungsten concentrate and ore imports by country in 2020



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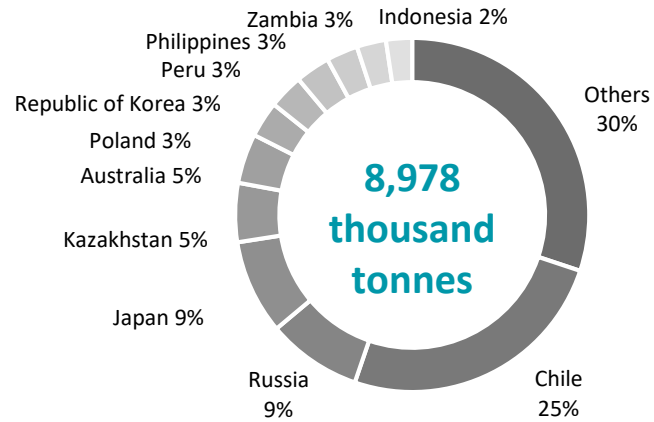
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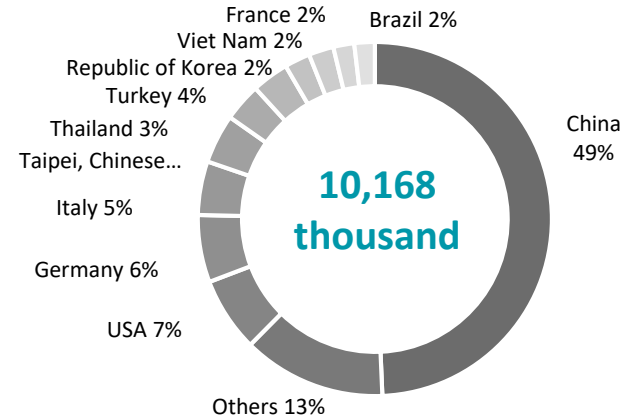
Copper and lead exports and imports



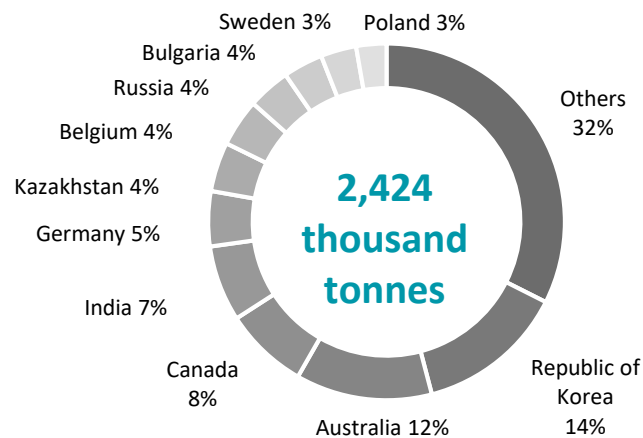
Structure of refined copper and untreated copper alloy exports by country in 2020



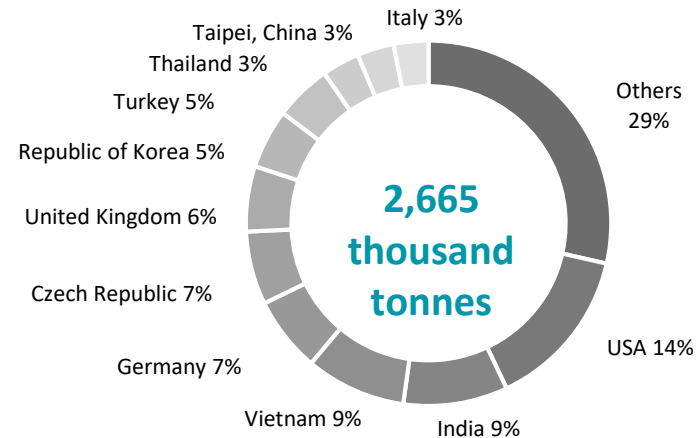
Structure of refined copper and untreated copper alloy imports by country in 2020



Structure of untreated lead exports by country in 2020



Structure of untreated lead imports by country in 2020



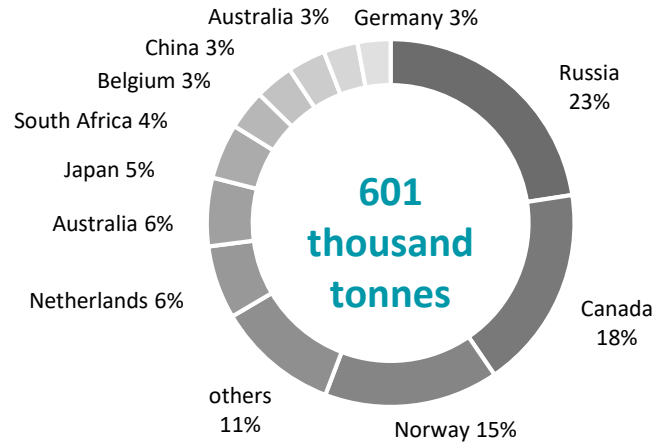
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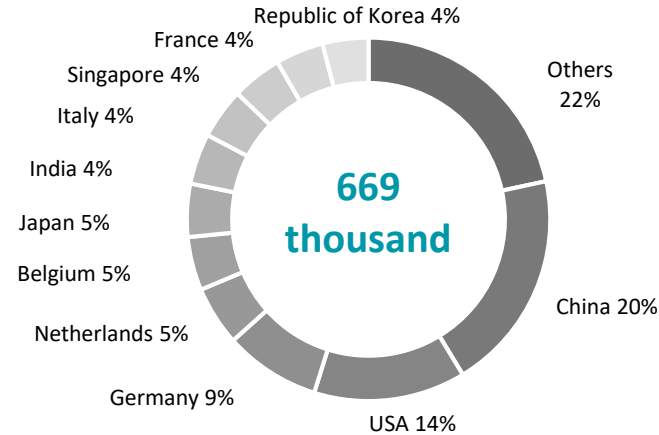
Nickel and cobalt exports and imports



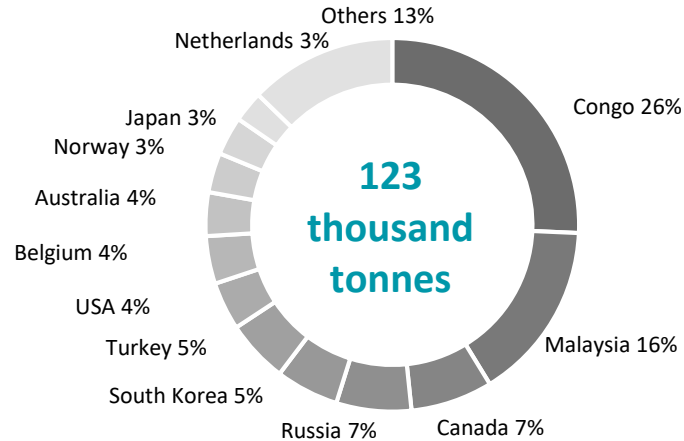
Structure of untreated nickel exports by country in 2020



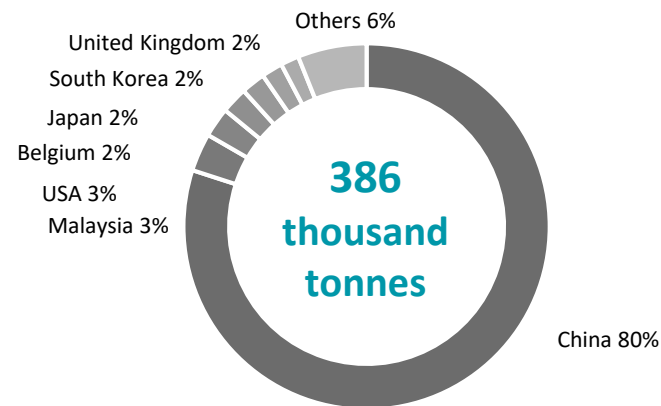
Structure of untreated nickel imports by country in 2020



Structure of cobalt exports by country in 2020



Structure of cobalt imports by country in 2020



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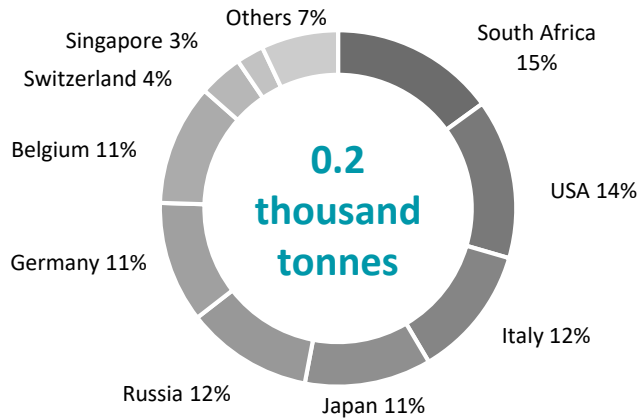
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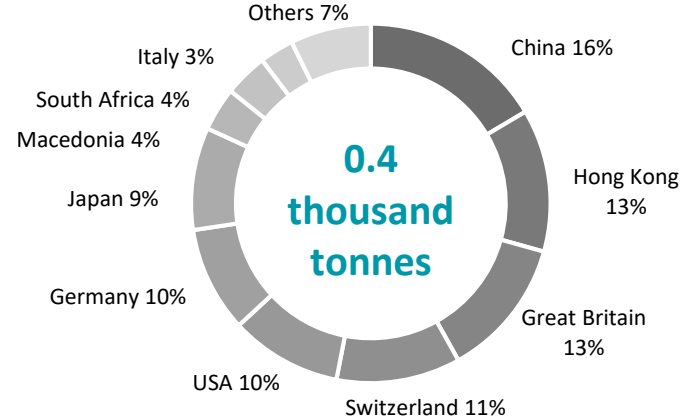
Platinum and palladium exports and imports



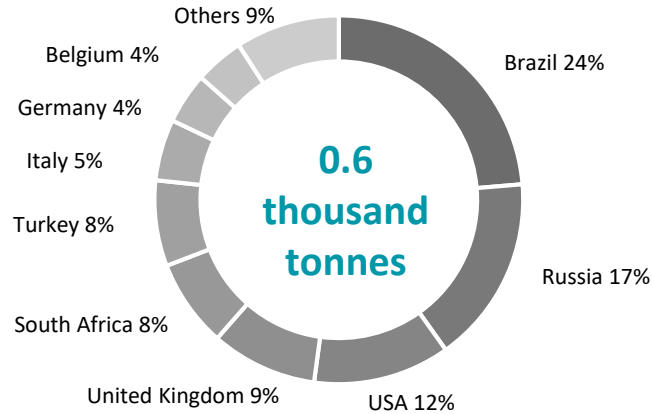
Structure of untreated platinum exports by country in 2020



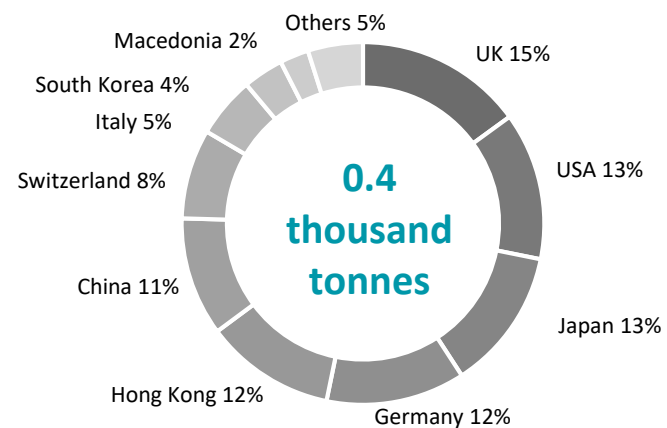
Structure of untreated platinum imports by country in 2020



Structure of untreated palladium exports by country in 2020



Structure of untreated palladium imports by country in 2020



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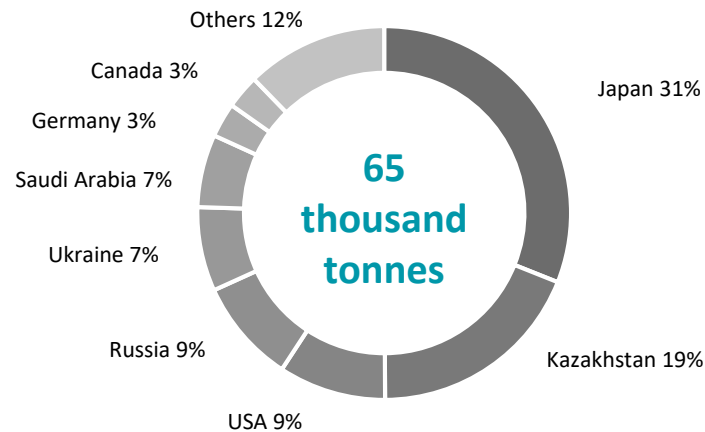
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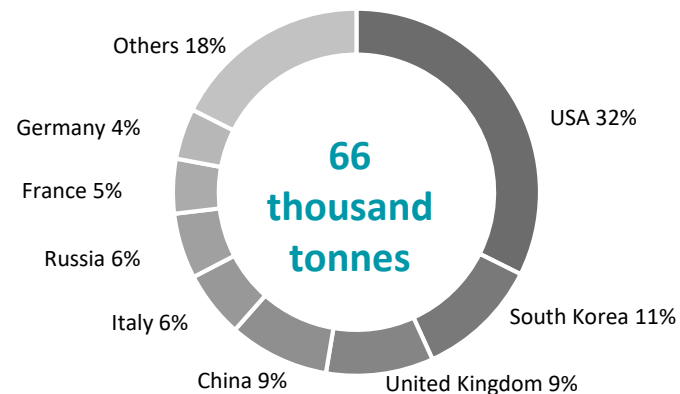
Titanium and zirconium exports and imports



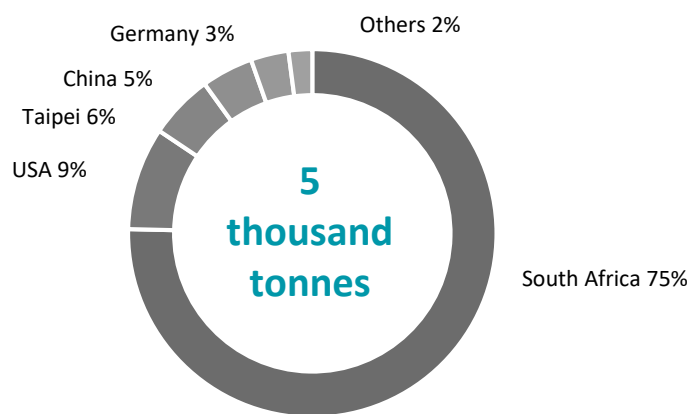
Structure of untreated titanium exports by country in 2020



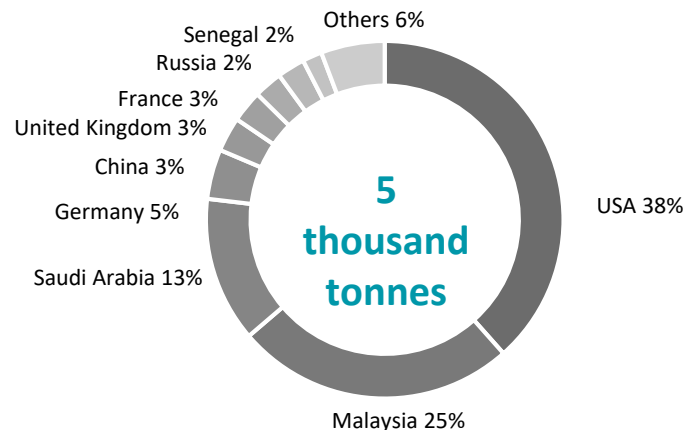
Structure of untreated titanium imports by country in 2020



Structure of untreated zirconium exports by country in 2020



Structure of untreated zirconium imports by country in 2020



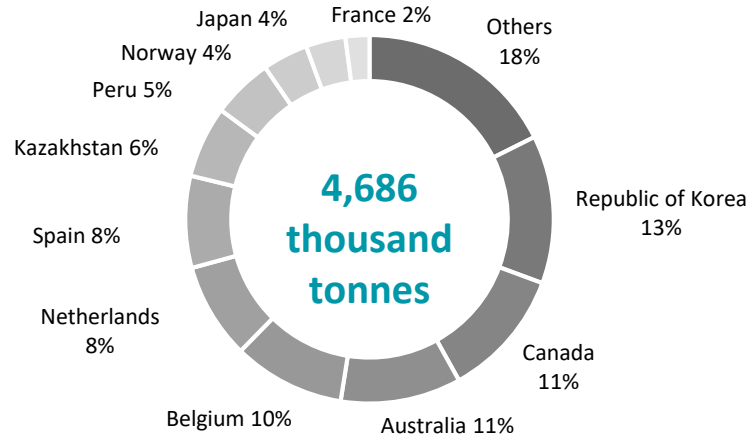
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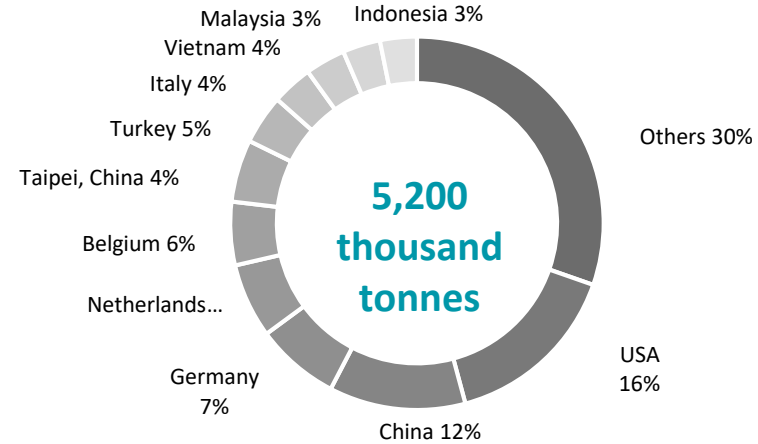
Zinc and aluminium exports and imports



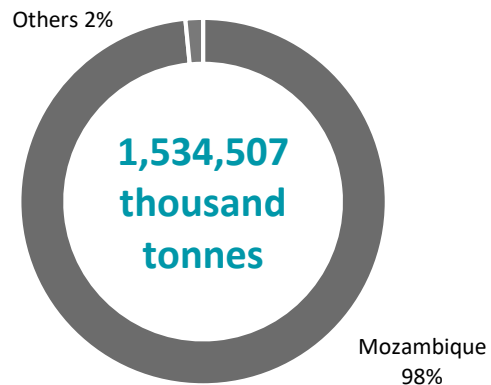
Structure of untreated zinc exports by country in 2020



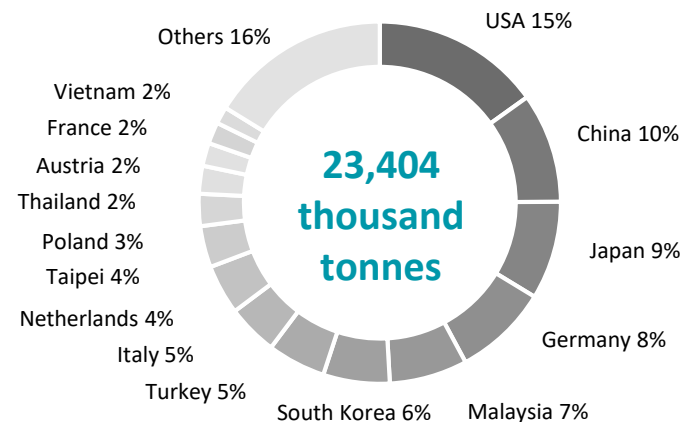
Structure of untreated zinc imports by country in 2020



Structure of untreated aluminium exports by country in 2020



Structure of untreated aluminium imports by country in 2020



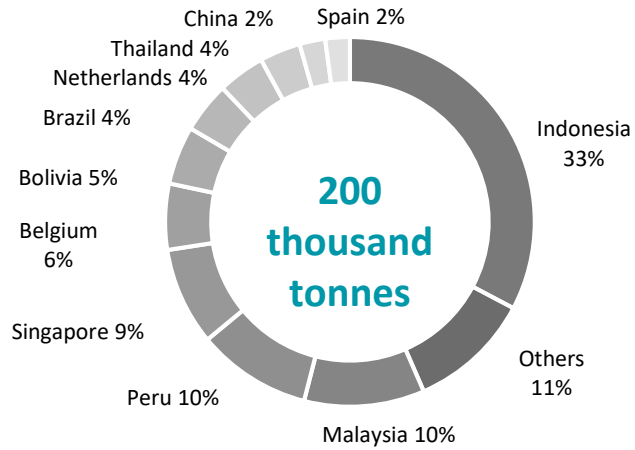
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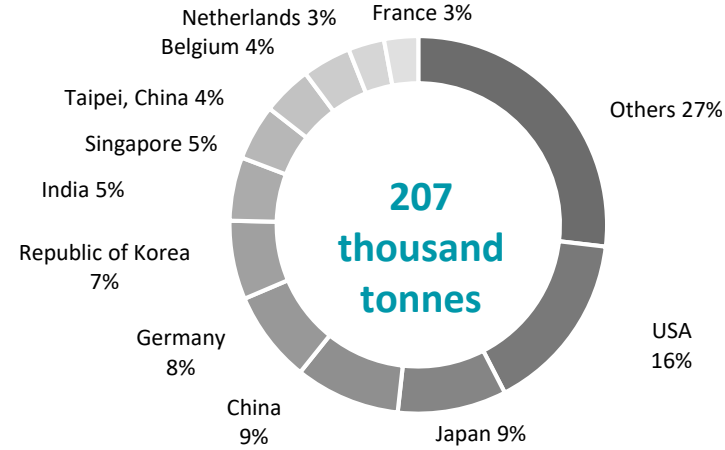
Tin and uranium exports and imports



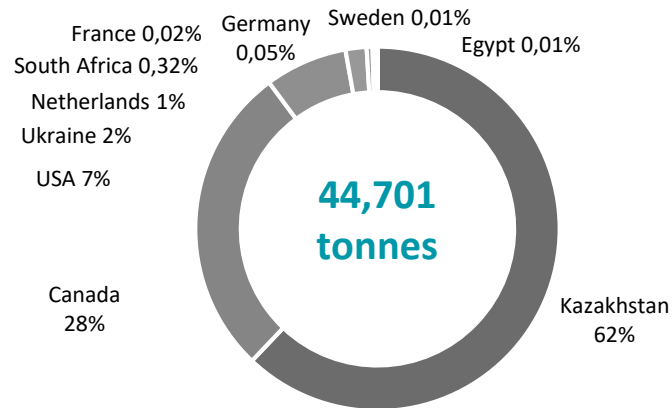
Structure of untreated tin exports by country in 2020



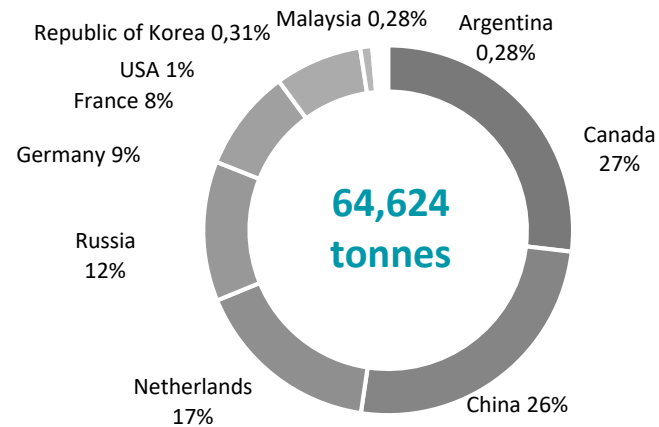
Structure of untreated tin imports by country in 2020



Structure of uranium exports by country in 2020



Structure of uranium imports by country in 2020



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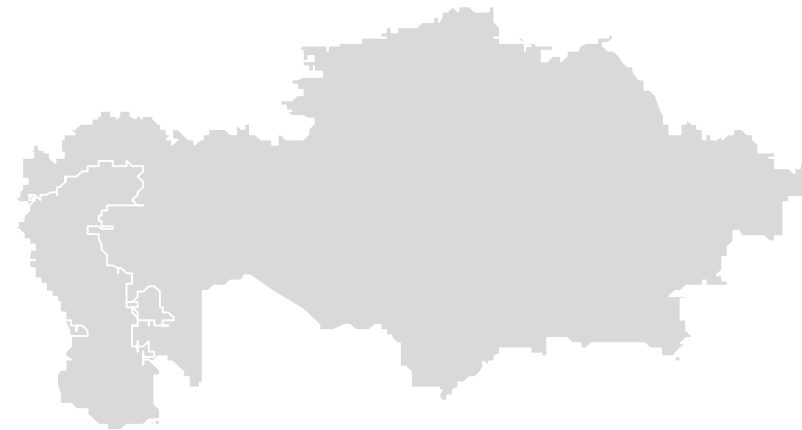


Availability of raw materials and advantageous geographical location

- Kazakhstan is a major exporter of uranium, chrome, titanium, silver, copper, lead and zinc, and is one of the richest countries in the world in terms of its reserves and the variety of those reserves. The country is 13th out of the 70 mining countries, and takes active measures to develop the non-ferrous metal sector.
- The economically active population of Kazakhstan aged over 15 reached 9.2 million in 2020, which is 48% of the total population. According to the EIU, this figure should reach 9.7 million by 2024.
- Non-ferrous metallurgy training is provided in Kazakhstan in 12 higher education institutions, while 18 training institutions offer technical and professional training.

Attractive investment climate:

- Base noble and non-ferrous metal production is a priority development sector for Kazakhstan.
- Concessions are in place to reduce corporate financial burdens, such as:
 - State Support and Business Development Programme “Business Road Map 2025”
 - Project and lease financing within the framework of the SIIDP
 - Sector support within the framework of the “Saving Simple Things” programme
 - Sector support within the framework of the Kazakhstan Entrepreneurial Code
 - Other state support measures, such as subsidised borrowing to purchase agricultural machinery and equipment, and others



Non-ferrous metallurgy sector priorities:

- the requirement to transition to a product with more advanced processing, new types of export product on account of the implementation and development of new innovative technology and the development of research;
- involvement in developing new fields, off-balance ore and production-induced mineral formations, which will expand the raw materials base and increase base ferrous and non-ferrous metallurgy production due to the introduction of new technology and greater research;
- the requirement to develop joint projects with global players in priority areas such as the extraction, selection and production of pure rare and rare-earth metals and their compounds, with further development of semi-conductor, electronic, instrument-making and other progressive science and technology sectors.
- promotion of the development of metal-consuming sectors, including in the form of state orders, will help develop advanced mining and metallurgy product.

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CAGR	Compound Annual Growth Rate
CIT	corporate income tax
EAEU	Eurasian Economic Union
EIU	The Economist Intelligence Unit
EU	European Union
Gcal	gigacalorie
JSC	joint stock company
Kazakhstan	Republic of Kazakhstan
KWH	kilowatt hour
LBMA	London Bullion Market Association
LLC	limited liability company
LLP	limited liability partnership
LME	London Metal Exchange
n/a	no data/not applicable
telecom.	telecommunications
VAT	value added tax
Q	quarter
USD	US Dollar



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