

UKRAINE: Mining Investment Opportunities

Critical Raw Materials



Ukrainian
Geological
Survey



Ministry of Environmental
Protection and Natural
Resources of Ukraine









Ukraine has strong geology and other factors to become a key CRM supplier for global industry

- The sector of critical raw materials for battery and modern technology manufacturing is one of the fast-growing sectors, where Ukraine can integrate with international and regional value chains, diversifying and de-risking global demand
- Ukraine holds 22 of the 50 strategic materials identified by the US as critical, and 25 out of the 34 recognized by the EU as critically important. Particularly, Ukraine holds very competitive positions in five key ones: graphite, lithium, titanium, beryllium and uranium
- To facilitate large-scale CRM development, Ukraine streamlines regulatory approvals, ensures necessary infrastructure support, and secures PPAs for energy supply
- The Investment Atlas contains mining business opportunities with deposits of CRM for their licensing through e-auctions or PSA tenders

CRITICAL RAW MATERIALS IN UKRAINE: SUMMARY OF OPPORTUNITIES

Mineral / material and its status	Why Ukraine is competitive?	Potential opportunities for Ukraine
<p>1. Graphite (batteries value chain)</p> 	<ul style="list-style-type: none"> Global undersupply is expected due to fast demand growth over next decade. Most of graphite currently supplied by China – need to diversify & de-risk supply Ukraine holds 6% of global reserves (#1 in EU) and is estimated to be in the middle of the global cost curve Critical material status: US, EU, UK, CA, big push to localize graphite processing 	<ul style="list-style-type: none"> Natural graphite mining and concentrate production Spherical graphite production (material used for anode) Long-term: anode / battery cell production
<p>2. Lithium (batteries value chain)</p> 	<ul style="list-style-type: none"> Global undersupply is expected due to massive demand growth over next decade Ukraine holds 1% of global reserves (#1 in EU), and is estimated to be in the middle of the global cost curve (very competitive in EU) Critical material status: US, EU, UK, CA, big push to localize lithium processing & recycling 	<ul style="list-style-type: none"> Lithium carbonate production for cathode material Lithium hydroxide production (requires extra investment) Long-term: cathode / battery cell production
<p>3. Titanium (titanium metal only)</p> 	<ul style="list-style-type: none"> Titanium dioxide / pigment: necessity to substitute Chinese supply to chemical industry Titanium metal: necessity to substitute Russian and Chinese supply to aerospace and defense sectors Ukraine holds the largest titanium reserves in Europe, ranking in the top-5 for titanium rutile reserves, capable of meeting US and EU metallic titanium demand for 25 years 	<ul style="list-style-type: none"> Ukraine has 7% of global production, and holds processing assets in pigment and sponge manufacturing which need to be modernised
<p>4-5. Beryllium, Uranium (nuclear fuel & defense)</p>  <p>(U) (Be)</p>	<ul style="list-style-type: none"> Importance of nuclear power is increasing globally, while there is significant reliance on Russian and China supply, which control 55% of the world's uranium enrichment capacity. The EU and the US produce almost no uranium ore, and have very little beryl that can be economically hand sorted Ukraine has the largest reserves of uranium in Europe, being among top-10 globally (2%), and their large part is estimated to be in the middle of the global cost curve Ukraine holds 13,9 Kt of reserves BeO, capable of satisfying 40 years of the world's production 	<ul style="list-style-type: none"> Ukraine extracts uranium in three underground mines and produces concentrate, supplying from 20 to 40% of its own needs for nuclear power plants Ukraine has the potential to integrate into the global nuclear fuel supply chain by expanding uranium mining and producing nuclear fuel elements

-  Included into USGS 2022 Critical Minerals List
-  Included into EU 2023 Critical Raw Materials Act
-  Included into UK 2021 Critical Minerals List
-  Included into Canada's 2024 Critical Minerals List



INVESTMENT GUIDE UKRAINE

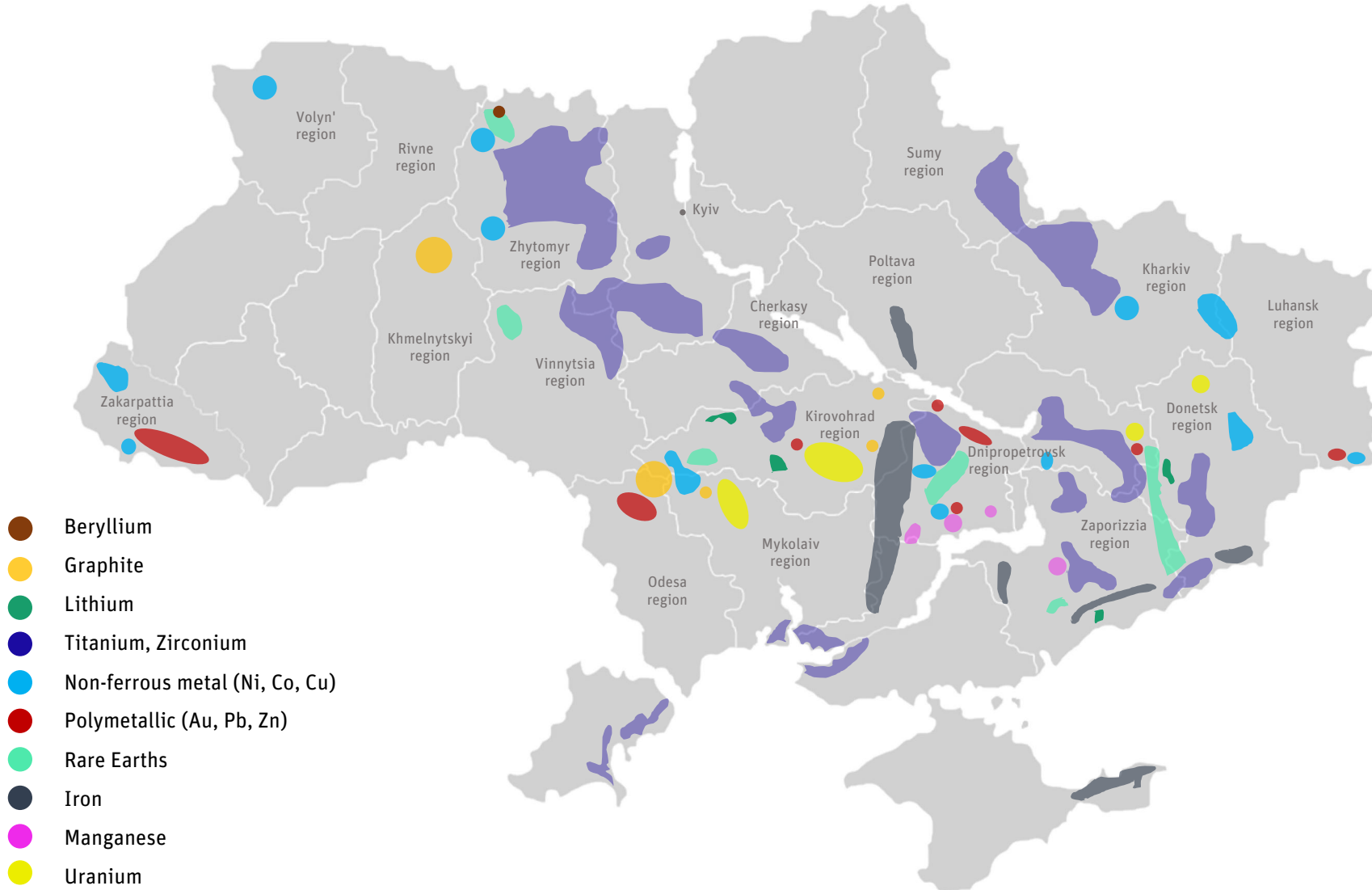
Ukraine proposes a wide range of mining investment opportunities

100 projects of mainly ten critical raw materials* could be developed to bridge the current mining gap in Europe

	Greenfield	Brownfield
Licensed	25	9
Unlicensed	50+	11
Dobra hard-rock lithium deposit (4220 acres) – 50 year license available	Stremyhorodske is one of the largest titanium deposits globally – 50 year license available	Novopoltavske is the large phosphate and rare earth deposit globally – \$300 mln investment needed

* Main mineral: Ilmenite, Rutile, Zircon, Lithium, Graphite, Nickel, Beryllium, Rare Earth Elements, Polymetallic, Zink

Map of Critical Raw Materials of Ukraine



UA reserves*			
C	18.6 Mt	6% #5	4%
Li		1-2% #1(EU)	
Ti		1% #9	7%
Be	13.9 Kt	N/A N/A	
U		2-4% #1(EU)	2%
Mn	140 Mt	7% #4	1.6%
Fe	6.5 Bt	3% #8	1.5%

X% Estimated reserves (A₁ B₁ C₁ C₂)
 # Reserves global ranking
X% % global reserves
 X% % global production

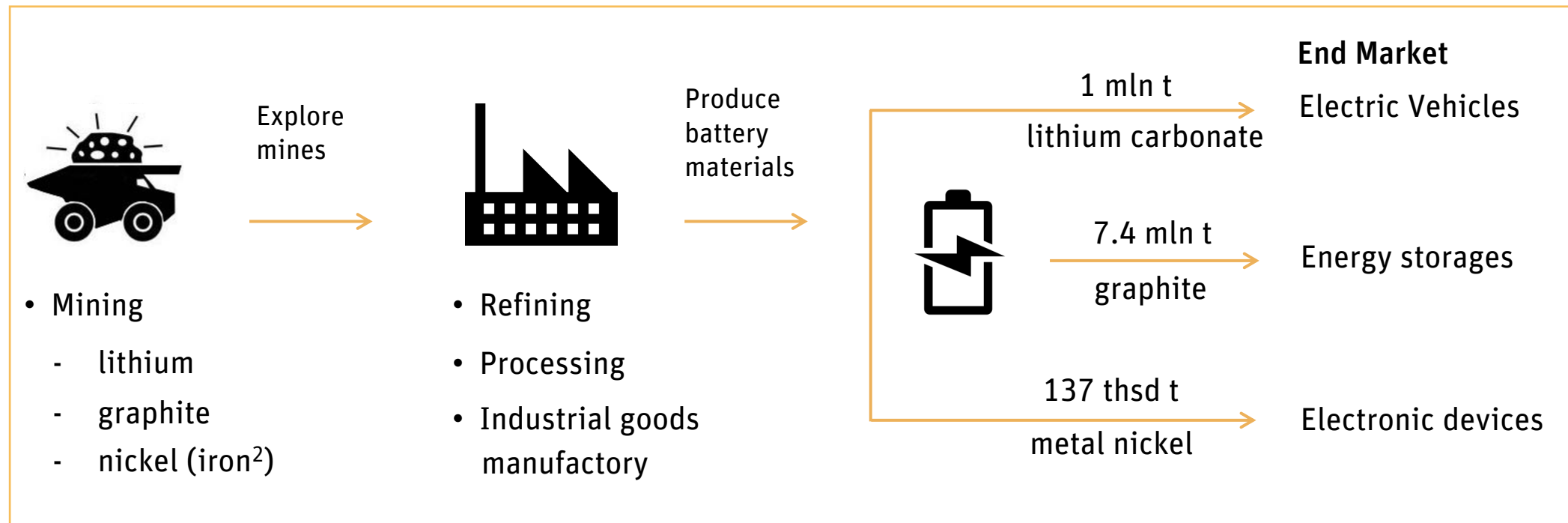
* Information about the size of reserves of Li, Ti, U is classified in Ukraine



Lithium

- Ukraine possesses one of the largest lithium deposits in Europe
- There are three hard-rock lithium deposits and one promising area, as well as a number of occurrences for pioneering exploration
- As of today lithium is not extracted in Ukraine. One lithium deposit is being operated under a license
- Lithium is an ultralight metal used for manufacturing of Li-batteries for energy storages, electric vehicles and devices, ceramics and glass

The discovered reserves of lithium and graphite will be enough to produce cathode and anode materials for Li-batteries with total capacity of 1000 GW/h to support the manufacture of about 20 millions of Electric Vehicles¹



¹ Capacity 60 kW/h

² LFP, graphite share – 29%, lithium – 13%

PSA

DOBRA license



- lithium ores, tantalum, niobium, rubidium, cesium, beryllium, tin, gold
- E&P license up to 50 years
- Kirovohrad region
- 1707 ha
- lithium oxide grade: ~1.38
- measured resources – "for official use only"

Open for nomination

KRUTA BALKA license



- lithium ores, tantalum, niobium, rubidium, cesium-containing
- E&P license up to 20 years
- Zaporizhzhia region
- 150 ha
- lithium oxide grade: ~0.86
- measured resources – "for official use only"

Is being prepared for e-auction

SHEVCHENKIVSKE license



- lithium ores, tantalum, niobium, beryllium
- production license up to 20 years
- Donetsk region
- 40 ha
- lithium oxide grade: ~1.1
- proved reserves – "for official use only"

Is being prepared for e-auction

Lithium ores spots



LITHIUM: RESERVES IN UKRAINE ARE SIZABLE IN EUROPE, BUT NOT YET FULLY EXPLORED



License owned by private players

	Grade % Li_2O	Composition	Reserves Mt	License holder	Status	
1	Polokhivske	1.21%	Petalite 85%, spodumene 15%	N/A ¹	UkrLithiumMining (ULM)	Pre-feasibility (\$330 m CAPEX need)

- **1.5Mtpa lithium ore mine** with 15-year life of mine
- **Concentrate plant** with ~ **300 ktpa** petalite concentrate production capacity
- Laboratory test work has generated **battery grade lithium carbonate** from ULM's petalite concentrate
- PEA level work on downstream converter completed, now advancing scoping study based on latest project parameters

License owned by government

	Grade % Li_2O	Composition	Reserves Mt	License holder	Status	
2	Dobra	1.38%	Spodumene-petalite	N/A ¹	State of Ukraine (ready for PSA)	Exploration
3	Kruta Balka <i>(in temporarily occupied territory)</i>	0.86%	Combination of minerals	N/A ¹	State of Ukraine (need to be prepared for auction)	Exploration
4	Shevchenkivske <i>(in temporarily occupied territory)</i>	1.1%	Spodumene - petalite	N/A ¹	State of Ukraine (need to be prepared for auction)	Exploration

1. Classified information



Graphite

- Ukraine is one of the world's five leading countries in terms of graphite reserves, which are about 343 million tons of ore with a natural graphite grade of 4–10%
- There are six known deposits, one of which produces annually 3–15 thousand of graphite concentrate, and is operated by the Australian public company Volt Resources
- The Ukrainian BGV Group and the Turkish ONUR Group are operators of 3 licenses. Several promising deposits and ore occurrences are available for further purchasing

**BURTYNSKE
(Horodniavska) license**



- graphite
- production license
- Khmelnytskyi region
- 105 ha
- proved reserves of graphite ores / graphite oxide (thousand tons):
cat. B – 28165 / 1736
C₁ – 85225 / 4848,
C₂ – 16586 / 898

Sold for \$1.6 million
March, 2021

**BURTYNSKE
(Maidanska) license**



- graphite
- E&P license
up to 20 years
- Khmelnytskyi region
- 310.4 ha
- proved reserves of graphite ores /graphite (thousand tons)
cat. C₂ – 25.535 / 1.4168
- grade of graphite – 5.12%

Open for nomination

PETRIVSKE (Vlasivska) license



- graphite
- E&P license up to 20 years
- Kirovohrad region
- 16.6 ha
- proved reserves of graphite ores /graphite (million tons) cat. A+B – 7.165 / 0.515
- grade of graphite – 7.19%

Open for nomination

BOHOSLOVSKYI, VOIEVODIVSKYI license



- graphite
- E&P license up to 20 years
- Mykolaiv region
- 2040 ha
- measured resources of graphite ores /graphite (thousand tons) cat. P₂ – 7820.5 / 313.8, cat. P₃ – 6616.2 / 175
- grade of graphite – up to 9.54%

Open for nomination

KODATSKYI license



- graphite
- E&P license up to 20 years
- Kirovohrad region
- 56.97 ha
- measured resources of graphite ores (million tons) cat. P₁ – 280.5
- grade of graphite – 4.17%

Open for nomination

Graphite ores spots



- 1. Zavallivske deposit (Khutir Andriivka, Promizhna, Pivdena Smuha, Pravoberezhna blocks)
- 2. Zavallivske deposit (South-East block)
- 3. Zavallivske deposit (Zarichna block)
- 4. Petrivske deposit (Vlasivska, Bili Horby blocks)
- 5. Burtynske deposit (Khmelivska block)
- 6. Burtynske deposit (Horodniavska block)
- 7. Burtynske deposit (Maidanska block)
- 8. Burtynske deposit (Lisova block)

- Licensed block
- Prepared for e-auction
- Is being prepared for e-auction
- Sold

GRAPHITE: THERE ARE SEVERAL PROJECTS AND LICENSED DEPOSITS IN UKRAINE

Illustrative locations and examples of potential projects



1 Balakhivske graphite project
Reserves: 44Mt of graphite ore with 5.4 % carbon grade
Description:
• construction of mine with a 24-year lifetime in the licensed area
• construction of up to 50ktpa graphite concentrate production plant (stage 1) & 19ktpa SPG (stage 2)
Project type: Greenfield construction
Investment: \$87M (stage 1)+\$316M (stage 2)
Operator: BGV Group (Ukraine)
Current status: Feasibility study

2 Zavalivskiy graphite project (current mining/refining capacity 7 ktpa)
Reserves: 22.9Mt graphite ore with 6.8% carbon grade
Description:
• construction/extension of mine
• modernizing processing facility up to 60 ktpa and construction of CSPG plan with 50 ktpa
Project type: Brownfield construction
Investment: \$110M (stage 1-2) + \$120M (stage 2)
Operator: Volt Resources (70%, Australia)
Current status: Pre-Feasibility study

3 Zarichna graphite license (part of Zavalivskiy deposit)
Reserves: 33 Mt graphite ore with 5.76% carbon grade
Description: greenfield graphite mining project at concept level
Operator: BGV Group (Ukraine)

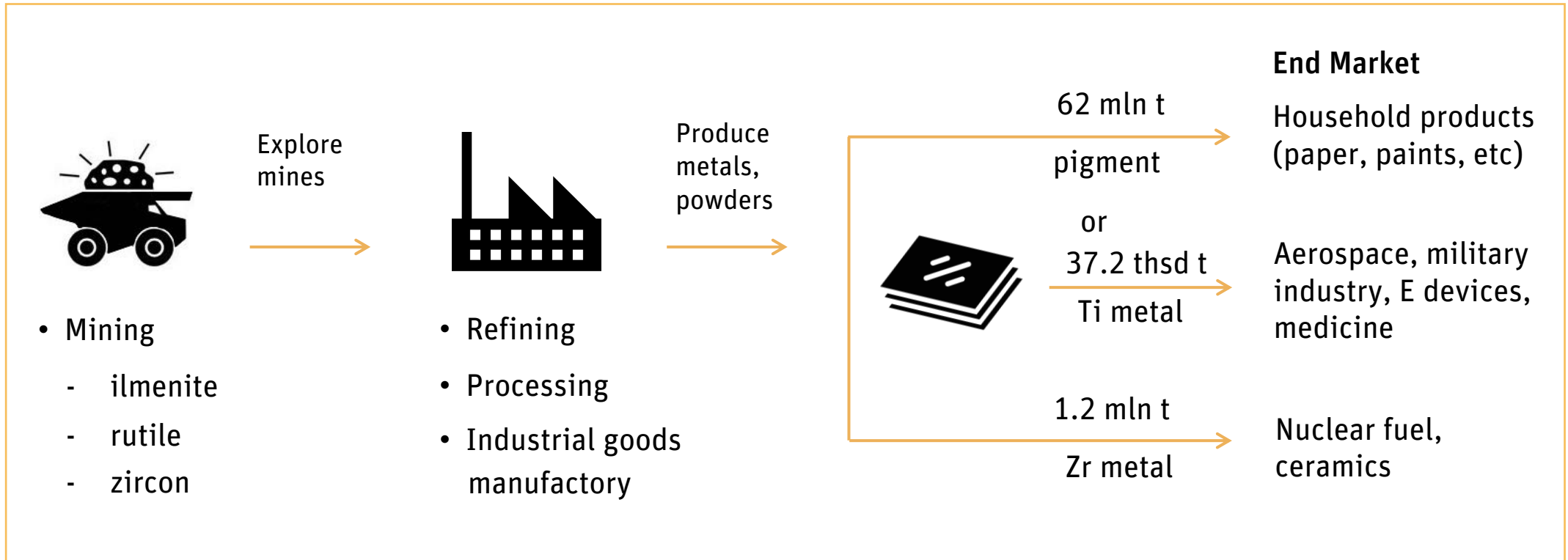
4 Horodniavska deposit
Reserves: 130 Mt graphite ore
Description: greenfield graphite mining project at concept level
Operator: Onur Group (Turkey)



Titanium

- Ukraine holds 1% of global titanium reserves, incl. top 10 for ilmenite and top 5 for rutile reserves, producing 7% of global production, and remaining processing assets in pigment and sponge manufacturing
- 28 sand and hard-rock deposits have been discovered. Only heavy mineral sand deposits are being developed, which comprise 35% of total reserves, the remainder is contained in hard-rock. Zirconium is often a coproduct
- Most titanium metal is used in aerospace applications, and the remainder is used in armor, chemical processing, marine hardware, and medical implants. The leading uses of TiO_2 pigment are paints, plastics, and paper

The discovered reserves of Ukrainian titanium are equal to 15 years of production of titanium globally



PSA

NOSACHIVSKE license



- titanium ores
- E&P license up to 50 years
- Cherkasy region
- 180 ha
- titanium ores reserves – "for official use only"

Open for nomination

PSA

STREMYHORODSKE license



- titanium ores
- E&P license up to 50 years
- Zhytomyr region
- 225 ha
- titanium ores reserves – "for official use only"

Open for nomination

TARASIVSKE license



- titanium ores
- E&P license up to 20 years
- Kyiv region
- 1019 ha
- titanium ores reserves – "for official use only"

Open for nomination

SELYSHCHANSKA license



- titanium ores
- exploration license
- Zhytomyr region
- 1860 ha
- grade of TiO_2 –
50–70 kg/m^3

Sold for \$1.8 million
April, 2021

MALYSHIVSKE (North-Western – 2) license



- titanium ores, zirconium,
disten, sillimanite, staurolite
- E&P license up to 20 years
- Dnipropetrovsk region, Kirovohrad region
- 3310 ha
- indicated resources (thousand tons):
disten + sillimanite – 1408,
staurolite – 568,
rutile-ilmenite sands – "for official use only"

Open for nomination

YURIIVSKO-KOZIIVSKYI license



- titanium ores, zirconium ores
- E&P license up to 20 years
- Zhytomyr region
- 2350 ha
- conditional ilmenite:
 P_1 – 2.7 million tons, 163.02 kg/m^3
 P_3 – 2.8 million tons, 65.53 kg/m^3

Open for nomination

BILOVODSKA license



- titanium ores, zirconium
- E&P license up to 20 years
- Sumy region
- 62 ha
- inferred resources of titanium-zirconium ores (thousand tons): zircon – 11, rutile – 15

Open for nomination

KORCHAKIV license



- titanium ores, zirconium
- E&P license up to 20 years
- Sumy region
- 750 ha
- inferred resources of titanium-zirconium ores (thousand tons): zirconium – 115, rutile – 137

Open for nomination

KHRAPIVSCHYNA license



- titanium ores, zirconium
- E&P license up to 20 years
- Sumy region
- 170 ha
- inferred resources of titanium-zirconium ores (thousand tons): zirconium – 59, rutile – 75

Open for nomination

HAYDARIV license



- titanium ores, zirconium
- E&P license up to 20 years
- Kharkiv region
- 971 ha
- inferred resources of titanium-zirconium ores (thousand tons): ilmenite – 1759, zirconium – 402

Open for nomination




Titanium ores spots



1. Balka Kruta technogenic deposit
2. Birzulivske deposit
3. Valky-Gatskivske deposit
4. Vovchanske deposit
5. Krasnorichenske deposit
6. Livoberezhne deposit
7. Likarivske deposit
8. Malyshevske deposit (sections Motronivsko-Annivska, North-West)
9. Malyshevske deposit (sections West, Central, East)
10. Mezhyrichne deposit (sections Isakivska, Pivdenna)
11. Mezhyrichne deposit (sections Bukivska, Emilivska, Osynova, Serednya, Yurska)
12. Nosachivske deposit
13. Paromivske deposit
14. Stremyhorodske deposit
15. Tarasivske deposit
16. Trostyanets deposit
17. Yurivska block
18. Avramivska block
19. Pidlisna block
20. Selyshchanska block
21. Verkhnie-Irshynske deposit
22. Davydkivske deposit (South section)
23. Zlobytske deposit
24. Irshanske deposit
25. Lemnenske deposit
26. Lemnenske deposit (West sections)
27. Lemnenske deposit (East section)
28. Torchynske deposit
29. Ushytske deposit
30. Ushomyrske deposit
31. Irshynske deposit (Shershniivska, Turchynetska blocks)


TITANIUM: UKRAINE HAS MINERAL RESOURCES, UP- AND MIDSTREAM ASSETS IN PIGMENT & METAL MANUFACTURING SUB-CHAINS

NON- EXHAUSTIVE


 Mining & Beneficiation
  Pigment production
  Sponge production




Mining & Beneficiation

-  ___Mt¹ ilmenite & rutile reserves in development, incl.:
- A** Irshanske (chloride ilmenite, 57%+ TiO₂ grade) and Vylnohirske (sulfate ilmenite 63% TiO₂ grade) mines (UMCC) ~4 Mt titanium minerals + 96 Kt zircon
 - B** Byrzulivske and Likarivske mines (Velta)
 - C** Valky-Gatskivske mine (GDF)

Pigment production

-  Capacity of 45 ktpa TiO₂ (Sumykhimprom)
Capacity of 80 ktpa TiO₂ (Krym Titan)

Sponge production

-  Capacity at 12 ktpa Ti-Metal (ZTMK), however **insufficient modernization investments** result in a cost disadvantage, leaving production susceptible to global price fluctuations and not feasible during market lows

Research and development

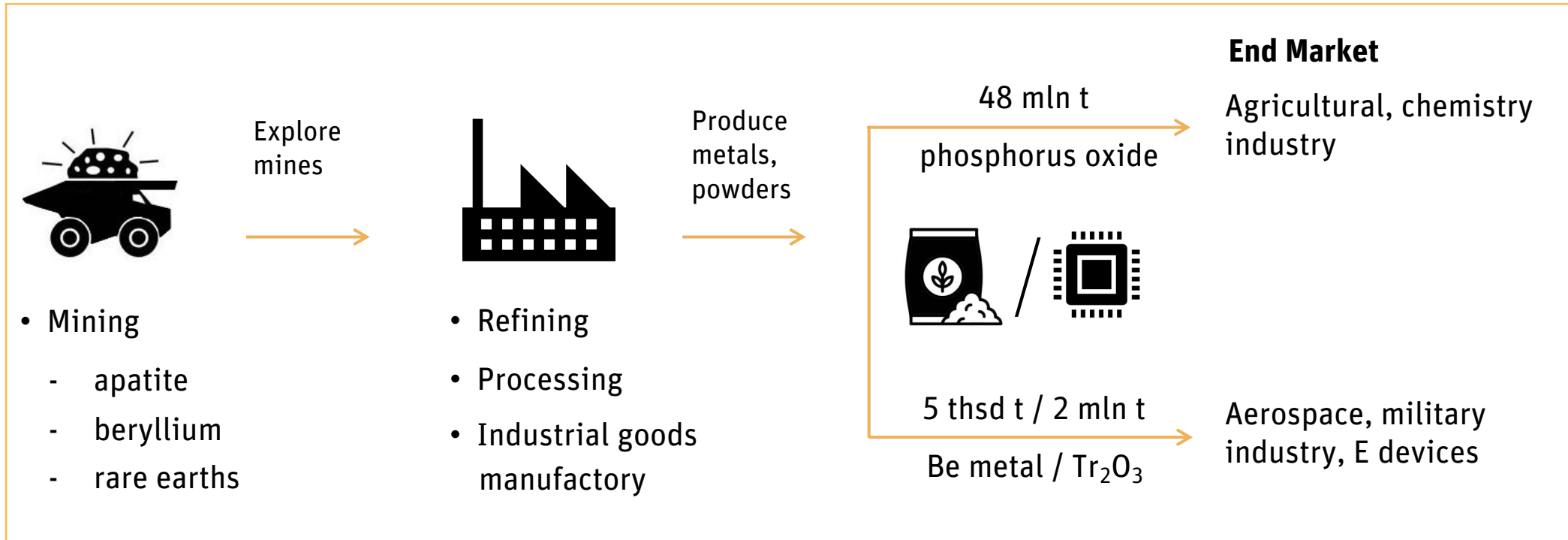
-  JSC "Titanium institute" provide design, development and implementation of titanium projects

Rare and rare earth elements

- Rare and rare earth metals are known to exist in six deposits. Tantalum and niobium extraction in non-commercial volumes is carried out only as a coproduct of titanium
- There is one beryllium deposit in Ukraine with reserves of 13.9 thousand of BeO, operated by the Ukrainian BGV Group
- The prospects of rare earth metals production are related to the development of the Novopoltavske deposit, which is one of the largest in the world, containing proven reserves of phosphate ores, and coproducts of rare earth elements, tantalum, niobium, strontium, magnetite



The development of combined apatite and rare earth deposits will allow to produce 100 millions tons of phosphate fertilizers and materials for high-tech electronic products



NOVOPOLTAVSKE license (mines Pivdenne, Pivniche)



- apatite, rare earth ores, tantalum ores, niobium ores, strontium ores, uranium ores, fluorine, magnetite
- production license
- Zaporizhzhia region
- 938 ha
- proved reserves (thousand tons): apatite B+C₁ – 859628/42310, C₂ – 95858/4268, strontium ores B+C₁ – 859627/865, C₂ – 95858/ 87, rare earth ores B+C₁ – 85962/1938, C₂ – 95858/274, tantalum ores, niobium ores – "for official use only"

Open for nomination

SABARIVSKE license

- rare earth ores
- E&P license up to 20 years
- Vinnytsia region
- grade of Σ TR – up to 6.44%
- the reserves are estimated under category C₂

Is being prepared for e-auction

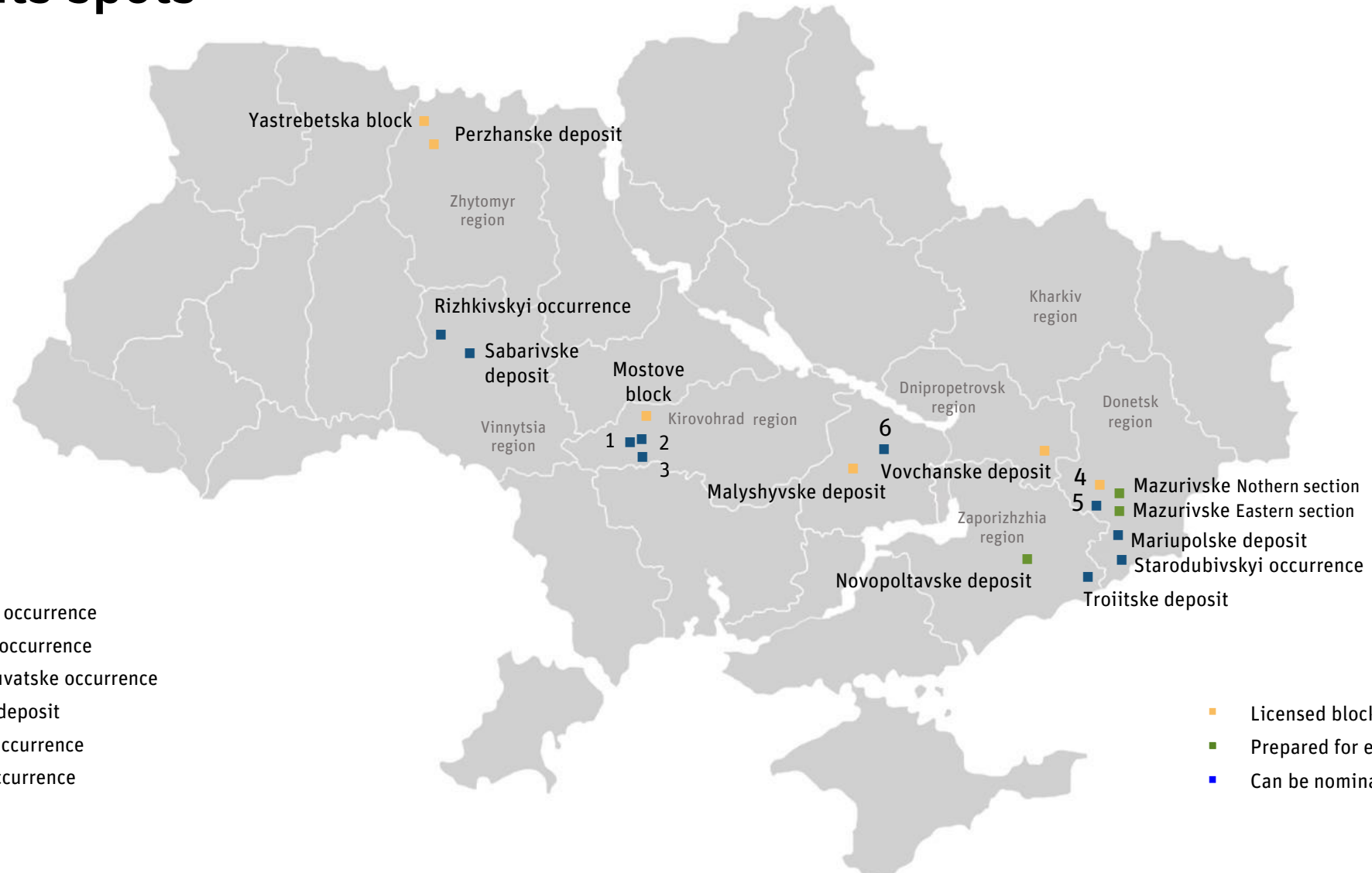
RIZHKIVSKYI license

- thorium ores, rare earth ores
- E&P license up to 20 years
- Vinnytsia region
- grade of Th – up to 0.873%, Σ TR – up to 0.35%
- the reserves were not estimated

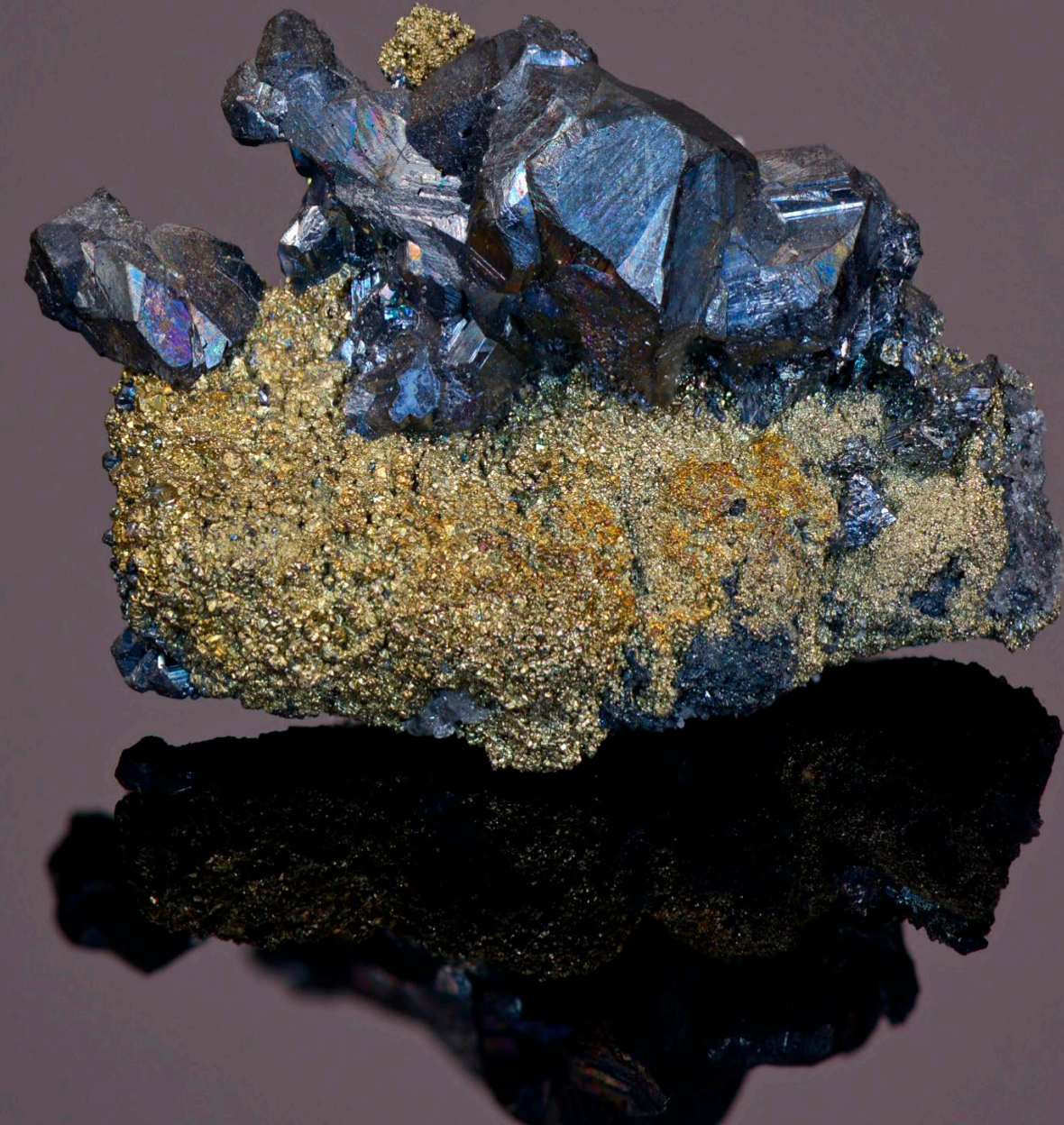
Is being prepared for e-auction

<https://www.geo.gov.ua/en/open-bids/>

Rare and rare earth elements spots



1. Lypnyazkyi occurrence
2. Tashlytsky occurrence
3. Novostankuvatske occurrence
4. Anadolske deposit
5. Dianivske occurrence
6. Gurivske occurrence



Nickel, cobalt, copper

- Ukraine has 12 deposits of non-ferrous metals with reserves of nickel – 390 Kt, cobalt – 20 Kt, chromium oxide – 700 Kt, and copper – 101 Kt
- The mining of these minerals is not carried out. The main perspective of nickel and cobalt production is connected with the development of Kapitonivske and Prutivske deposits, which have been explored by Ukrainian private operators since 2019

ZALISY-SHMEN'KY license



- ores of copper
- E&P license
up to 20 years
- Volyn region
- 2266 ha
- grade of Cu – up to 2.6%
- measured resources
(thousand tons)
cat. P₂ – 160

Open for nomination

LYPOVENKIVSKE license



- ores of chromium, nickel,
cobalt
- production license
- Kirovohrad region
- 42 ha
- grade of Co – up to 0.043%,
Ni – up to 1.05%
- chromium ores reserves
(thousand tons): cat. C₁ – 1.061,
ores of cobalt-nickel-silicate
reserves cat. A+B – 4694,
inferred resources – 3225

Open for nomination

VERBYNSKA license



- molybdenum ores
- E&P license up to 20 years
- Zhytomyr region
- 290 ha
- grade of Mo – up to 2%
- measured resources (thousand tons)
molybdenum / Mo:
cat. C₂ – 1.792 / 5,
cat. C₁ – 90 / 2.7

Open for nomination

ZHELEZNIAKY license



- ores of copper, nickel, cobalt,
platinum, palladium
- E&P license up to 20 years
- Zhytomyr region
- 290 ha
- grade of Ni – 0.66%
Cu – 0.063%, Co – 0.013%
- inferred resources
(thousand tons) cat. P₃:
Ni – 151, Cu – 14, Co – 3

Open for nomination

SUKHOKHUTIRSKA license

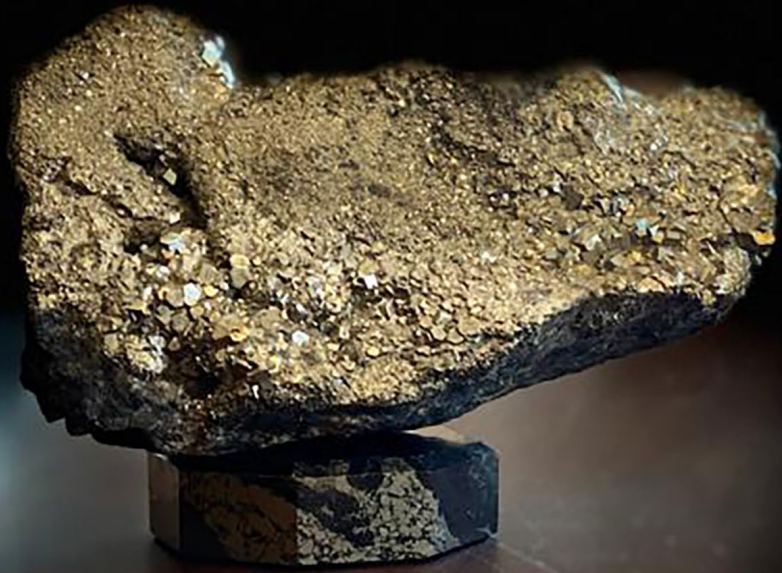


- ores of talc-magnesite,
nickel, cobalt
- E&P license up to 20 years
- Dnipropetrovsk region
- 127 ha
- grade of Ni – up to 0.5%
- ores reserves (thousand tons)
cat. C₂: talc-magnesite – 75739,
Ni – 73, Co – 4

Open for nomination

Non-ferrous metal spots





Gold-lead-zinc deposits

- The reserves of lead and zinc are mainly concentrated in ores of polymetallic deposits
- There are discovered seven deposits. The mining and processing are carried out at Muzhiyivske
- Ukrainian industry holds metallurgical processing of lead-containing materials, obtaining lead, zinc, and their alloys. There is no affintage and melting facilities

ZHOVTOVODSKA license



- Dnipropetrovsk region
- 1150 ha
- 29 drillholes,
total depth 7.4 thousand m
- gold grade – @1.22–2.78 g/t,
min. 0.8 g / t;
niobium – 20–50 g/t
- measured, indicated resources
of gold (thousand tons):
P₁ – 16.5, P₂ – 12, P₃ – 11

Sold for \$ 205 000
December, 2020

BALKA SHYROKA license



- E&P license up to 20 years
- Dnipropetrovsk region
- 200 ha
- 285 drillholes, total depth –
92.5 thousand m,
mine depth – 168 m
- gold grade – @7.1 g/t,
min. 3.9 g/t
- measured, indicated resources
(thousand tons): P₁ – 12.5, P₂ – 15

Open for nomination

KVITKIVSKA license



- E&P license up to 20 years
- Odesa region
- 670 ha
- 25 drillholes, total depth –
8.9 thousand m
- gold grade – 0.1–14.7 g/t
- indicated resources
(thousand tons) cat. P₂ – 40
- Kvitkivska & Mayska blocks
can be considered as a single
investment project

Open for nomination

MAISKA license



- E&P license up to 20 years
- Odesa region
- 250 ha
- 177 drillholes, total depth –
64,5 thsd m, mine depth – 204 m
- gold grade – @3.4 g/t
- measured, indicated
resources (thousand tons):
P₁ – 22, P₂ – 19

Open for nomination

Polymetallic spots





Uranium

- Uranium is vital for energy security, particularly in nuclear power generation, offering a stable, low-carbon energy supply
- Ukraine has the largest reserves of uranium in Europe, being among top-10 globally, and their large part is estimated to be in the middle of the global cost curve
- Ukraine extracts uranium ore in three underground mines and produces uranium concentrate (2% of the world's production), supplying from 20 to 40% of the uranium needs for Ukraine's nuclear power plants
- The grade of uranium in ore is comparable with the middle of the global, the cost of production could be more competitive due to the modernization of current facilities and the use of situ leaching technology



Geologic reports virtual data room

- To make publicly available information about critical minerals on a free access website, a **common project with the EBRD** was launched, and the developed digital solution got the International Award
- As of 2024, the virtual Data Base* contains 125 critical raw minerals deposits and occurrences, placed on an online interactive map with EN menu, and scanned 6000 books of legacy geological reports with brief descriptions of investment opportunities

* Access temporarily restricted for the period of martial law



Ukraine declared the Open Door Policy to attract strategic investors

Concession

Easy way to obtain E&P license for up to 20 years through e-auctions

PSA

Agreement with the Government for up to 50 years with fiscal stability and international arbitration clauses

Farm-in




















Partnership with operator of license

BACK-UP











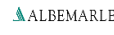











GRAPHITE AND LITHIUM: POTENTIAL STRATEGIC INVESTORS OR OFF-TAKERS

NON- EXHAUSTIVE

Graphite/anode

		Anode supplier to LG Energy solution, SK and Samsung , that supply cells to Tesla, Ford, Audi, BMW, Mercedes Benz, and Volkswagen . LG Energy solution also has JVs with GM, Honda, Hyundai, Stellantis
		Anode supplier to LG Energy solution, Panasonic and SK , that supply cells to Tesla, Ford, Audi, BMW, Mercedes Benz, and Volkswagen . LG Energy solution also has a JV with GM, Honda, Hyundai and Stellantis
		Integrated energy operator in Portugal and internationally
		Battery manufacturer for electric vehicles, industrial systems, and energy storage systems
		A supplier of energy storage systems and technologies for industrial applications. The company manufactures backup and motive power batteries, battery chargers, power equipment, battery accessories, and enclosures for outdoor equipment systems
		Supplies cells to Tesla, Ford, Audi, BMW, Mercedes Benz, and Volkswagen . LG Energy solution also has JVs with GM, Honda, Hyundai, Stellantis
		Supplies cells to Tesla and Toyota
		Supplies cells to Audi, BMW and Volkswagen
		Supplies cells to Ford
		Tesla has a significant portfolio of gigafactories, including operational and planned for construction, and plans to start own production of cells

Lithium/cathode

		Nickel based cathode supplier to LG Energy solution and SK, that supply cells to Tesla and Ford
		Nickel based cathode supplier to LG Energy solution, Panasonic and SK, that supply cells to Tesla and Ford
		Nickel based cathode supplier to LG Energy solution and SK, that supply cells to Tesla and Ford
		Nickel based cathode supplier to SK, that supply cells to Ford
		Manufactures and sells performance lithium compounds primarily used in lithium-based batteries, specialty polymers, and chemical synthesis applications
		Develops, manufactures, and markets engineered specialty chemicals worldwide, offers lithium compounds, including lithium carbonate, lithium hydroxide, lithium chloride, and lithium specialties and reagents
		Engages in the production and sale of lithium and boron in Argentina
		Produces and distributes specialty plant nutrients, iodine derivatives, lithium derivatives, potassium chloride and sulfate, industrial chemicals, and other products and services
		Integrated energy operator in Portugal and internationally
		Battery manufacturer for electric vehicles, industrial systems, and energy storage systems
		Tesla has a significant portfolio of gigafactories, including operational and planned for construction, and plans to start own production of cells

TITANIUM: POTENTIAL STRATEGIC INVESTORS OR OFF-TAKERS FOR UKRAINIAN TITANIUM

NON- EXHAUSTIVE



Titanium metal producers



Industrial corporation, one of the world's largest producers of various metals



American aerospace company, manufactures components for jet engines, fasteners and titanium structures for aerospace applications, and forged aluminum wheels for heavy trucks. Formerly part of Arconic



Industrial goods and metal fabrication company that manufactures investment castings, forged components, and airfoil castings for the aerospace, industrial gas turbine, and defense industries. Owned by Berkshire Hathaway



Formerly Allegheny Technologies Incorporated



Owned by Apollo Asset Management



Subsidiary of RTX Corporation



(Was acquired by PCC and operates under PCC Metals Group Division) Was the first company in history to produce a titanium ingot. The company is building an ultra-modern production complex in the city of Ravenswood, Wyoming.



Owned by Air Industries Group



Titanium pigment producers



American chemical company, manufactures and sells performance chemicals falling within three segments: Titanium Technologies (titanium dioxide), Fluoroproducts and Chemical Solutions



American worldwide chemical company involved in the titanium products industry



Enriching lives through innovation

American multinational manufacturer and marketer of chemical products for consumers and industrial customers. Has operations in the UK, Hungary, Russia



Global producer and marketer of value-added titanium dioxide pigments. Owned by Valhi, Inc., NL Industries



The British chemical giant, but with a very powerful production complex in the state of Ohio, USA. This complex once belonged to Cristal and Tronox

International partners



The Geological Surveys of Europe

