



Ukrainian
Geological
Survey



Ministry of Ecology and
Natural Resources of
Ukraine

UKRAINE

Critical Minerals Portfolio





The EU-Ukrainian Strategic Partnership on Critical Minerals

- In July 2021 the EU and Ukraine signed a Memorandum on Strategic Partnership in the Raw Materials
- In November 2022, Ukraine was represented for the first time at the European Raw Materials Week, where it held an investment forum together with the European Commission, presenting mining business opportunities
- The next investment forum was held in June 2023 during the second Ukrainian Recovery Conference in London



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	26	9
Unlicensed	50+	11
Dobra hard-rock lithium deposit (4220 acres) – 50 year license available	Stremyhorodske is one of largest titanium deposits globally – 50 year license available	Novopoltavske is large phosphate and rare earth deposit globally – \$300 mln investment needed

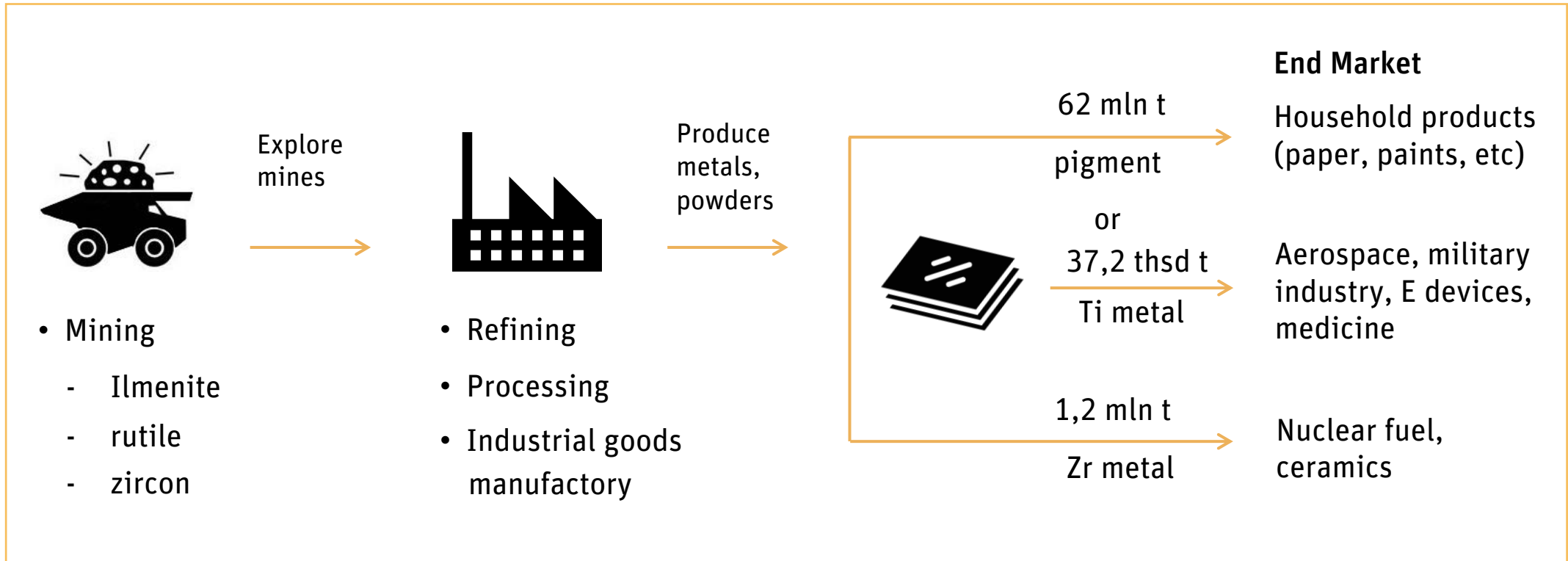
* main mineral: Ilmenite, Rutile, Zircon, Lithium, Graphite, Nickel, Beryllium, Rare Earth Elements, Polymetallic, Zink



Titanium

- Ukraine is one of the 10 leading countries in the world in terms of proven reserves of titanium and accounts for 7% of global production
- 28 fields and more than 30 ore occurrences have been discovered so far. The main titanium-containing minerals are ilmenite, rutile. Zirconium is often a coproduct.
- Currently, titanium is mined at six heavy-mineral sands fields, from which ~900.000 tons of concentrate are produced thereof (~ 350 thousand tons TiO_2) in 2020. There is an ongoing privatization of largest titanium mining and processing factory in Europe – United Mining&Chemical Company
- It is possible to process up to 50 thousand tons of concentrate into the sponge inside of the country with further refining to titanium metal abroad

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





Lithium

- As of today lithium is not mined in Ukraine. Its reserves account for near a one third of those proven in Europe and ~3% of world's
- There are three explored fields with a lithium oxide content of 1.1–1.4% and one promising area for further exploration. There are also several lithium ore occurrences
- Implementation of one project at the stage of production and primary processing requires \$150–250 million of investments
- One petalite field is licensed by UkrLithiumMining LLC. The reserves are approved according to JORC classification





Graphite

- Ukraine is one of the world's five leading countries in terms of graphite reserves, which are about 19 million tons of ore with a natural graphite content of 5-8%
- There are six known fields, one of which currently produces annually 5,5 thousand of graphite concentrate, and was acquired in 2021 by the Australian public company Volt Resources
- The Ukrainian BGV Group and the Turkish ONUR Group are operators of 3 licenses. Several promising ore occurrences available for purchasing
- In order to develop the innovative potential of graphite, the European Commission initiated a scientific research program Graphene Flagship



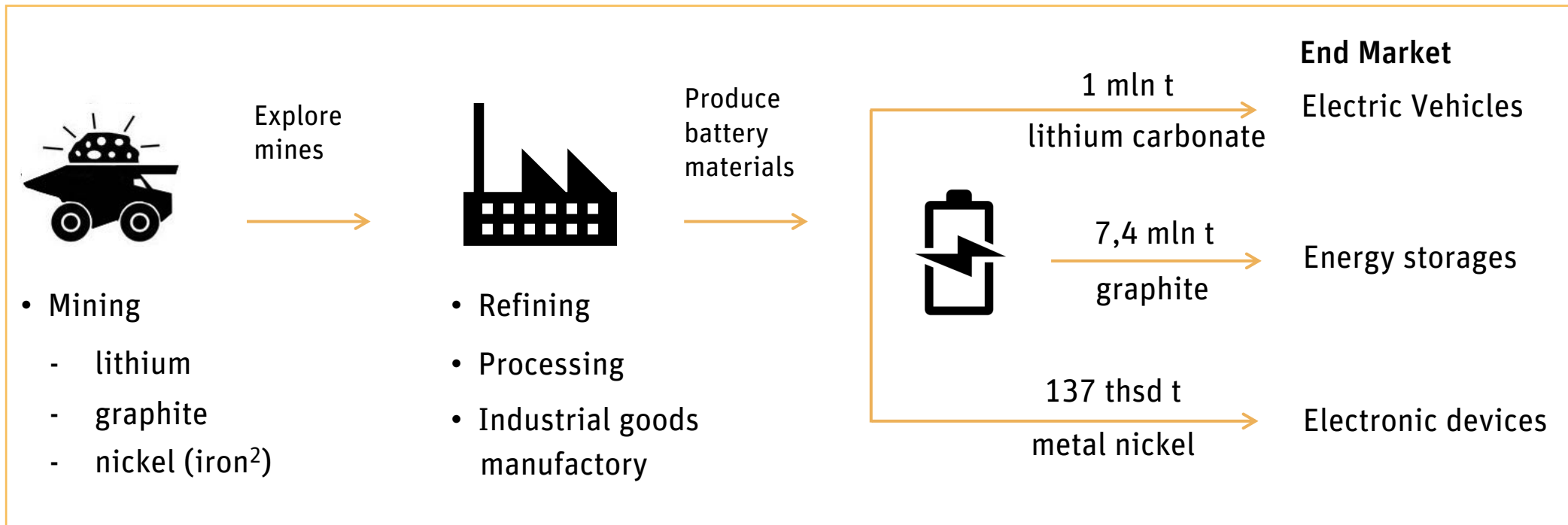


Nickel & Cobalt

- There are 12 silicate nickel fields in Ukraine, which contain cobalt as a coproduct. The cobalt reserves are up to 9 thousand tons
- Ukraine's industry, precisely the Pobuzhsky ferronickel plant, imports nickel and cobalt raw materials
- The main prospects for the development of cobalt are related to Kapitanivske and Prutivske deposits, which have been operated by private investors since 2019



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 manufactory of about 20 millions of Electric Vehicles¹



¹ Capacity 60 kW/h

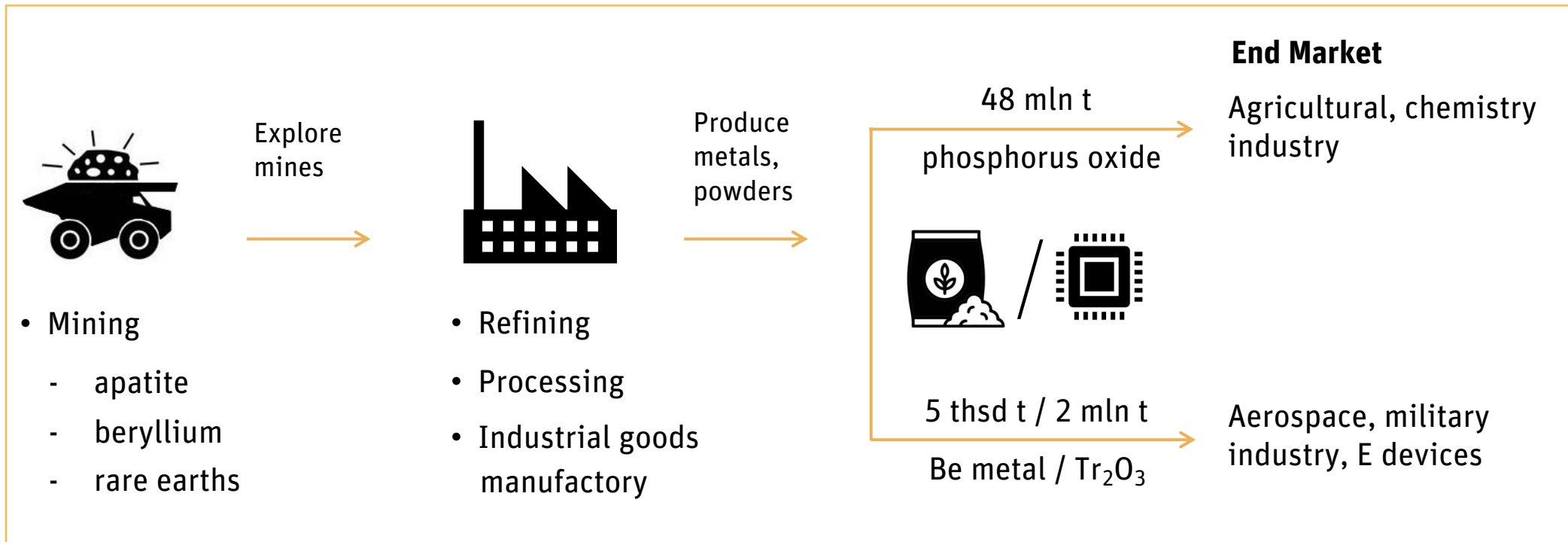
² LFP, graphite share – 29%, lithium – 13%

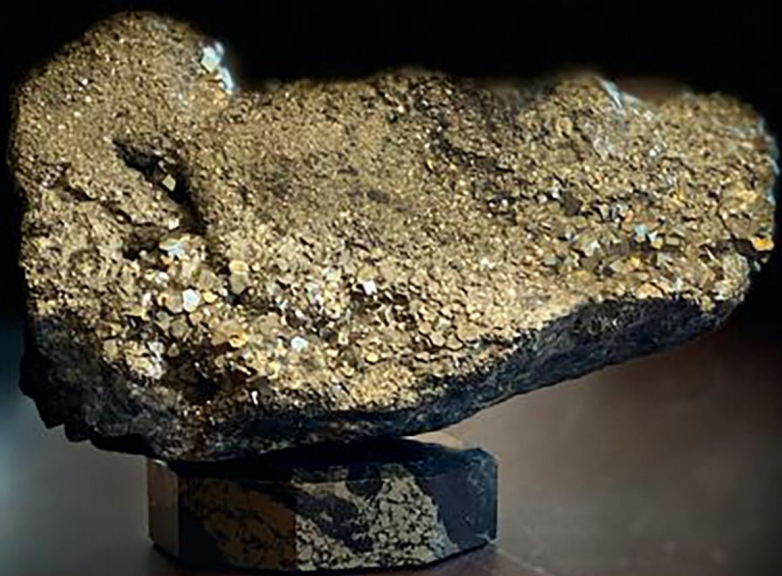


Rare and rare earth metals

- Rare and rare earth metals such as tantalum, niobium, and beryllium are known to exist in six fields. Tantalum and niobium extraction in non-commercial volumes is carried out only as a coproduct of titanium
- The projections of rare earth production are related to the development of the Novopoltavske apatite ore field and potentially several other ore occurrences
- There is one beryllium field in Ukraine (Perzhanske) with reserves of 15,3 thousand of BeO, containing also tantalum, niobium, zirconium, tin, molybdenum, lithium, zinc, etc. A production license for this deposit was issued in 2019 to the BGV Group

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





Gold-lead-zinc deposits

- Ukrainian industry carries out a metallurgical processing of lead-containing materials and obtains on their basis lead, zinc and their alloys
- The reserves of lead and zinc are mainly concentrated in ores of polymetallic deposits
- There are no affinage production and melting plants in Ukraine, which are able to work with lead, copper, zinc concentrates
- There are accounted seven fields, and the production is currently carried out at Muzhiyivske field. New 20-years licenses for exploration, pilot development and production are open for e-auctions



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



Sustainable and Green mining

- All mining projects in Ukraine have to meet high national and global standards in health, safety and environment (HSE)
- Ukraine implemented EU procedure of environmental impact assessment, which fully complies with the Directive 2011/92/EU
- Local budgets receive up to 30% of the royalty paid from the extraction of minerals. Mining companies are obliged to report according to EITI
- Following EU Association Agreement, Ukraine officially announced to join the European Green Deal Initiative, including commitments to reduce CO2 emission

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opportunity
in Europe since
World War II”**

VOLODYMYR ZELENSKYY

THE PRESIDENT OF UKRAINE

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