

# UKRAINE

## Investment Opportunities in Exploration & Production

Strategic and Critical Raw Materials

Au  
Co  
Mo  
Ti  
Li  
Zr  
Be  
Cr  
Ni



Ukrainian  
Geological  
Survey



Ministry of Environmental  
Protection and Natural  
Resources of Ukraine





## Key messages

**The raw materials base of Ukraine** is able to meet the needs of the national industry as well as to facilitate its export potential development of resilient value chains of critical minerals

Domestic enterprises consume mainly local raw materials for metallurgy, machine building and construction. Energy resources, agrochemical raw materials, non-ferrous metals are imported

The deposits of the so-called metals of a low-carbon future used in innovation technology are hardly produced in Ukraine. It is important now to increase their production, create enrichment and processing capacities, as demand for them is expected to grow rapidly in the world market

Available resources and prospects for production of **critical raw materials** in Ukraine, as well as their integration to global value chains will support development of open strategic autonomies, therefore will help to avoid unwilling economic dependencies

The **Investment Atlas** contains proposals with deposits of strategic and critical raw materials for their licensing through e-auctions or PSA tenders.



# 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



# Strategic and Critical Raw Materials

Li

Lithium

Ti

Titanium

Zr

Zirconium

Ni

Nickel

Co

Cobalt

Cr

Chrome

Mo

Molybdenum

Be

Beryllium

Ta

Tantalum

Nb

Niobium

Au

Gold

Pb Zn

Lead Zink

C

Graphite

C<sub>(x)</sub>H<sub>(x)</sub>

Hydrocarbons

The list is not limited to the above mentioned





# Lithium

- Ukraine possesses one of the largest lithium deposits in Europe
- It is an ultralight metal used for manufacturing of Li-batteries for energy storages, electric vehicles and devices, ceramics and glass
- 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

### KRUTA BALKA license



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

Open for nomination

### PSA DOBRA license



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

Open for nomination

### SHEVCHENKIVSKE license



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

Is being prepared for e-auction

# Lithium ore spots





# Titanium and Zirconium

- Ukraine is among top ten countries in the world in terms of proven reserves of titanium ores and provides more than 7% of their global production
- 28 discovered deposits have been explored. The main titanium-containing mineral is ilmenite and rutile. Zirconium is often a coproduct
- Currently, only heavy mineral sands deposits are being developed, which make up 25% of total reserves, the rest is contained in hard-rock deposits.
- Titanium is used in aviation and missile technology, ship-building, machine building, food, medical industry and non-ferrous metallurgy



### SELYSHCHANSKA license



- titanium ore
- exploration license
- Zhytomyr region
- 1860 ha
- content of  $\text{TiO}_2$  –  
50–70 kg / m<sup>3</sup>

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<sub>1</sub> – 2,7 million tons, 163,02 kg / m<sup>3</sup>  
P<sub>3</sub> – 2,8 million tons, 65,53 kg / m<sup>3</sup>

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

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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

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Open for nomination

### KHRAPIVSCHYNA license



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

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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 cat. P<sub>2</sub> (thousand tons):  
ilmenite – 1759  
zirconium – 402

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Open for nomination

PSA

### NOSACHIVSKE license



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

Open for nomination

PSA

### STREMYHORODSKE license



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

Open for nomination

### TARASIVSKE license



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

Open for nomination



# Titanium ore spots



# Nickel, cobalt, chromium, copper, molybdenum

- Ukraine possesses considerable deposits of non-ferrous metals and imports significant volumes of those for its own needs
- Explored fields and prospective areas are complex and mainly concentrated within the Ukrainian Crystalline Massif
- The production of these raw materials is either not carried out or is very limited
- The estimated reserves are (thousand tons):  
nickel – 215, cobalt – 8.8, chromium oxide – 453;  
measured and indicated resources (thousand tons):  
chromium oxide – 3120, copper – 95

### PROSPECTIVE FIELD ZALISY-SHMEN'KY license



- ores of copper
- exploration license
- Volyn region
- 2337 ha
- content of Cu – up to 2.6%
- measured resources (thousand tons):  
cat. P<sub>2</sub> – 160

Sold for \$600 000  
May, 2022

### LYPOVENKIVSKE license



- ores of chromium, nickel  
cobalt
- production license
- Kirovohrad region
- 42 ha
- content of Co – up to 0.043%,  
Ni – up to 1.05%
- chromium ore reserves  
(thousand tons) cat. C<sub>1</sub> – 1.061  
ores of cobalt-nickel-silicate  
reserves cat. A+B – 4694  
inferred resources – 3225

Open for nomination



### VERBYNSKA license



- molybdenum ore
- E&P license up to 20 years
- Zhytomyr region
- 290 ha
- content of Mo – up to 2%
- measured resources (thous. tons)  
cat. C<sub>2</sub>: molybdenum – 1.792 Mo – 5  
cat. P<sub>1</sub>: molybdenum – 90 Mo – 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
- content of Ni – 0.66%  
Cu – 0.063%, Co – 0.013%
- inferred resources (thous. tons)  
cat. P<sub>3</sub>: Ni – 151  
Cu – 14  
Co – 3

Open for nomination

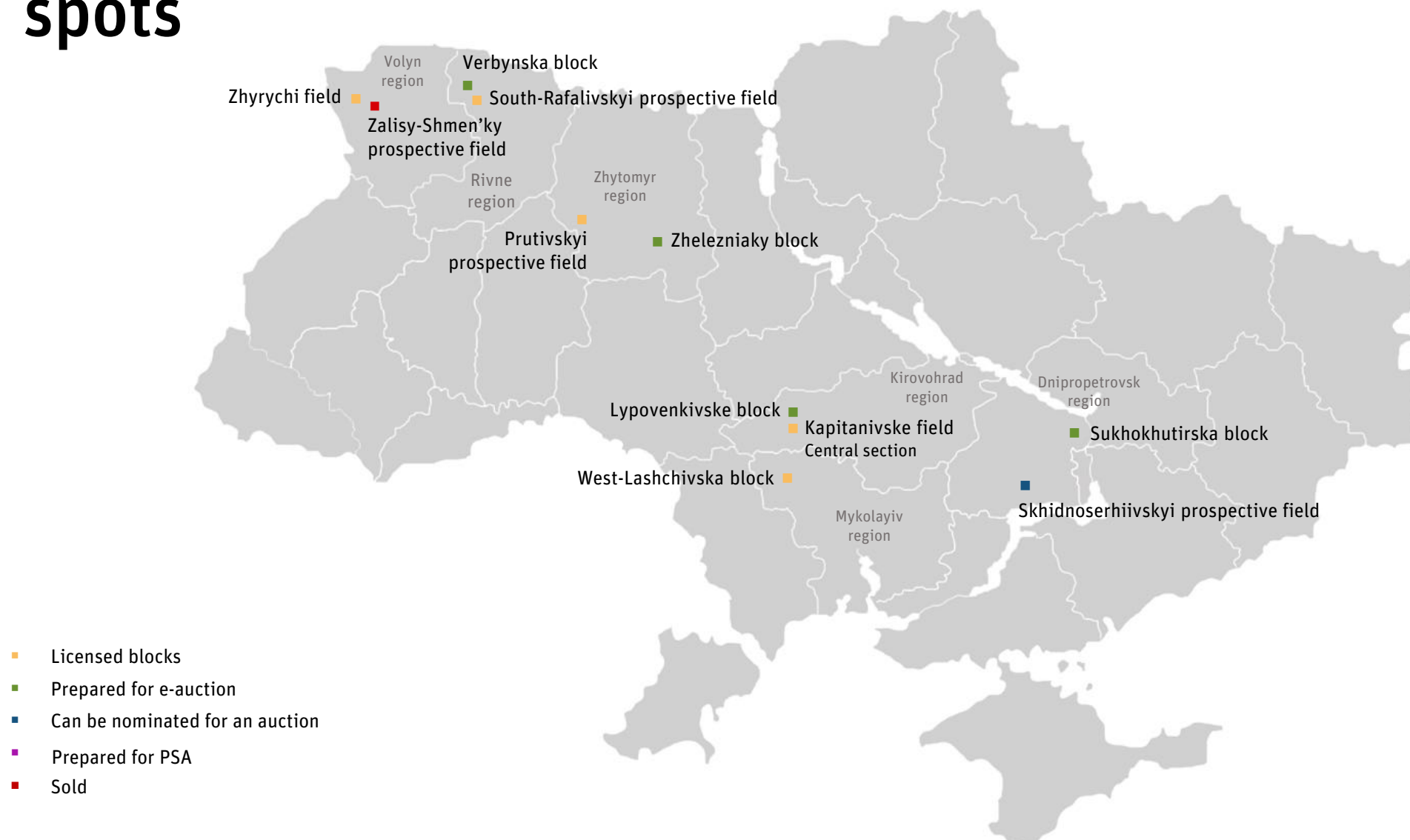
### SUKHOKHUTIRSKA license



- ores of talc-magnesite  
nickel, cobalt
- E&P license up to 20 years
- Dnipropetrovsk region
- 127 ha
- content of Ni – up to 0.5%
- ore reserves (thous. tons)  
cat. C<sub>2</sub>: talc-magnesite – 75739, Ni – 73  
Co – 4

Open for nomination

# Non-ferrous metal spots



## Graphite, rare earth metals

- Graphite reserves are registered within six deposits, production is carried out within only one
- Novopoltavske phosphate and rare earth deposit is one of the largest phosphate ore deposits in the world, discovered in 1970, containing proved reserves of phosphate ore, and coproducts of rare earth elements, tantalum, niobium, strontium, magnetite
- Zirconium and scandium are coproducts and concentrated in sand or hard rock deposits in significant volumes, however there is no extraction
- Reserves of tantalum, niobium, beryllium are placed within six deposits, non-commercial production is carried out within Malyshevske and Vovchanske fields



### **HORODNIAVSKA license**



- graphite
- production license
- Khmelnytskyi region
- 105 ha
- proved reserves of graphite  
graphite ore (thousand  
tons): cat. B – 28165  
C<sub>1</sub> – 85225, C<sub>2</sub> – 16586  
graphite oxide (thousand  
tons): cat. B – 1736  
C<sub>1</sub> – 4848, C<sub>2</sub> – 898

Sold for \$1.6 million  
March, 2021

### **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 cat. (thousand tons) of  
apatite B+C<sub>1</sub> 859628/42310, C<sub>2</sub> 95858/4268,  
strontium ores B+C<sub>1</sub> 859627/865, C<sub>2</sub> 95858/ 87,  
rare earth ores B+C<sub>1</sub> 85962/1938, C<sub>2</sub> 95858/274,  
tantalum ores, niobium ores – 'for official use only'

Open for nomination

## KHMELIVSKA license



- graphite
- E&P license up to 20 years
- Khmelnytskyi region
- 143,3 ha

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Open for nomination

## ZOLOCHIVSKA license



- zirconium ores titanium ores
- E&P license up to 20 years
- Kharkiv region
- 780 ha
- measured resources (thousand tons): Zr – 87  
rutile – 124

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Is being prepared for e-auction

# Rare earth minerals spots





# 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



## ZHOVTOVODSKA license



- Dnipropetrovsk region
- 1150 ha
- 29 wells drilled,  
total depth 7.4 thousand m
- gold content – avg 1.22–2.78 g/t  
min. 0.8 g / t  
niobium – 20–50 g/t
- measured, indicated resources  
of gold (thousand tons):  
 $P_1 - 16.5$ ,  $P_2 - 12$ ,  $P_3 - 11$

Sold for \$ 205 000  
December, 2020

## BALKA SHYROKA license



- E&P license up to 20 years
- Dnipropetrovsk region
- 200 ha
- 285 wells drilled, total depth –  
92.5 thousand m; mine depth –  
168 m
- gold content – avg 7.1 g/t,  
min. 3.9 g/t
- measured, indicated resources  
(thousand tons):  $P_1 - 12.5$ ,  $P_2 - 15$

Open for nomination

## KVITKIVSKA license



- E&P license up to 20 years
- Odesa region
- 670 ha
- 25 wells drilled, total depth –  
8.9 thousand m
- gold content – 0.1–14.7 g/t  
indicated resources  
(thousand tons):  $P_2 - 40$
- Kvytkivska and 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 wells drilled, total depth –  
64,5 thsd m, mine depth – 204 m
- gold content – avg 3.4 g/t
- measured, indicated resources  
(thsd tons):  $P_1 - 22$ ,  $P_2 - 19$

Open for nomination

# Polymetallic spots



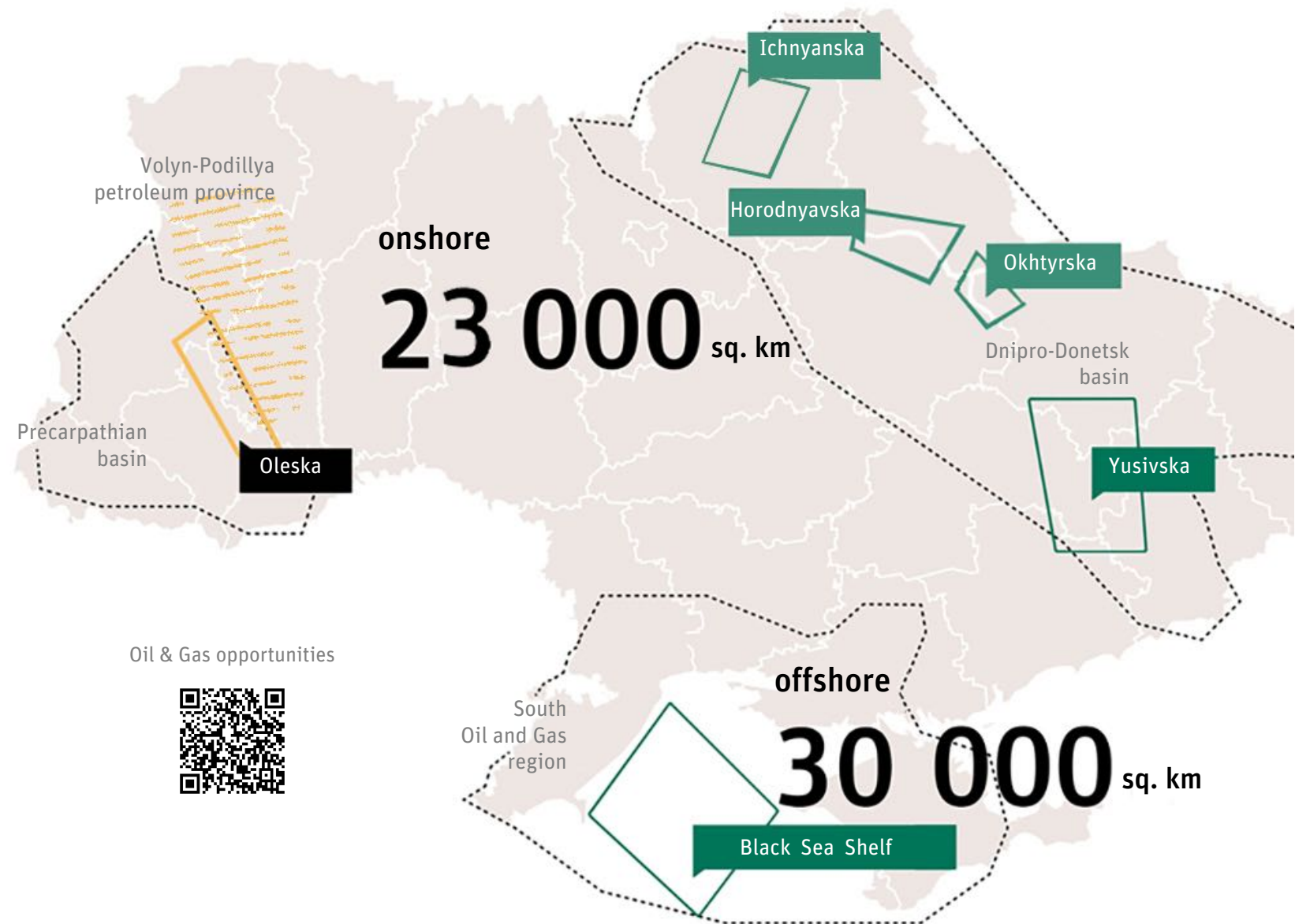
# Hydrocarbons

## Results

- 11 concession licenses were sold on e-auctions (2020-22)
- Signing of eleven PSAs
- Re-launch of Yuzivska PSA
- Unlock offshore potential in the Black Sea

## Plans

- Re-launch of Oleska PSA
- Open new concession licenses for e-auctions
- Exploring Volyn-Podillya petroleum province



## MAIORIVSKA block



- natural gas condensate
- production license for 20 years
- Poltava region
- 42 km<sup>2</sup>
- inferred resources of natural gas – 2755 million m<sup>3</sup>, of condensate – 172 thousand tons

Sold for \$30 million  
November, 2022

## BUDYSCHANSKO- CHUTIVSKA block



- hydrocarbons
- production license for 20 years
- Poltava region
- 175 km<sup>2</sup>
- oil reserves – 2,73 thousand tons, gas – 856 million m<sup>3</sup>  
prospective resources of oil – 2006 thousand tons, gas – 20,587 million m<sup>3</sup>

Sold for \$23 million  
August, 2020

## 50 HYDROCARBON BLOCKS



- natural gas liquids
- exploration & production license for 20 years
- 10 regions
- 6500 km<sup>2</sup>
- discovered & undiscovered reserves – 320 million tons BOE

Open for nomination



### YULIIVSKA field (ZOLOCHIV block)



- natural gas, condensate  
ethane, propane  
butanes
- production license for 20 years
- Kharkiv region
- 14 km<sup>2</sup>
- discovered & undiscovered  
reserves: natural gas –  
1128 million m<sup>3</sup>  
condensate – 251 thousand tons

Sold for \$4.3 million  
April, 2021

### SOUTH-RUSANIV license



- oil  
natural gas  
condensate
- exploration & production license  
for 20 years
- Sumy region
- 310 km<sup>2</sup>
- inferred resources of  
natural gas – 3.3 billion m<sup>3</sup>

Sold for \$11,5 million  
October, 2021

PSA

### OLESKA license



- hydrocarbons
- exploration & production  
license, till 2063
- Lviv region,  
Ivano-Frankivsk region
- 6300 km<sup>2</sup>
- contingent resources of  
unconventional gas – 3 trillion m<sup>3</sup>
- «Nadra Oleska» LLC  
is a license holder

Open for nomination

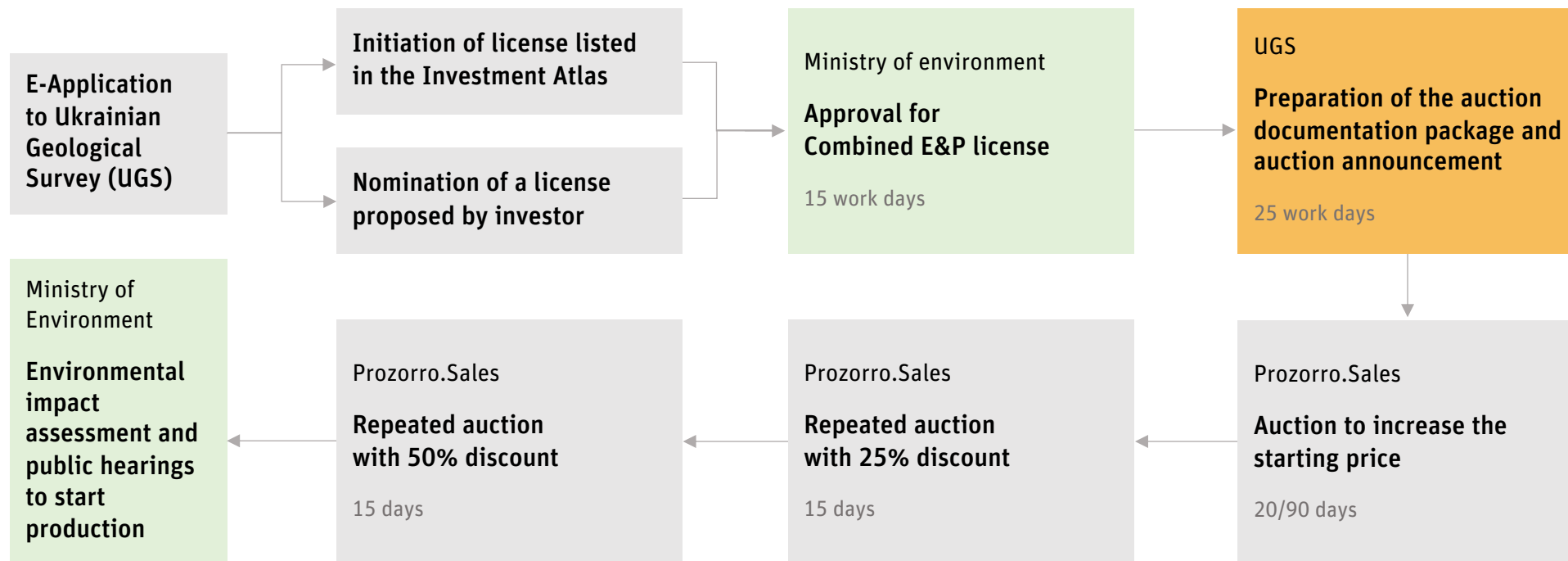
# Geologic reports virtual data room

- The database contains descriptions of investment objects, information about land plots within the contours of deposits, as well as geologic reports
- 82 geologic reports consist of 401 books including 3 746 graphic materials
- Information about land plots is published with a list of cadastral numbers



# **Annexes**

# Obtaining a Special Permit (License) through E-auction



## Winner:

1. Signs the protocol of auction (up to 6 working days)
2. Pays a fee to the exchange operator
3. An agreement on compensation of state expenses for exploration works is concluded (up to 20 working days)
4. Pays the fee to the state budget, concludes an agreement on terms and conditions of subsoil use, receives a license (up to 30 working days)

Cabinet of Ministers Resolution № 993 dated, September 23, 2020  
(amendments as of July 26, 2022, # 836)



# Ukrainian Government announced the Open Door Policy for foreign investors

## Farm-in

Partnerships with  
current license holders

## 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



The PSAs list of  
Critical Raw Materials  
blocks

**The state facilitates sustainable development projects with the creation of maximum added value in Ukraine, which will contribute to its transition to a carbon-neutral economy and a digital future**

**Support of the Government of Ukraine**

<b>Projects with significant investments</b>	<b>Production sharing agreements</b>	
	<ul style="list-style-type: none"> <li>▪ Mining</li> <li>▪ Processing</li> <li>▪ Intermediate production</li> <li>▪ Finished goods</li> <li>▪ Recycling</li> </ul>	

# Licensed fields and open offers

## Existing Concession licenses

## Concession licenses offers

Lithium ores						
Polokhivske field	Ukrliativvydobuvannya	production	2017–2037	Shevchenkivske field Balka Kruta block Dobra block	Donetsk Zaporizhzhia Kirovohrad	production exploration production
Nickel, cobalt, copper chromium						
West Lashchiv block Zhyrychi field South Rafalivskiy prospective field Prutivskiy prospective field Kapitanivske field (South, Central sections) Karnaukhivska block Zalisy-Shmen'ky prospective field	VIP-Trader Volynpryrodoresurs NorthWest Mining Colormet of Ukraine Mine Extraction LLC Metals Exploration Ukraine Inter Aktyv	production production exploration exploration production exploration exploration	2016–2026 2017–2037 2016–2021 2019–2024 2019–2032 2021–2026 2022–2027	Zheleznyaky block Lypovenkivske field Sukhohutirska block Hrushkivske field Devladove field Derenyuhsk field + 5	Zhytomyr Kirovohrad Dnipropetrovsk Kirovohrad Dnipropetrovsk Mykolaiv	exploration production exploration production production production
Tantalum, niobium, apatite-rare metal ores						
Vovchanske field Malyshevske field Mostove block Anadolske field	Demurinsky Mining and Processing Plant UMCC Taurus Infinity RM Minings LLC	exploration* production* production production*	2002–2031 2007–2027 2019–2029 2019–2034	Lypnyazkyi prospective field Tashlytskyi prospective field Novostankuvatske prospective field Novopoltavske field	Kirovohrad Kirovohrad Kirovohrad Zaporizhzhia	exploration exploration exploration production
Beryllium, zinc						
Perzhanska field	Perzhanska Ore Company	production	2019–2039	Horodetskyi prospective field Pokrovo-Kyriivskyi prospective field	Zhytomyr Donetsk	exploration exploration
Zirconium, scandium, rare earth elements						
Yastrebitska block Mazurivske tecnogenic field (East s.)	CFR Group LLC Azov-Mineraltekhnik	exploration production	2019–2024 2021–2031	Azovske field Zolochivska block Hurivskyi prospective field Starodubivskyi prospective field Mazurivske field (North section) + 3	Donetsk Kharkiv Dnipropetrovsk Donetsk Donetsk	exploration exploration exploration exploration exploration
Molybdenum						
Chervona block	Rud Investium	exploration	2020–2025	Verbynska block Skhidnoseriivskyi prospective field	Zhytomyr Dnipropetrovsk	exploration exploration

\* In production

Titanium: zircon-rutile-ilmenite-apatite placers, scandium						
Balka Kruta technogenic field	Koliorovi metaly	production *	2003–2033	Kropyvniian field	Zhytomyr	production
Vovchanske field	Demurinsky Mining and Processing Plant	production *	2002–2031	Vydyborz'ka prospective field	Zhytomyr	exploration
Yurivska block	Titanium-apatite group	exploration	2019–2024	Fedorivske field	Zhytomyr	production
Avramivska block	TsentrUkrGeologiya	exploration		Korchakiv prospective field	Sumy	exploration
Livoberezhne field	Zhytomyrburrozvidka	production	2013–2033	Bilovodskyi prospective field	Sumy	exploration
Trostryanetske field	Zhytomyrburrozvidka	production	2013–2033	Haidarivskyi prospective field	Kharkiv	exploration
Mezhyrichne field (Isakivska, South s.)	Mezhyrichensk MCC	production *	2002–2032	Khrapivshchyna prospective field	Sumy	exploration
Mezhyrichne field (B., E., O., S., Y. s.)	UMCC	production *	2015–2035	Yuriivsko-Roziivska block	Zhytomyr	exploration
Malyshevske field (C., E., W. sections)	UMCC	production *	2015–2043	Tarasivske field	Kyiv	production
Selyshchanska block	Zhytomyr	exploration	2021–2026	Stremyhorodske field	Zhytomyr	production
Malyshevske field(M.-A.,N-W sections)	Motronivsk MCC	production *	2004–2034	Nosachivske field	Cherkasy	production
Valky-Gatskivske field	Valki Ilmenite	production *	2001–2031	Malyshevskefield (North West sections)	Dnipropetrovsk	production
Byrzulivske field	Velta	production *	2007–2027	Verkhnie-Irshynske field	Dnipropetrovsk	production
Likarivske field	Dekart Minerals	production	2019–2039	Davydkivske field (South section)	Kharkiv	production
				Zlobytske field	Zhytomyr	production
				Irshanske field	Zhytomyr	production
				Lemnenske field	Zhytomyr	production
				Lemnenske field (West sections)	Zhytomyr	production
				Lemnenske field (East section)	Zhytomyr	production
				Torchynske field	Zhytomyr	production
				Krasnorichynske field	Zhytomyr	production
				Paromivske field	Zhytomyr	exploration
				+ 9		
Gold ore, polymetallic ores						
Muzhiivske field	Karpatska Rudna Company	production *	2012–2032	Zolota Balka field	Dnipropetrovsk	production
Sauliak field	Sauliak	production	2010–2030	Balka Shyroka block	Dnipropetrovsk	exploration
Serhiivske field	Stone processing company of Ukraine	production	2010–2030	Kvitkivska block (East, Central sections)	Odesa	exploration
Bobrykivske field	Donetskyi Kryazh	production	2013–2018	Maiska block	Odesa	exploration
Klyntsivske field	Lyra Mine Minerals	production	2019–2034	Dilovetska block	Zakarpattia	production
Berehivske field	Karpatska Rudna Company	exploration	2012–2024			
Kvasivske prospective field	Western Geological Explorational Company	exploration	2012–2022			
Zhovtovodska block	Spys Ukrayina	exploration	2021–2026			
Graphite						
Zavallivske field (Zarichna section)	Pobuzhzhya's Development LCC	production *	1996–2035	Burtynske field (Khmelivska section)	Khmelnyskyi	production
Zavallivske field (South-East section)	Zavally Grafit Kombinat	production	2019–2039	Mlynkivska prospective field	Kirovohrad	exploration
Balakhivske field (South section)	Ukrainian supply group	production	2019–2039	Troitske field	Zaporizhzhia	production
Burtynske field(Horodnyavska section)	Spys Ukrayina	production	2021–2041	+ 4		



# International partners



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**Investment Guide**  
UkraineInvest



**UGS Annual Report 2022**

