

MINERAL RESERVES AND RESOURCES CLASSIFICATION OF UKRAINE

Implementation of the UNFC in Ukraine

Raw Materials week
13–17 November 2023
Brussels

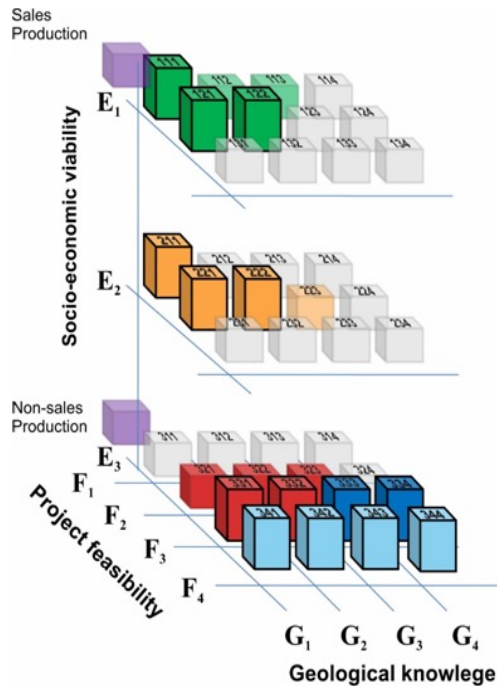


Classification of Ukraine's Mineral Reserves and Resources



- In 1997, Ukraine was the first country in Europe and worldwide to implement the UNFC standards at the national level
- Classification of Mineral Reserves and Resources was developed following the UN ECOSOC decision No. 227/1997, which recommended it for practical use by the UN member states
- The Classification is used for all types of minerals (coal, oil, gas, metallic and non-metallic raw materials, groundwater)

UNFC principles and methodological approaches

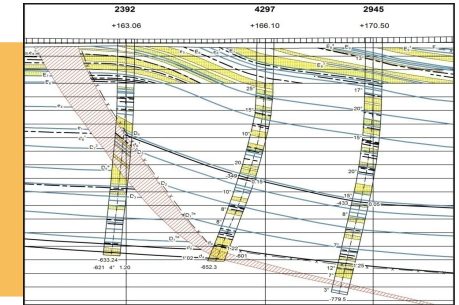


	Commercial projects	111 121 122
	Potentially commercial projects	211 221 222
	Non-commercial projects	331 332
	Exploration projects	333 334
	Additional quantities in place	341 342 343 344
	Other combinations	
	Extracted quantities	
	Classes, used in ukrainian Classification	
123	Codification (E ₁ , F ₂ , G ₁)	

1

Exploration Targets
Exploration Results
Mineral Resources
Mineral Reserves

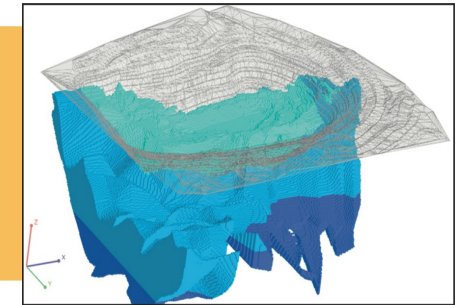
E F G



2

Scoping Study
Pre-feasibility Study
Feasibility Study

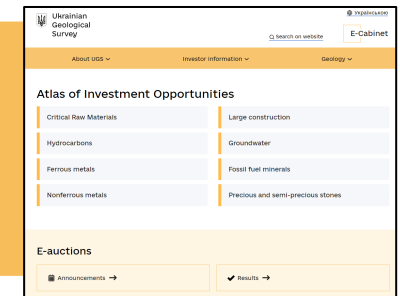
E F G



3

State Accounting of Mineral Deposits
Statistical data for production/extraction
Statistical data for resources and reserves
Licensing functions

E F G



State of the Balance of Mineral Deposits in 2022

State balance of Ukraine's minerals reserves

Mineral	Total number of deposits (subsoil areas)	Number of deposits assessed based on the Classification of Mineral Reserves and Resources of the State Subsoil Fund (UNFC)	Number of deposits assessed based on the 1960 and 1981 USSR Classifications
Natural gas	467	467	-
Oil	216	216	-
Metallic (ore)	157	64	93
Water (mineral, drinking, technical)	1873	717	1156
Coal	1039	512	527
Peat	682	55	627
Non-Metallic (construction, mining chemical, mining technical)	4738	1940	2798
Precious and collectible stones	19	19	-
Total	9191	3971	5201

Source: State Balance of Mineral Reserves of Ukraine (2022), State Geological Information Fund of Ukraine

Harmonization with the UNFC categories

E

Primary conditions	UNFC
Balance reserves of deposits and sites approved by the SCMR of the USSR, TCMR, or SCMR of Ukraine based on the 1960 and 1981 Classifications of the USSR	2xx Conditionally balance and off-balance reserves, the production and use efficiency of which cannot be unambiguously determined at the time of assessment
Off-balance reserves of deposits and sites approved by the SCMR of the USSR, TCMR, or SCMR based on the 1960 and 1981 Classifications of the USSR	3xx Reserves, the assessment of which has not been conducted, or it does not allow determining their commercial significance

F

Primary conditions	UNFC
Reserves of deposits and sites approved by the SCMR of the USSR, TCMR, or SCMR of Ukraine based on the 1981 and 1960 Classifications of the USSR and recognized as such that are prepared for commercial development	x2x The degree of justification of reserves extraction based on the determined optimal development project requires further detailed assessment
Reserves of deposits and sites approved by the ACMR, SCMR of the USSR, TCMR, or SCMR of Ukraine based on older Classifications of the USSR	x3x Possible commercial significance and profitability of the development cannot be reliably determined due to the lack of information, but existing positive results of geological exploration justify further geological exploration works to obtain additional data to assess the feasibility of development
Mineral reserves recorded in the Balance or Cadastre that have been approved by the ACMR, SCMR of the USSR, TCMR, or SCMR of Ukraine and recognized as explored or prospective for exploration	
Mineral reserves and resources, including residual reserves of previously operated deposits and sites that are reasonably classified as those that cannot be extracted using modern methods of development	x4x Mineral reserves and resources that cannot be extracted

G

USSR Classification	Primary conditions	UNFC
A B C ₁ C ₂	Reserves of deposits and sites approved by the SCMR of the USSR, TCMR, or SCMR for which the ratio of different categories of reserves corresponds to the SCMR guidelines	xx1
A B C ₁ C ₂	Reserves of deposits and sites approved by the SCMR of the USSR, TCMR, or SCMR for which the ratio of different categories of reserves does not correspond to the SCMR guidelines	xx2
A B C ₁ C ₂	Mineral reserves that are recorded in the Balance or Cadastre but they have not been approved by the SCMR of the USSR, TCMR, SCMR	xx2
A B C ₁ C ₂	Mineral reserves that are recorded in the Balance as previously explored and non-operated deposits with incomplete exploration	xx3

Ukraine's Critical Raw Materials

- more than 140 objects (deposits)
- 22 useful elements

Viabile Projects

Coking coal, Graphite, Manganese, Silicon metal, Titanium, Vanadium, Zircon

111+121+122
(additional 211, 221, 222)

Potentially Viabile Projects

Beryllium, Cobalt and Nickel, Copper, Hafnium, Lithium, REE, Scandium, Tantalum and Niobium

121+122
(additional 211, 221, 222)

Prospective Projects

Aluminium, Barite, Fluorspar, Germanium, Magnesium, Strontium

331+332
(additional 333, 334)

Minerals / Metals	Deposits (accounted / licensed objects)	UNFC code
Aluminium	3 / 0	331, 332
Beryllium	3 / 1	111, 122, 211, 222, 333, 334
Barite	1 / 0	331, 332
Cobalt and Nickel	12 / 3	122, 331, 332, 333
Coking coal	28 / 26	111, 122
Copper	5 / 3	122, 332, 333
Fluorspar	3 / 0	121, 331, 332, 333
Germanium	220 / 74 (no extraction)	331, 332
Graphite	6 / 2	111, 121, 222, 331, 332
Hafnium	2 / 2 (complex deposits)	111, 221, 331
Lithium	4 / 1	122, 222, 332
Magnesium	2 / 0	331, 332
Manganese	5 / 3	111, 121, 122, 221, 331, 332
Phosphorite ores	3 / 1	111, 122, 331, 332
Rare Earth Elements (REE)	3 / 2 (complex deposits)	122, 331, 332
Scandium	12 / 3 (complex deposits)	222, 332, 33
Silicon metal	6 / 6	111, 222, 332
Strontium	1 / 0 (complex deposits)	331, 332
Tantalum and Niobium	4 / 3 (complex deposits)	111, 122, 331, 332
Titanium	20 / 10	111, 121, 122, 221, 331, 332
Vanadium	8 / 7 (complex deposits)	111, 122, 221, 331, 332
Zircon	8 / 7 (complex deposits)	111, 122, 221, 222, 331, 332



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