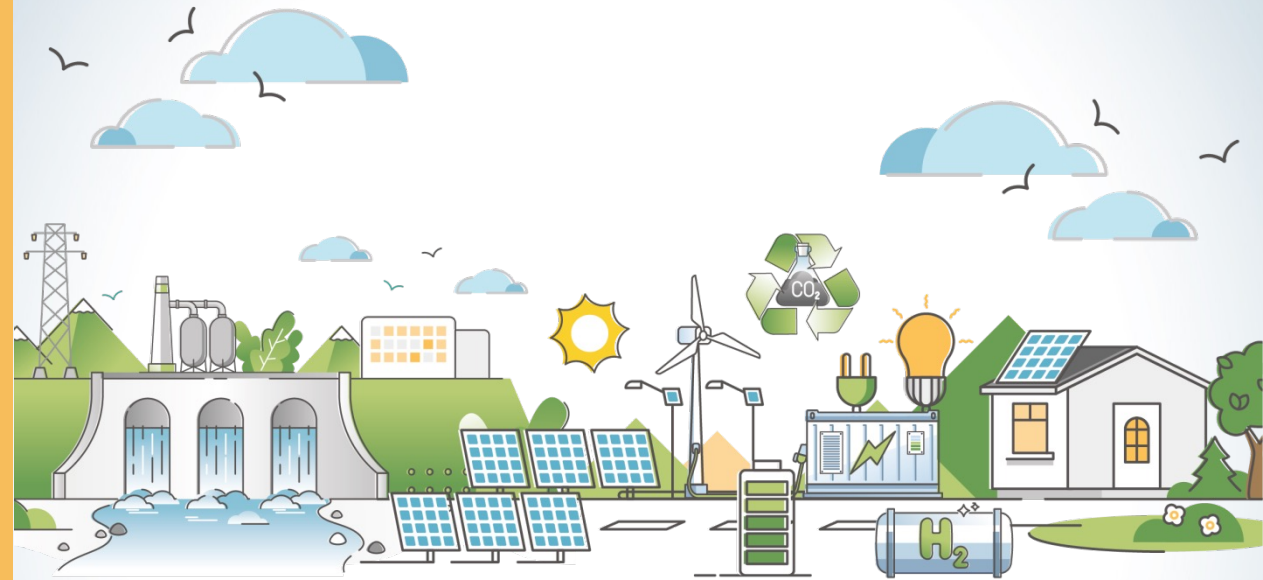


# Application of the UNFC for Solid Mineral Reserves, Estimated according to the USSR Classification's Principals

UKRAINIAN EXPERIENCE



**RESOURCE MANAGEMENT WEEK 2023**  
ASSURING SUSTAINABILITY IN RESOURCE MANAGEMENT



Ukrainian  
Geological  
Survey



State Commission of Ukraine  
on Mineral Resources



**UNECE**

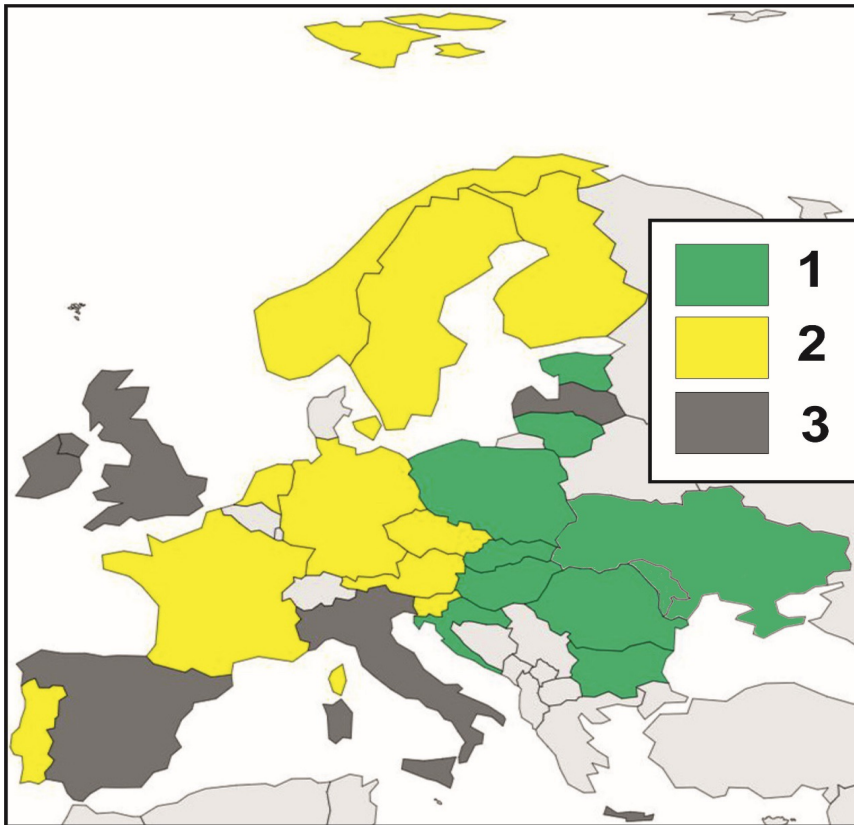
# The European Critical Raw Materials Act provides the use of the UNFC standards to estimate the mineral reserves and resources in Europe



- European commission indicated their support for availability and EU level harmonization of geological data in line with United Nations Framework Classification for Resources (UNFC)
- Member States would have to periodically report, using the UNFC classification system, on results from public and private exploration activities, that have already estimated mineral resources or reserves according to existing national or international reporting codes

Sources: [https://single-market-economy.ec.europa.eu/publications/european-critical-raw-materials-act\\_en](https://single-market-economy.ec.europa.eu/publications/european-critical-raw-materials-act_en)

# European countries mainly carry out systematic evaluation of mineral raw materials at the state level

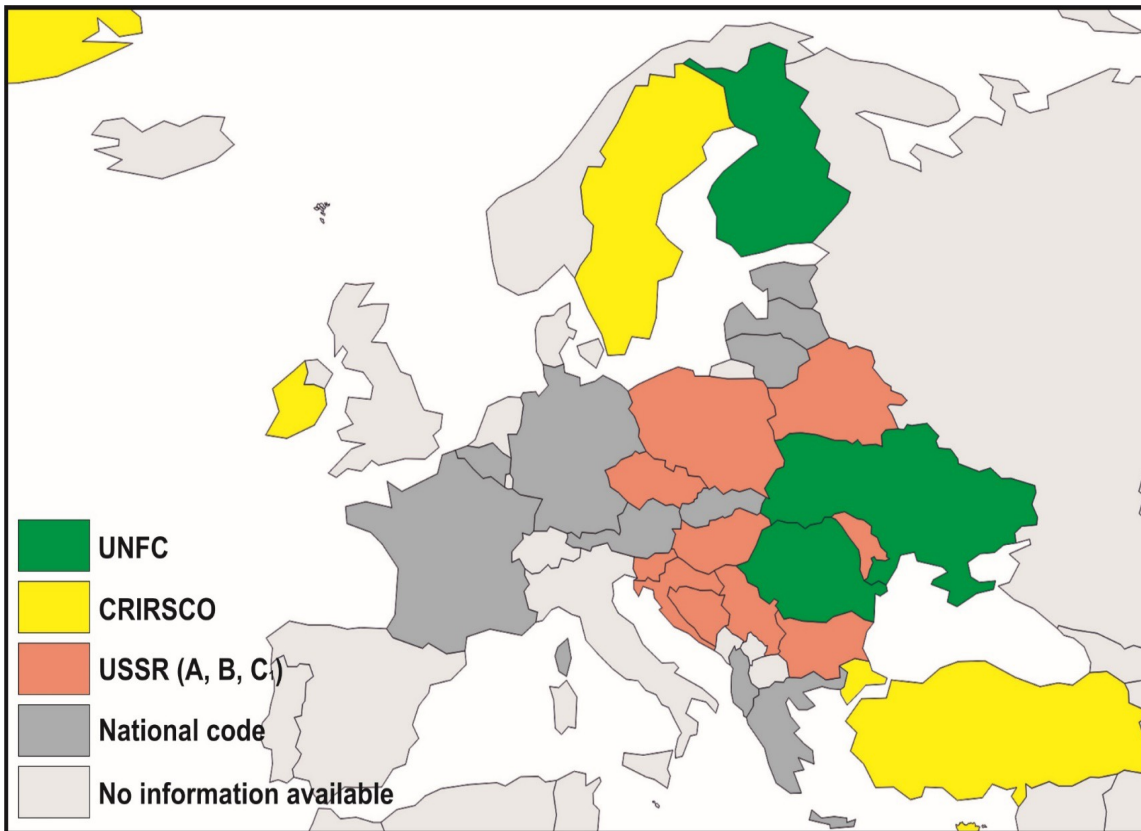


1. Countries where systematic evaluating of mineral raw material resources is required by the law (balance of mineral deposits, cadaster of mineral deposits and occurrences)
2. Countries where evaluating of mineral raw material resources is conducted in the form of consolidated informational reports (statistics of ministries, mineral bulletins, annual reports)
3. Countries where evaluating of mineral raw material resources is not conducted. Information is provided by various organizations in the form of company reports, scientific works, etc.

In European countries, primary the national institutions – such as geological surveys (30%) and statistical agencies (45%) – are responsible for evaluating

Source: ORAMA project (<https://orama-h2020.eu/>)

# Meanwhile, European countries (and the world) do not use a single approach in the evaluation of reserves and resources



- Today, only a few countries have adopted the methodology and approaches of the UNFC to evaluate the reserves and resources. In 1997, Ukraine was the first country in Europe and worldwide to implement the UNFC standards
- Many states of the former Warsaw bloc and countries of Eastern Europe have still used the USSR classification principles
- Meanwhile, in order to attract credit capital, mining companies often make resource estimates according to international PRMS system for hydrocarbons, JORC or NI43-101 from the CRIRSCO family for solid minerals

Source: ORAMA project (<https://orama-h2020.eu/>)

# In Ukraine more than 43% of deposits are estimated in line with the UNFC. However, 5 200 unlicensed fields have still required reassessment



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	0
Oil	216	216	0
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	0
<b>Total</b>	<b>9191</b>	<b>3971</b>	<b>5201</b>

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



# Ukraine initiates to develop the Bridging Document between former USSR evaluation system and the UNFC for solid minerals on unlicensed fields



- The Ukrainian Commission on Mineral Resources has developed the draft of Guideline, which could be the base for the future Bridging Document between the USSR and the UNFC classification for solid minerals and underground waters
- Ukraine has used this approach for solid minerals for many years and Ukraine proposes to share its experience with other European countries, which have still operated the Soviet evaluation system

# Key takeaways

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1. UNFC is a universal classification system of the global level, in which resources are classified on the basis of three fundamental criteria: environmental and socio-economic viability of the project, the status and justification of the field development project, geological study or the level of confidence of knowledge
2. Unlike other classification systems (CRIRSCO, PRMS), the UNFC is used for all types of minerals (mineral raw materials, hydrocarbons, renewable resources, anthropogenic resources, thermal, etc.)
3. The European Critical Raw Materials Act by 2030 provides the use of the UNFC standards to harmonize the information about the mineral reserves and resources in Europe
4. The UNFC is internationally harmonized through the use of Bridging documents with other classification systems CRIRSCO and PRMS. Meanwhile, it is missing a converter from former USSR evaluation system for solid minerals and underground waters, which is still used by many European countries
5. In Ukraine, more than 43% of deposits are estimated according to the UNFC, mainly these are deposits under development\*. More than 5,200 deposits, the lion's share of which are unlicensed, require reassessment
6. The Ukrainian Commission on Mineral Resources has developed the draft of Guideline, which could be the framework for the future Bridging Document between the USSR and the UNFC classification for solid minerals and underground water on unlicensed deposits

\* the legislation of Ukraine provides for the right to evaluate reserves according to international standards (PRMS, JORC, etc.)

**Back Up**



# Classification of the UNFC corresponds to the best international practices and has a number of advantages over stock evaluation systems



Criteria of the assessments	UNFC	National evaluations, based on USSR	CRIRSCO (JORC and NI)	PRMS
Geological assessment	✓	✓	✓	✓
Technical feasibility of the project	✓	✗*	✓	✓
Economic and social viability of the project	✓	✗	✓	✓
Types of mineral resources	all	all	solid	hydrocarbons

- UNFC is a universal system at the global level that classifies reserves and resources of all types of minerals, allowing to bring them to a single understandable value
- National systems based on the Soviet assessment approach determine the physical volume of mineral raw materials, without taking into account the economic feasibility or technological capacity of extraction
- CRIRSCO and PRMS assessment is required on a regular basis, as the size of commercially recoverable reserves and resources depends on current market conditions

\*. partially included in the Feasibility study of the project

# Assessment of minerals based on different classification systems



Mineral	UNFC	1960 and 1981 USSR Classifications	Committee for Mineral Reserves International Reporting Standards (CRIRSCO)	PRMS
Natural gas	✓	✓	✗	✓
Oil	✓	✓	✗	✓
Metallic (ore)	✓	✓	✓	✗
Water (mineral, drinking, technical)	✓	✓	✗	✗
Coal	✓	✓	✓	✗
Peat	✓	✓	✓ ✗	✗
Non-Metallic (construction, mining chemical, mining technical)	✓	✓	✓ ✗	✗
Precious and collectible stones	✓	✓	✗	✗
Geothermal energy	✓	✗	✗	✗
Solar energy, wind, biomass, stream power, ebb and flow energy	✓	✗	✗	✗
Anthropogenic resources	✓	✗	✗	✗

# General comparison scheme for classification systems



Level of confidence	UNFC					USSR Classification		
	Class	Subclass	Categories			Balance reserves	Off-balance reserves	Resources
<div>highest</div> <div>↑</div> <div>lowest</div>	Viable projects	Active	1	1	1	A, B, C <sub>1</sub>		
		Approved for development	1	1	2	A, B, C <sub>1</sub> (sometimes C <sub>2</sub> )		
	Potentially viable projects	Development is pending	2 (3)	2 (3)	1		A, B, C <sub>1</sub>	
			2 (3)	2 (3)	2		C <sub>2</sub> (sometimes C <sub>1</sub> )	
			2 (3)	2 (3)	3			P <sub>1</sub>
	Non-viable projects	Development is unclarified	3	3	3, 4			P <sub>2</sub> (P <sub>3</sub> )

# 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	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
B		
C <sub>1</sub>		
C <sub>2</sub>	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 <sub>1</sub>	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
C <sub>2</sub>		
A		
B	Mineral reserves that are recorded in the Balance as previously explored and non-operated deposits with incomplete exploration	xx3
C <sub>1</sub>		
C <sub>2</sub>		