



# GSEU

**GEOLOGICAL SERVICE | FOR EUROPE**

## **GSEU WP2 TRAIN-THE-TRAINER COURSE**

### **Module: Introduction**

### **Level 1**

**Ljubljana , 15-16 April 2024**

**Antje Wittenberg, BGR**

**Janne Hokka, GTK**

**Tuomas Leskela, GTK**

[www.geologicalservice.eu](http://www.geologicalservice.eu)



**Funded by  
the European Union**



## Basic information - Official Documents I

- UNFC developments through time
- Recall the UNFC concept
- Overview of interlinkages of concepts of reporting schemes
- Datasets principles
- Introduction of the basic UNFC documents

# slido



**Take a guess ... when did the work to develop a universal classification system – now known as UNFC was initiated?**

① Start presenting to display the poll results on this slide.



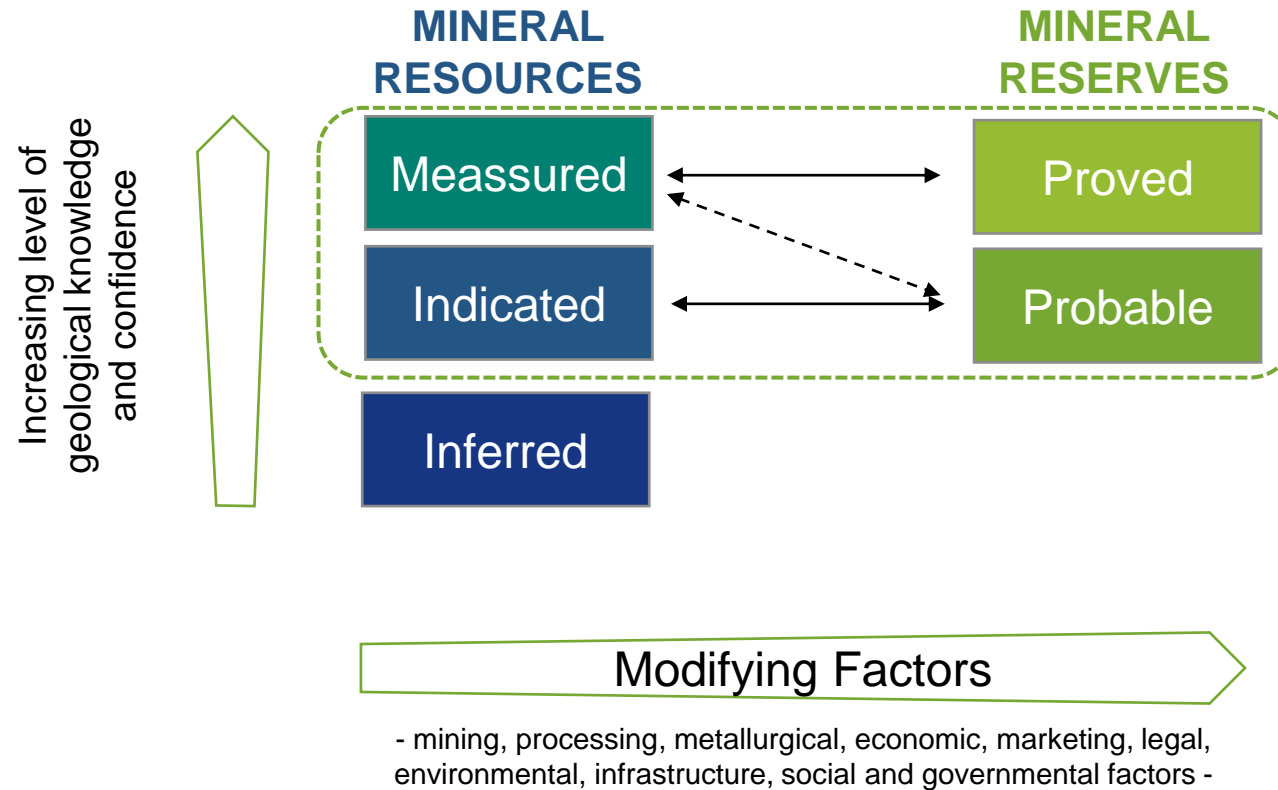


# UNFC developments through time

- 1965 • **1st Red Book** by ENEA and OECD – classified uranium resources according to a) **Reasonably Assured Resources** and b) **Estimated Additional Resources** in combination with Cost Categories
- 1975 • UN' Economic and Social Council was calling for the development of a mineral resources classification system to be used in reporting data.
- 1976 • Principles of the Mineral Resource Classification system of the U.S. Bureau of Mines and U.S.G.S. (USGS Bulletin 1450-A), based on “Mineral Resource Estimates and Public Policy” (McKelvey, **1972**, American Scientist, V.60, No.1, p.32-40)
- 1992 • UNECE Working Party on Coal initiated the 1st version of the UNFC to create an instrument on an internationally consistent and uniform basis using market economic criteria; **1997** approved the 3-dimensional **proven - probable - possible** concept.
- 2004 • Agreement on 3-dimensional approach a) **geological assessment**, b) **feasibility assessment** and c) **degree of economic viability**
- 2009 • Simplified **United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources** version with full adaptation for oil, gas and uranium resources allowing for bridging
- 2016 • Adaptation for **other resources** since, e.g. geothermal, **anthropogenic**, groundwater and integrated renewable resource classification (geothermal, bioenergy, solar, wind, hydropower) since 2021
- 2019 • **UNFC 2019 Update** integrating environmental and social aspects renamed as **United Nations Framework Classification for Resources** in response to the extensions since 2016
- 2022 • **UNFC GUIDANCE EUROPE** a Guidance for the Application of the UNFC for **Mineral and Anthropogenic Resources** in Europe in line with the EU INSPIRE Directive



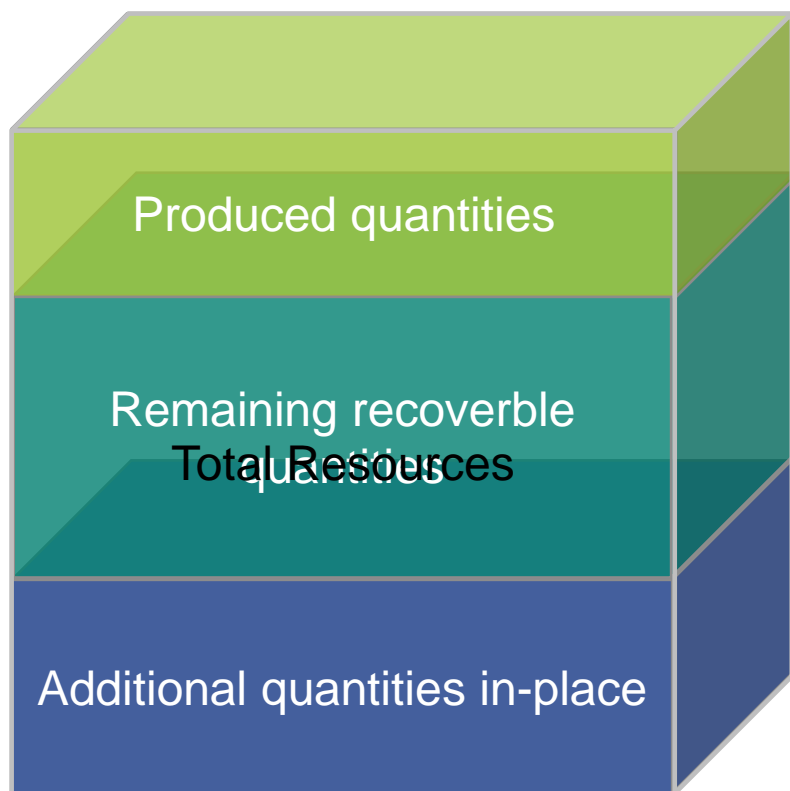
# General relation between mineral resources and mineral reserves





# UNFC developments - Basic principles

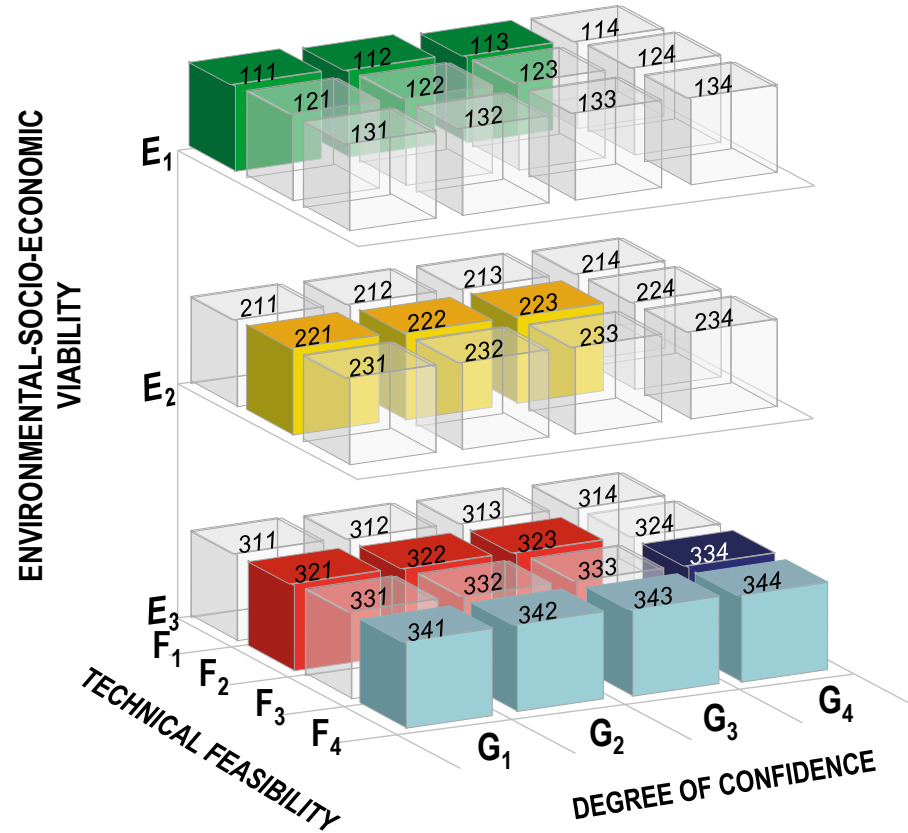
Total Resources *initially* in-place of naturally occurring energy and mineral resources, are described in terms of:



- sum of sales quantities and non-sales quantities as determined at their respective reference points between a specified initial time up to a given date and time.
- sum of sales quantities and non-sales quantities estimated to be produced at the respective reference points from a given initial time up to a given date and time. **UNFC focus on remaining recoverable quantities**
- quantities estimated to be in-place at the initial time, less the sum of the produced quantities and the estimated remaining recoverable quantities.



# UNFC recent concept



The UNFC 2019 update provides additional information about:

- the degree of knowledge/information (G-axes);
- the degree of technical feasibility (F-axes);
- the degree of social and environmental viability (E-axes).

# slido



**So let's see – anything you already remember?**

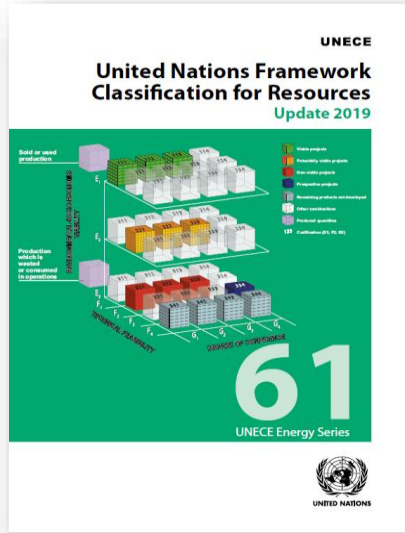
**Name up to 3 UNFC documents you are aware of.....**

① Start presenting to display the poll results on this slide.

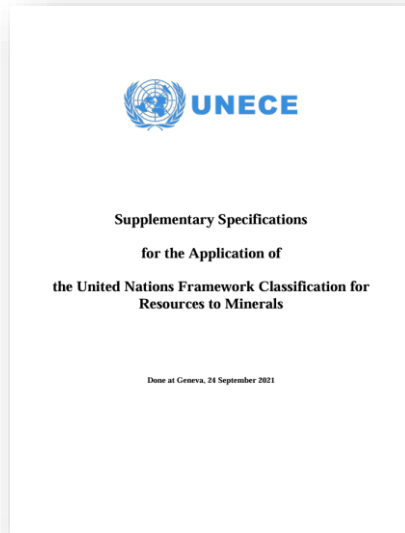




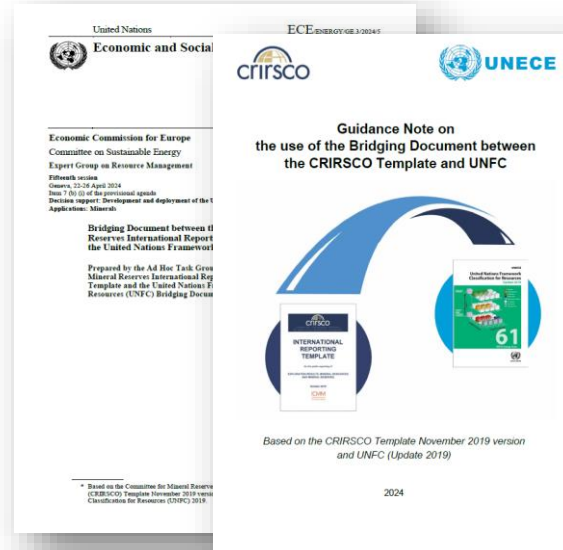
# Main Documents



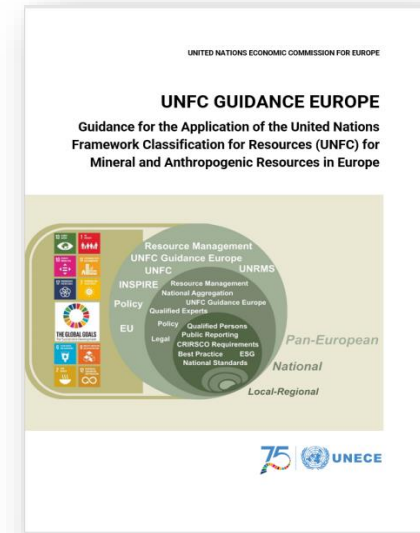
**Generic, global standard, UNFC Principles**  
*All*



**Specifications for mineral projects**  
*Competent Persons  
Qualified Experts  
Mineral Companies  
GeoSurveys*



**CRIRSCO to UNFC Bridging**  
*Competent Persons  
Qualified Experts  
Mineral Companies  
GeoSurveys*



**UNFC and INSPIRE**  
*Qualified Experts  
GeoSurveys  
Authorities (national and EU level)*



# UNFC 2019 update

A UNFC-based inventory will facilitate decision-making by stakeholders related to raw material stocks and flows in Europe. Reliable and relevant information on Sources and Products is important for:



**Public-sector decision-making** ranging from onsite, municipality, regional, country and European level on aspects of the resource life cycle



**Economic management** for planning, organization, and leading activities of management of all corporate levels

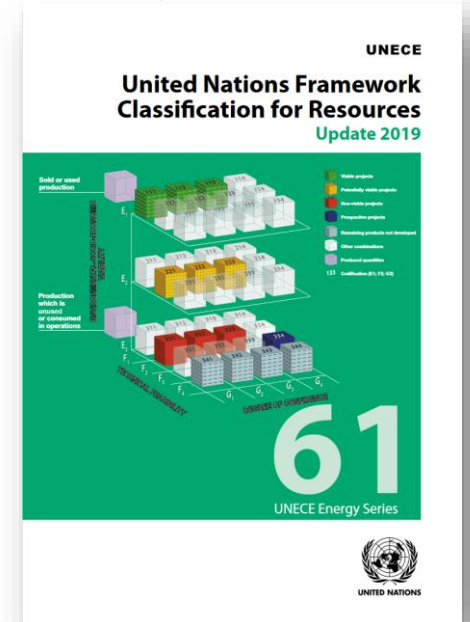


**Finance investment** decision making considering economic, environmental, and social aspects of raw material Projects



In **expertise, knowledge, and education**

Available also in various languages, incl. unofficial translations such as German, Greek, Hungarian, Portuguese, Slovenian provided by GSOs mainly.



**Note: The UNFC is non-mandatory. Yet, it is of growing importance within the EU.**



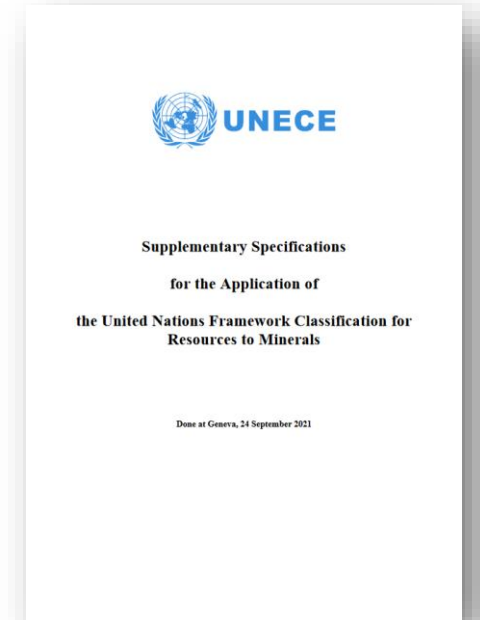
## Supplementary Specifications for the Application - Mineral Projects

Specifies functional requirements to classify mineral projects, incl.:

- a) Project plan and definition;
- b) Project evaluation;
- c) Project classification;
- d) Project reporting.

Covering all stages of a Minerals Project in the mineral cycle from Prospecting/Exploration to Remediation.

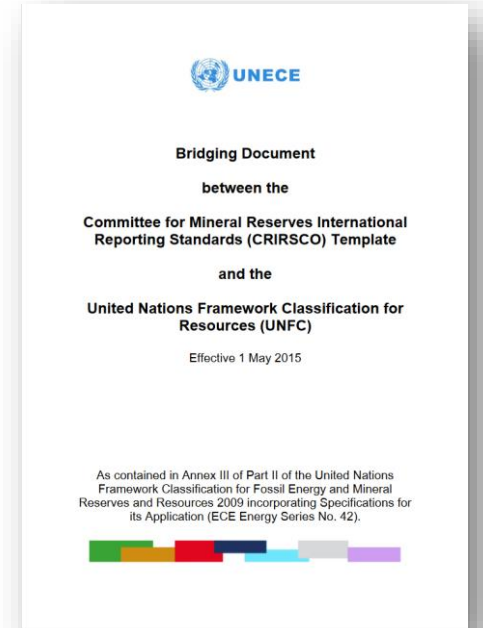
Recommended for Competent Persons; Qualified Experts; Mineral Companies; GeoSurveys and Mining Authorities in particular.





# CRIRSCO-UNFC Bridging Document 2024

- A Bridging Document generally provides instructions on how to classify estimates generated by application of that system using the UNFC Numerical Codes and vice versa.
- Explains the relationship between UNFC-2009 and another classification system that has been endorsed by the Expert Group on Resource Classification as an Aligned System.
- Provides guidance
  - For **Qualified Experts, Competent Persons** and other users from industry and authorities
  - on subcategories



**Note:** In case of resource and reserve data reported inline with CRIRSCO the bridging advice should be followed. An up-date release is expected by end of April, see [UNECE.org](http://UNECE.org).



# UNFC Guidance for Europe

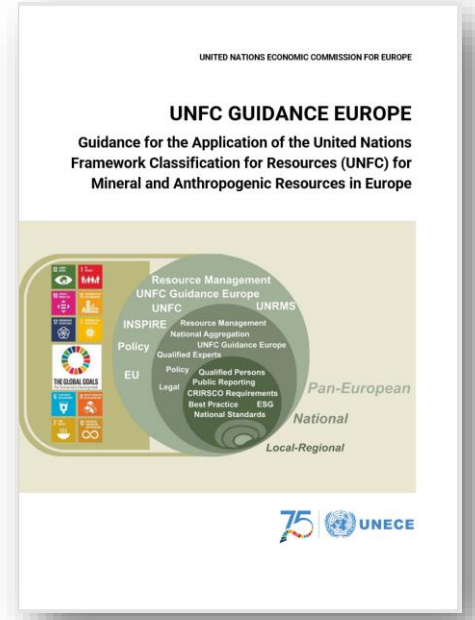
Mineral raw materials projects of the extractive industry from geogenic resources (geological occurrences), and residues, e.g. tailings, stockpiles, waste rocks ➔ anthropogenic resources.

## Guidance for

- Users, incl. regional and national authorities to facilitate decision-making and maintain databases for primary and secondary raw materials Projects based on UNFC
  - ➔ [Section “Overview of UNFC Implementation for European Regional and National Authorities”. Bridging to INSPIRE.\(Table10\)](#)
- Qualified Experts and estimate preparers to classify primary and secondary raw materials Projects using UNFC
  - ➔ Section “Practical Guidance in Applying UNFC for Primary and Secondary Raw Materials in Europe” and Annexes.

## Assist

- to establish and maintain primary and secondary raw materials projects inventory;
- in classifying projects and sources according to UNFC 2019 update.
- to provide a uniform raw materials dataset suitable for aggregated data across Europe for both primary and secondary raw material.

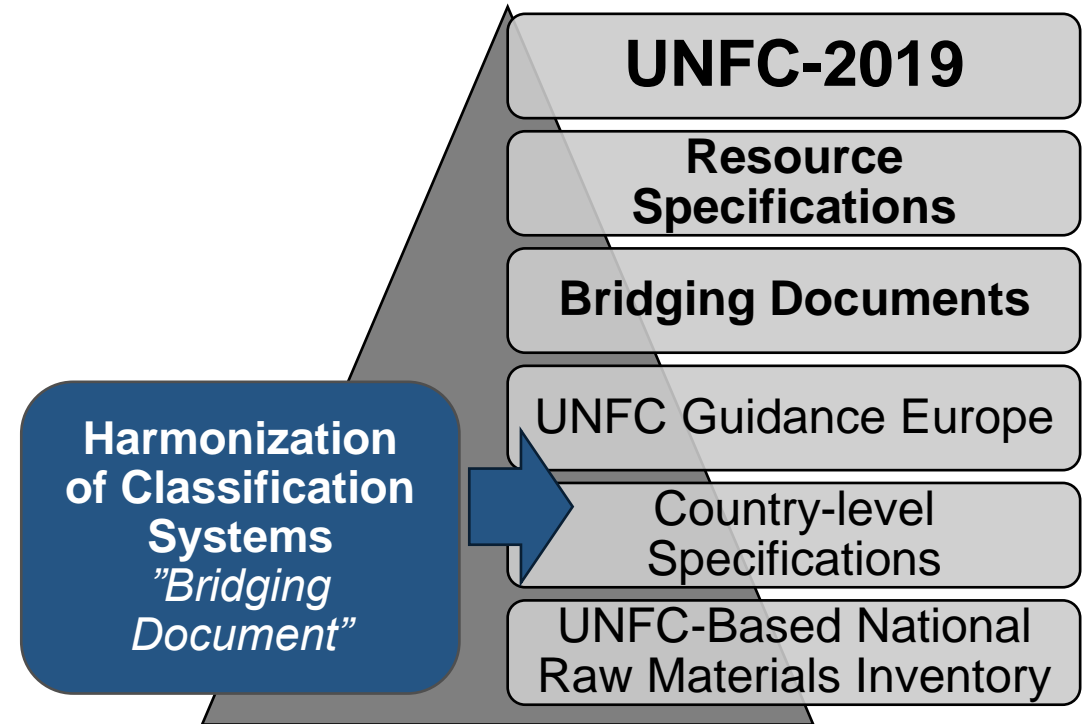


**Note: The use of the UNFC Guidance Europe document is non-mandatory, but recommended.**



# UNFC Document hierarchy

- Within the hierarchy, documents at higher levels consistently **override** those at lower levels.
- Supplemental specifications for **Minerals** provide the guideline to **apply the three axes of the rating matrix to mineral projects**.
- Guidance-level documents are not mandatory UNFC documents; instead, they provide detailed guidance on the use of UNFC and assist users who are applying it.







# Guidance Note to support the UNFC 2009

## - Definition of a Project -

A **Project** is a defined **development or mining operation** which provides the **basis for economic evaluation and decision-making**. In the early stages of evaluation, incl. exploration, the Project might be defined only in conceptual terms, whereas more mature Projects will be defined in significant detail.

**Where no development or mining operation can currently be defined** for all or part of a deposit, based on existing technology or technology currently under development, all quantities associated with that deposit (or part thereof) are **classified in Category F4**.

A Project comprises a defined activity, or set of activities, which **provides** the **basis for estimating both costs and potential revenues** associated with its implementation.

**Note: UNFC-2009 was designed as a Project-based system for the evaluation and classification of fossil energy and mineral reserves and resources located on or below the Earth's surface.**



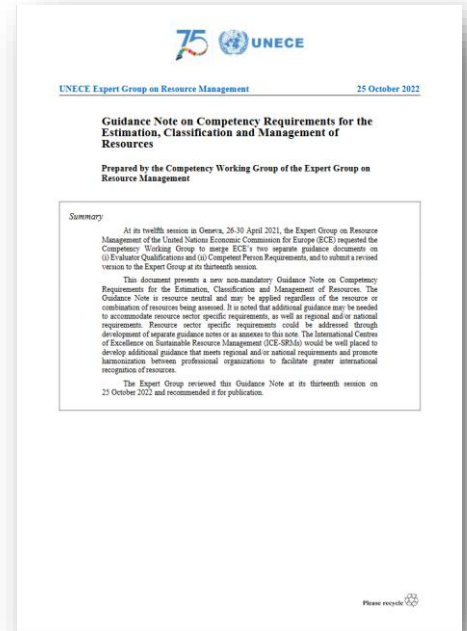


# Guidance Note on Competency Requirements for the Estimation, Classification and Management of Resource

The Guidance Note is resource neutral and may be applied regardless of the resource or combination of resources being assessed. It defines:

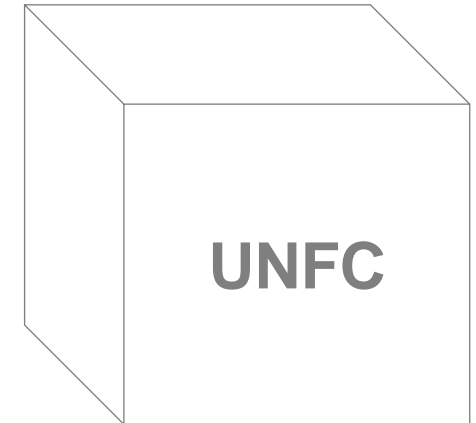
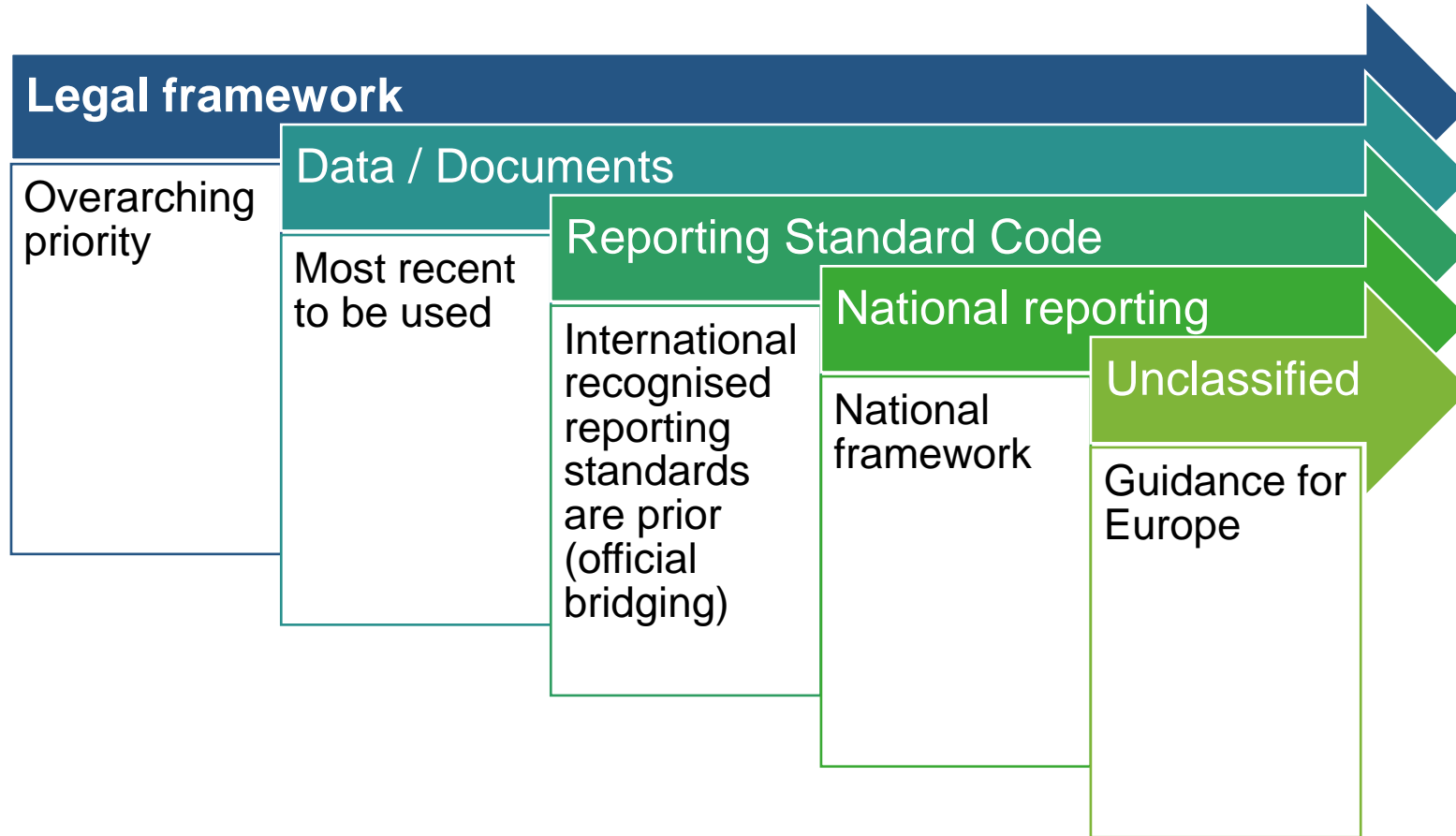
- **Professional Organization (PO):** a self-regulatory professional association or statutory body (e.g. government authority) that admits individuals on the basis of their academic qualifications, experience, and ethical fitness [...].
- **Qualified Assessment (QA):** a formal report pertaining to the estimated quantities and/or value of resources made by a Qualified Expert [...].
- **Qualified Expert (QE):** an independent person with education, training and relevant professional experience in a discipline pertinent to a resource, acting in compliance with the professional standards of competence and ethics established by his/her PO. This person is responsible for the standards and methodologies used for collecting, analysing and verifying information used in a QA

**Note: The Guidance Note on Competency Requirements for the Estimation, Classification and Management of Resource is non-mandatory**





# Dataset principles for bridging





## Take home message

- UNFC is a tool to communicate the availability of resources and the maturity level of Projects by applying generic principles and harmonized terminology for classifying.
- Several documents are conducted to support users, to ensure harmonized terminology and to provide guidance for bridging existing mineral data inventories to UNFC.
- When applying UNFC the legal framework followed by binding documents shall be respected.
- UNFC is a resource classification system while resource estimation is with the Competent Person.
- UNFC has its **limits** as for example it is currently **not a legally mandated standard** for financial reporting or for minerals inventory reporting within the vast majority of countries.



## UNFC documents related to minerals

	Title	Year	URL
<b>Generic</b>	United Nations Framework Classification for Resources Update 2019	2020	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/publ/UNFC_ES61_Update_2019.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/publ/UNFC_ES61_Update_2019.pdf</a>
<b>Specifications for the Application of the UNFC to</b>	<b>Minerals</b> - outlines the Supplementary Specifications for the Application of the UNFC to Minerals Projects -	2021	<a href="https://unece.org/sites/default/files/2022-01/UNFC%20Mineral%20Specifications%202021.pdf">https://unece.org/sites/default/files/2022-01/UNFC%20Mineral%20Specifications%202021.pdf</a>
	<b>Anthropogenic Resources</b> - specifies the UNFC terminology and principles to enable its application to Anthropogenic Resources. Anthropogenic Resources can be found in a variety of sources, including: mine tailings, buildings, infrastructure, consumer goods, and from all the material life cycle stages, including production, use and end-of-life.-	2018	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/Anthropogenic_Resources/UNFC_Antropogenic_Resource_Specifications.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/Anthropogenic_Resources/UNFC_Antropogenic_Resource_Specifications.pdf</a>



# UNFC documents related to minerals

	Title	Year	URL
Guidelines	Guidance Note to support the UNFC 2009 <u>Definition</u> of a Project	2016	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/UNFC-Guidance-Notes/UNFC.Project.Guidance.Note_15.07.2016.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/UNFC-Guidance-Notes/UNFC.Project.Guidance.Note_15.07.2016.pdf</a>
	Principles of resource classification (ECE/ENERGY/GE.3/2020/3)	2020	<a href="https://unece.org/sites/default/files/2022-01/ECE_ENERGY_GE.3_2020_3e.pdf">https://unece.org/sites/default/files/2022-01/ECE_ENERGY_GE.3_2020_3e.pdf</a>
	Social & environmental considerations (ECE/ENERGY/GE.3/2021/6)	2021	<a href="https://unece.org/sites/default/files/2022-01/ECE_ENERGY_GE.3_2021_6e.pdf">https://unece.org/sites/default/files/2022-01/ECE_ENERGY_GE.3_2021_6e.pdf</a>
	UNFC - Glossary of Common Terms (ECE/ENERGY/GE.3/2022/3)	2022	<a href="https://unece.org/sites/default/files/2022-03/ECE_ENERGY_GE.3_2022_3.pdf">https://unece.org/sites/default/files/2022-03/ECE_ENERGY_GE.3_2022_3.pdf</a>
	Guidance Note on <u>Competency Requirements</u> for the Estimation, Classification and Management of Resources	2022	<a href="https://unece.org/sites/default/files/2022-11/Guidance_Note_on_Competency_Requirements_25_October_2022.pdf">https://unece.org/sites/default/files/2022-11/Guidance_Note_on_Competency_Requirements_25_October_2022.pdf</a>
	UNFC <u>Guidance for Europe</u>	2022	<a href="https://unece.org/sites/default/files/2022-11/UNFC%20GUIDANCE%20EUROPE-FINAL.pdf">https://unece.org/sites/default/files/2022-11/UNFC%20GUIDANCE%20EUROPE-FINAL.pdf</a>
Bridging	NEA/IAEA ‘Red Book’ (ECE/ENERGY/2014/6)	2014	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/comm23/ECE.ENERGY.2014.6_e.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/comm23/ECE.ENERGY.2014.6_e.pdf</a>
	to CRIRSCO Template (Revised 1 May 2015)	2015	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/UNFC_specs/Revised_CRIRSCO_Template_UNFC_Bridging_Document.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/UNFC/UNFC_specs/Revised_CRIRSCO_Template_UNFC_Bridging_Document.pdf</a>
	China Classification for Resources/Reserves of Solid Fuels and Mineral Commodities	2018	<a href="https://unece.org/fileadmin/DAM/energy/se/pdfs/Comm27/ece.energy.2018.5_e_UNFC_China_Minerals_BD_FINAL_as_submitted.pdf">https://unece.org/fileadmin/DAM/energy/se/pdfs/Comm27/ece.energy.2018.5_e_UNFC_China_Minerals_BD_FINAL_as_submitted.pdf</a>



slido



## Where to find specifications for Qualified Expert?

① Start presenting to display the poll results on this slide.



11h30 – 12h30

## Slido, Q&A and discussion

- Theory
- CRIRSCO-to-UNFC for active projects
- underpinning plenary case exercise



# GSEU

**GEOLOGICAL SERVICE | FOR EUROPE**

**Thank you for your attention**

**Antje Wittenberg, BGR**

**Janne Hokka, GTK**

**Tuomas Leskela, GTK**

[www.geologicalservice.eu](http://www.geologicalservice.eu)



**Funded by  
the European Union**

