D R A F T

United Nations Framework Classification for Fossil Energy and Mineral Resources 2008 (UNFC-2008)

SECTION I

1. The United Nations Framework Classification (UNFC-2008) applies to fossil energy and mineral resources located in the subsoil. It serves the needs for classification at a global level (for energy and mineral supply studies), for governments (resources management and policy formulation), for industry (business process management) and for financial reporting.

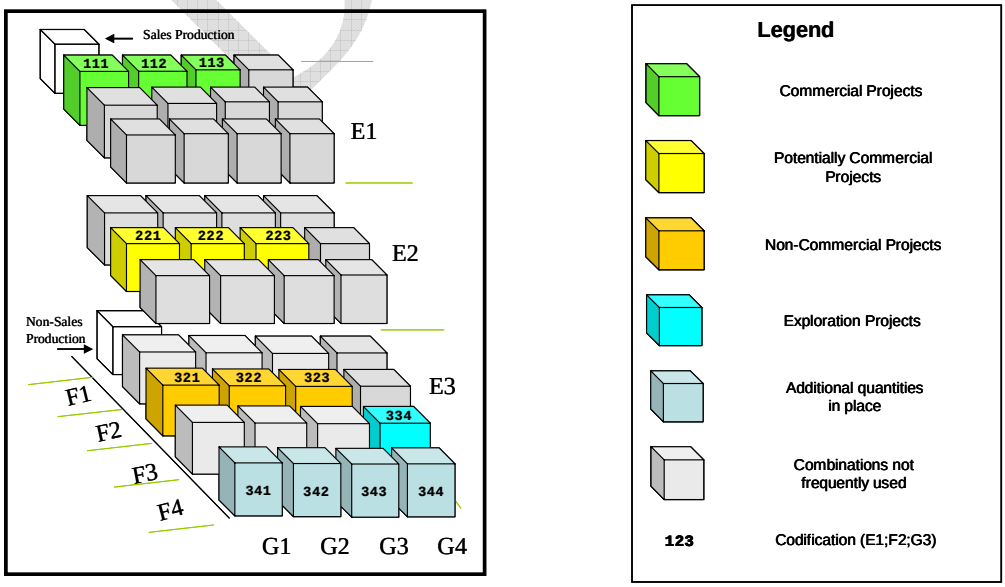
SECTION II

2. The UNFC is a generic system in which quantities are classified on the basis of the three fundamental criteria of economic and social viability (E), field project status and feasibility (F), and geological knowledge (G), using a numerical coding system. Combinations of these criteria create a three-dimensional system. Categories (e.g. E1, E2, E3) and, in some cases, sub-categories (e.g. E1.1) are defined for each of the three criteria as set out and defined in Annexes I and II.

3. The first set of categories (the E axis) designates the degree of favourability of social and economic conditions in establishing the commercial viability of the project, including consideration of market prices and relevant legal, regulatory, environmental and contractual conditions. The second set (the F axis) designates the maturity of studies and commitments necessary to implement mining plans or development projects. These extend from early exploration efforts before a deposit or accumulation has been confirmed to exist through to a project that is extracting and selling a commodity, and reflect standard value chain management principles. The third set of categories (the G axis) designates the level of certainty in the geological knowledge and potential recoverability of the quantities.

4. The categories and sub-categories are the building blocks of the system, and are combined in the form of "classes". The UNFC can be visualised in three dimensions, as shown in Figure 1, or represented in a practical two-dimensional abbreviated version as shown in Figure 2.

Figure 1. UNFC categories and examples of classes



SECTION III

5. A class is uniquely defined by selecting from each of the three criteria a particular combination of a category or a sub-category (or groups of categories/sub-categories). Since the codes are always quoted in the same sequence (i.e. E; F; G), the letters may be dropped and just the numbers retained. The numerical code defining a class is then identical in all languages using Arabic numerals.

6. While there are no explicit restrictions on the possible combinations of E, F and G categories or sub-categories, only a limited number will generally be applicable. For the more important combinations (classes and sub-classes), specific labels are provided as a support to the numerical code, as illustrated in Figure 2.

Figure 2. Abbreviated version of the UNFC, showing primary classes

Total commodity initially in place	Past Production	Sales Production / Non-sales Production[1]	Class	Categories E	Categories F	Categories G[2]
	Future recovery by commercial development projects or mining operations		Commercial Projects[3]	1	1	1, 2, 3
	Potential future recovery by contingent development projects or mining operations		Potentially Commercial Projects[4]	2[5]	2	1, 2, 3
			Non-Commercial Projects[6]	3	2	1, 2, 3
	Additional quantities in place associated with known deposits[7]			3	4	1, 2, 3
	Potential future recovery by successful exploration activities		Exploration Projects	3	3	4
	Additional quantities in place associated with potential deposits[9]			3	4	4

[1] Future non-sales production is categorized as E3.1. Resources that will be extracted but not sold can exist for all classes of recoverable quantities. They are not shown in the figure.
[2] G categories may be used discretely, particularly when classifying solid minerals and quantities in place, or in cumulative form (e.g. G1+G2), as is commonly applied for recoverable fluids.
[3] Commercial Projects have been confirmed to be technically, economically and socially feasible. Recoverable quantities associated with Commercial Projects are defined in many classification systems as Reserves, but the term Reserves is widely misunderstood.
[4] Potentially Commercial Projects are expected to be developed in the foreseeable future, in that the quantities are assessed to have reasonable prospects for eventual economic extraction, but technical and/or commercial feasibility has not yet been confirmed. Consequently, not all Potentially Commercial Projects may be developed.
[5] In some cases, Potentially Commercially Projects may satisfy the requirements for E1.
[6] Non-Commercial Projects include those that are at an early stage of evaluation in addition to those that are considered unlikely to become technically and commercially feasible developments within the foreseeable future.
[7] A portion of these quantities may become recoverable in the future as commercial circumstances change or technological developments occur. Depending on the commodity type and recovery technology (if any) that has already been applied, some or all of these quantities may never be recovered due to physical and/or chemical constraints.

7. As shown in Figure 2, the total commodity initially in place is classified at a given date in terms of the following:

(a) Recovered quantities that have been sold – Sales Production.

(b) Recovered quantities that have not been sold – Non-sales Production.

(c) Quantities associated with a known deposit that may be recovered in the future by extractive activities. Technical and commercial evaluation studies based on defined development projects or mining operations constitute the basis for the classification.

(d) Additional quantities in place associated with a known deposit that will not be recovered by any currently defined development project or mining operation.

(e) Quantities associated with a potential deposit that may be recovered in the future provided that the deposit is confirmed.

(f) Additional quantities in place associated with a potential deposit that would not be expected to be recovered even if the deposit is confirmed.

8. Material balance of total quantities can be maintained by full application of the classification. For this purpose a reference point shall be established where the quantity, quality and sales (or transfer[8]) price of recovered quantities are determined.

9. With the exception of past production that may be measured, quantities are always estimated. There will be a degree of uncertainty associated with the estimates. The uncertainty is communicated either by quoting discrete quantities of decreasing levels of confidence (high, moderate, low) or by generating three specific scenarios or outcomes (low, best and high estimates). The former approach is typically applied for solid minerals, while the latter method is commonly used in petroleum. A low estimate scenario is directly equivalent to a high confidence estimate (i.e. G1), whereas a best estimate scenario is equivalent to the combination of the high confidence and moderate confidence estimates (G1+G2). A high estimate scenario is equivalent to the combination of high, moderate and low confidence estimates (G1+G2+G3). Quantities may be estimated using deterministic or probabilistic methods.

10. Where relevant, discovered quantities that may be recovered in the future are subdivided into quantities that are forecast to be sold and quantities that are forecast to be extracted but not sold.

11. Potentially recoverable quantities may be recovered in the future through projects that are contingent on one or more conditions yet to be fulfilled. Contingent projects are classified into projects for which the social and economic conditions are expected to be acceptable for implementation and those where they are not. In the former case, contingency is caused by the recovery project not being sufficiently matured to confirm technical and/or commercial feasibility, which can then provide the basis for a commitment to extract and sell the commodity at a commercial scale. In the latter case, neither the project nor the economic and social conditions are sufficiently matured to indicate a potential for commercial recovery and sale. A deposit or an accumulation may give rise to several projects with different status.

[8] In large integrated projects, it may be necessary to determine an internal “transfer” price between “upstream” operations and “midstream” or “downstream” operations based on a netback calculation.

SECTION IV

12. For further clarity in global communications, additional generic UNFC sub-classes are defined based on the full granularity provided by the sub-categories included in Annex II. These are illustrated in Figure 3.

Figure 3. UNFC classes and sub-classes defined by sub-categories[9]

UNFC Classes defined by categories and sub-categories						
Total commodity initially in place	Recovered	Sales Production				
		Non-sales Production				
	Class		Sub-class	Categories		
				E	F	G
	Known Deposit	Commercial Projects	On Production	1	1.1	1, 2, 3
			Approved for Development	1	1.2	1, 2, 3
			Justified for Development	1	1.3	1, 2, 3
		Potentially Commercial Projects	Development Pending (economic)	1	2.1	1, 2, 3
			Development Pending (marginal)	2	2.1	1, 2, 3
			Development On Hold	2	2.2	1, 2, 3
		Non-Commercial Projects	Development Unclarified	3.2	2.2	1, 2, 3
			Development Not Viable	3.3	2.3	1, 2, 3
		Additional quantities in place		3.3	4	1, 2, 3
	Potential Deposit	Exploration Projects	None defined[10]	3.2	3	4
		Additional quantities in place		3.3	4	4

SECTION V

13. Classifications other than the one shown in Figure 2 can be generated by choosing appropriate combinations of categories, or by grouping or further subdividing the categories. This permits the harmonization of resource inventories that are developed on the basis of different classification systems.

14. Conversely, when the unabbreviated UNFC is used to build a resource inventory, this can be converted to inventories developed on other harmonized classifications without going back to the basic resource information.

SECTION VI

15. Classifications often need to be adapted to national or local needs. Modifications of this nature should be checked for consistency with the unabbreviated UNFC and other applications in use.

[9] Refer also to the footnotes for Figure 2.

[10] Generic sub-classes have not been defined here, but it is noted that in petroleum the terms Prospect, Lead and Play are commonly adopted.

Annex I. Definition of Categories and Explanatory Notes

Category	Definition	Explanatory Notes
E1	**Extraction and sale has been confirmed to be economically viable.**	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions. All necessary approvals/contracts have been confirmed or there are reasonable expectations that all such approvals/contracts will be obtained within a reasonable timeframe. Economic viability is not affected by short-term adverse market conditions provided that longer-term forecasts remain positive.
E2	**Extraction and sale is expected to become economically viable in the foreseeable future**.	Extraction and sale has not yet been confirmed to be economic but, on the basis of realistic assumptions of future market conditions, there are reasonable prospects for economic extraction and sale in the foreseeable future.
E3	**Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic viability.**	On the basis of realistic assumptions of future market conditions, it is currently considered that there are no reasonable prospects for economic extraction and sale in the foreseeable future; or, economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase). Also included are quantities that are forecast to be extracted, but which will not be available for sale.
F1	**Feasibility of extraction by a defined development project or mining operation has been confirmed.**	Extraction is currently taking place; or, implementation of the development project or mining operation is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.
F2	**Feasibility of extraction by a defined development project or mining operation is subject to further evaluation.**	Preliminary studies demonstrate the existence of a deposit in such form, quality and quantity that the feasibility of extraction by a defined (at least in broad terms) development project or mining operation can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of extraction.
F3	**Feasibility of extraction by a defined development project or mining operation cannot be evaluated due to limited technical data.**	Very preliminary studies (e.g. during the exploration phase), which may be based on a defined (at least in conceptual terms) development project or mining operation, indicate the need for further data acquisition in order to confirm the existence of a deposit in such form, quality and quantity that the feasibility of extraction can be evaluated.
F4	**No development project or mining operation has been identified.**	In situ (in-place) quantities that will not be extracted by any currently defined development project or mining operation.
G1	**Quantities associated with a known deposit that can be estimated with a high level of confidence.**	For in situ (in-place) quantities, and for recoverable estimates of fossil energy and mineral resources that are extracted as solids, quantities are typically categorised discretely, where each discrete estimate reflects the level of geological knowledge and confidence associated with a specific part of the deposit. The estimates are categorised as G1, G2 and/or G3 as appropriate. For recoverable estimates of fossil energy and mineral resources that are extracted as fluids, their mobile nature generally precludes assigning recoverable quantities to discrete parts of an accumulation. Recoverable quantities must be evaluated on the basis of the impact of the development scheme on the accumulation as a whole and are categorised on the basis of three scenarios or outcomes that are equivalent to G1, G1+G2 and G1+G2+G3.
G2	**Quantities associated with a known deposit that can be estimated with a moderate level of confidence.**	
G3	**Quantities associated with a known deposit that can be estimated with a low level of confidence.**	
G4	**Estimated quantities associated with a potential deposit, based primarily on indirect evidence.**	Quantities that are estimated during the exploration phase are subject to a substantial range of uncertainty as well as a major risk that no development project or mining operation may subsequently be implemented to extract the estimated quantities.

Notes:

(a) The term “extraction” is equivalent to “production” when applied to petroleum.
(b) The term “deposit” is equivalent to “accumulation” or “pool” when applied to petroleum.
(c) The phrase “economically viable” encompasses economic (in the narrow sense) plus other relevant “market conditions”, and includes consideration of prices, costs, legal/fiscal framework, environmental, social and all other non-technical factors that could directly impact the viability of a development project.

Annex II. Definition of Sub-Categories

Category	Sub-Category	Sub-Category Definition
E1	**E1.1**	Extraction and sale is economic on the basis of current market conditions and realistic assumptions of future market conditions.
	E1.2	Extraction and sale is not economic on the basis of current market conditions and realistic assumptions of future market conditions, but is made viable through government subsidies and/or other considerations.
E2	None defined.	
E3	**E3.1**	Quantities that are forecast to be extracted, but which will not be available for sale.
	E3.2	Economic viability of extraction cannot yet be determined due to insufficient information (e.g. during the exploration phase).
	E3.3	On the basis of realistic assumptions of future market conditions, it is currently considered that there are no reasonable prospects for economic extraction and sale in the foreseeable future.
F1	**F1.1**	Extraction is currently taking place.
	F1.2	Capital funds have been committed and implementation of the development project or mining operation is underway.
	F1.3	Sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.
F2	**F2.1**	Project activities are ongoing to justify development in the foreseeable future.
	F2.2	Project activities are on hold and/or where justification as a commercial development may be subject to significant delay.
	F2.3	There are no current plans to develop or to acquire additional data at the time due to limited potential.