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# UNITED NATIONS FRAMEWORK CLASSIFICATION FOR RESOURCES

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**Draft Updated Version**

**2019**

**Summary:**

This document is a **working draft** of the proposed update of the United Nations Framework Classification for Resources (UNFC). The purpose of the update is to not make any fundamental changes to UNFC but to respond to (i) the need to align to the Sustainable Development Goals (SDGs); (ii) the broadening scope of resource sectors covered by UNFC; and (iii) the inputs from the Expert Group on Resource Management Task Forces on the G axis, Social and Environmental Aspects and Competent Persons. The update is intended primarily to provide revised terminology that will be suitable for all resources and include recommendations related to social and environmental aspects that were previously approved by the Expert Group on Resource Management.

This draft text is presented for discussion at the tenth session of the Expert Group on Resource Management, Geneva, 29 April – 2 May 2019. The Expert Group will be presented with a number of options as to how or if to proceed with this draft text.

## PREFACE

With the adoption of the 2030 Agenda for Sustainable Development (2030 Agenda) in 2015, sustainable resource management has become the fundamental basis of a balanced future for this planet. All the Sustainable Development Goals (SDGs) require energy and raw materials for their timely realization. Establishing a complete picture of the current and future supply base of energy and minerals is thus necessary for effective resource management. Accurate and consistent estimates of energy and raw material resources, though important for classification and management of resources, is not the only metric that is important. The estimates for quantities will have to be coherent with other scientific and socio-environmental-economic information, and together they provide the foundation for meaningful assessments and decision making under different contexts.

Responding to the need to provide the guiding principles and a harmonized terminology for communicating the availability of resources globally, and to support the development and production of resources, the United Nations Economic Commission for Europe (ECE) in the 1990s took the initiative to develop a simple, user-friendly and uniform system. The result of these efforts was the creation of the United Nations Framework Classification for Reserves and Resources of Solid Fuels and Mineral Commodities (UNFC-1997) that was endorsed by the United Nations Economic and Social Council (ECOSOC) in 1997. In 2004, the Classification was extended to also apply to petroleum (oil and natural gas) and uranium and renamed the United Nations Framework Classification for Fossil Energy and Mineral Resources 2004 (UNFC-2004). In its Decision 2004/33, ECOSOC then invited the Member States of the United Nations, international organizations and the United Nations regional commissions to consider taking appropriate measures for ensuring its worldwide application. This Decision offered an opportunity to harmonize existing resource classifications in response to the integration of financial and resource industry activities worldwide.

In 2009, the United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources 2009 (UNFC-2009) was developed to include minerals, petroleum and nuclear fuels. The specifications that allow UNFC to be fully operational were developed by the Expert Group on Resource Management (known as the Expert Group on Resource Classification prior to December 2018) between 2010 and April 2013. In response to the application of UNFC to renewable energy, injection projects and anthropogenic resources, the name was changed in 2017 to the United Nations Framework Classification for Resources (UNFC).

Following the adoption of the Sustainable Development Goals in 2015, the Expert Group started developing guidelines for social and environmental consideration and recommended their incorporation into the system in 2018. Guidelines for Competent Persons were also adopted in 2017. Considering the requirements of the 2030 Agenda, the increasing application of UNFC in different resource sectors and the development of new guidelines for different applications, the Expert Group at its eighth session in 2017 decided to update UNFC and the generic specifications. There was a need to modify the terminology to be applicable for all resources. The current revision of UNFC is in response to this decision. This revision adheres to the classification framework of UNFC-2009, with a number of changes incorporated to make it applicable for all resources such as minerals, petroleum, nuclear fuel resources, renewable energy, injection projects for geological storage and anthropogenic resources. The current revision of UNFC is intended to satisfy the requirements of different resource sectors and application as well as making it fully aligned to the sustainable resource management called for by the 2030 Agenda.

Minor changes to the classification system are included, which do not impact the current users of UNFC. The key changes, apart from the normalization of the text, to make UNFC applicable for all resources are provided in the notes at the end of this document. The Expert Group also decided that in the future UNFC will remain evergreen with incremental changes made as required. In the future, users of UNFC can expect a continuity of the system as changes are progressively made. Necessary guidelines will be provided to facilitate transition to new revisions, if required. This approach will also ensure that all users will find it easier to adopt the most recent update of UNFC.

UNFC is developed and maintained by ECE, under the global mandate given by ECOSOC, and through the cooperation and collaboration of both ECE and non- ECE member countries, other United Nations agencies and international organizations, intergovernmental bodies, professional associations, the private sector and many individual experts.

Today's world, globalized by capital market and other factors has resulted in an increasing number of multi-resource companies operating in many different countries and jurisdictions. Also, the development of new types of resources, such as renewable energy, unconventional petroleum and mineral resources and anthropogenic resources, demonstrates that the historical boundaries between the energy and raw material sectors is no longer valid. Following the overarching elements of the 2030 Agenda, resource management needs to be empowered with new tools that can aid to achieve the goals of integrated and total resource management, comprehensive resource production, the circular economy, low emissions and zero waste. Moreover, technological disruptions in the context of the fourth industrial revolution are becoming more and more self-evident. By incorporating the frontier concepts and all sustainable resource development activities, UNFC captures the common principles and provides a tool for consistent classification of resources, regardless of the sector.

Recognizing the need for UNFC to support sustainable development in different contexts and respond to new challenges, the Expert Group in 2018 decided to adopt UNFC as part of a new United Nations Resource Management System (UNRMS), which will provide the principles, specifications, guidelines, protocols, best practices and case studies on sustainable management of all primary and secondary resources. UNRMS will ensure assessing all the aspects of resource management, such as social, environmental, economic and technological factors, which are important for resource management rather than the single metric of quantities available in a project.

## ACKNOWLEDGEMENTS

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## ACRONYMS AND ABBREVIATIONS

Ad Hoc Group of Experts	ECE Ad Hoc Group of Experts on the Harmonization of Fossil Energy and Mineral Resources Terminology
AMV	African Mining Vision
ECE	United Nations Economic Commission for Europe
Expert Group	ECE Expert Group on Resource Management (previously Expert Group on Resource Classification)
IEC	International Electrotechnical Commission
IFC	International Finance Cooperation
ISO	International Organization for Standardization
ROD	Realms of Discourse
SDGs	Sustainable Development Goals
SEEA	System of Environmental-Economic Accounting
SI	Système International d'Unités
UNFC	United Nations Framework Classification for Resources

## INTRODUCTION

The objective of UNFC is to communicate the availability of resources for future supply. The objective is achieved by providing generic principles and harmonized terminology for classifying and managing resources. Deriving its vision from the global requirements, UNFC is designed as a system to facilitate the supply of energy and raw materials required for sustainable development. The emerging challenges in these sectors are the sustainable, environmental-friendly, carbon neutral and efficient development and production of energy and raw materials that are required for a growing population of the planet.

UNFC is a universally acceptable and internationally applicable scheme for the classification of energy and raw material resource exploration, development and production projects and national and regional level assessments, and is currently the only classification in the world to do so. UNFC reflects conditions in the economic, environmental and social domain, including markets and government framework conditions, social and environmental considerations, technological and industrial maturity of the projects and the ever-present uncertainties and is aligned to the requirements of the 2030 Agenda for Sustainable Development (2030 Agenda). It provides a single framework on which to build international energy and raw material studies and policies, support government resource management policies, plan industrial processes innovation and allocate capital efficiently.

UNFC is a generic principle-based system in which quantities are classified by the three fundamental criteria of

- social, environmental and economic viability (E),
- field project status and feasibility (F), and
- level of knowledge / confidence in estimates in the potential recoverability of the quantities (G).

UNFC uses a numerical and language independent coding scheme. Combinations of these criteria create a three-dimensional system.

## SUSTAINABLE DEVELOPMENT GOALS

On 25 September 2015, the 194 countries of the UN General Assembly adopted the 2030 Development Agenda titled Transforming Our World: the 2030 Agenda for Sustainable Development. The Sustainable Development Goals (SDGs) is a set of 17 "Global Goals"<sup>1</sup>. The SDGs are unique in that they call for action by all countries, poor, rich and middle-income to promote prosperity while protecting the planet. Sustainable resource management and adequate resources are key to the realization of all the SDGs, hence a new resource management tool-kit is also required. The most relevant SDGs in this respect are 1,2,5,6,7,9,10, 11,12,13,15 and 17. It should be also mentioned that SDG13 mirrors the Paris Agreement to combat climate change<sup>2</sup>.

As part of the 2030 Agenda, regional approaches such as the Africa Mining Vision (AMV) are also important considerations<sup>3</sup>. AMV builds on Agenda 2063, which is a strategic framework for the socio-economic

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<sup>1</sup> Sustainable Development Goals <https://www.un.org/sustainabledevelopment/sustainable-development-goals/>

<sup>2</sup> The Paris Agreement <https://unfccc.int/process-and-meetings/the-paris-agreement/the-paris-agreement>

<sup>3</sup> African Mining Vision <http://www.africaminingvision.org/>

transformation of Africa over the next 50 years<sup>4</sup>. Agenda 2063 seeks to accelerate the implementation of past and existing continental initiatives for growth and sustainable development. AMV is Africa's own response to tackling the paradox of great mineral wealth existing side by side with pervasive poverty. Similar approaches in a less formal manners are available for Europe, Eurasia, Asia – Pacific and Latin America regions.

## THE CLASSIFICATION FRAMEWORK

The UNFC framework consists of four Parts:

- Part I: Principles – Definitions for the classifications system that are applicable to all resources
- Part II: Generic Specifications – Mandatory rules to be followed in the classification to ensure consistency in application
- Part III: Generic Guidelines – Additional instruction on how UNFC should be applied in specific circumstances.
- Part IV: Additional notes and clarifications to UNFC

In addition, not included in this document, are other complementary documents:

- Sectoral specifications: Mandatory rules that apply to specific resource sectors
- Sectoral guidelines: Additional instructions for specific resource sectors
- Bridging documents: Explaining the relationship between UNFC and another classification system.

## APPLICATION

UNFC applies to energy, mineral and raw material quantities available from every resource source, including non-renewable and renewable, and primary and secondary resource sources available on Earth. It has been designed to meet, to the extent possible, the needs of applications pertaining to

- a) policy formulation based on energy and raw material studies;
- b) resources management functions;
- c) corporate business processes; and
- d) financial capital allocation.

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<sup>4</sup> Agenda 2063 <https://au.int/en/agenda2063>

# PART I

## PRINCIPLES FOR THE APPLICATION OF THE UNITED NATIONS FRAMEWORK CLASSIFICATION FOR RESOURCES (UNFC)

Part I provides the principles (or definitions) for the application of United Nations Framework Classification for Resources (UNFC).

UNFC is a generic principle-based system in which quantities associated with a Resource Source are classified. A Resource Source is the initial form in which a product of potential socio-environmental-economic interest is found, or from which such a product may be derived.

### I. CATEGORIES AND SUB-CATEGORIES

The classification is done on the basis of the three fundamental set of categories of social, environmental and economic viability (E), field project status and feasibility (F), and level of knowledge / confidence in estimates in the potential recoverability of the quantities (G), using a numerical coding system.

Combinations of these categories may be seen a three-dimensional system, as shown in [Figure 1](#).

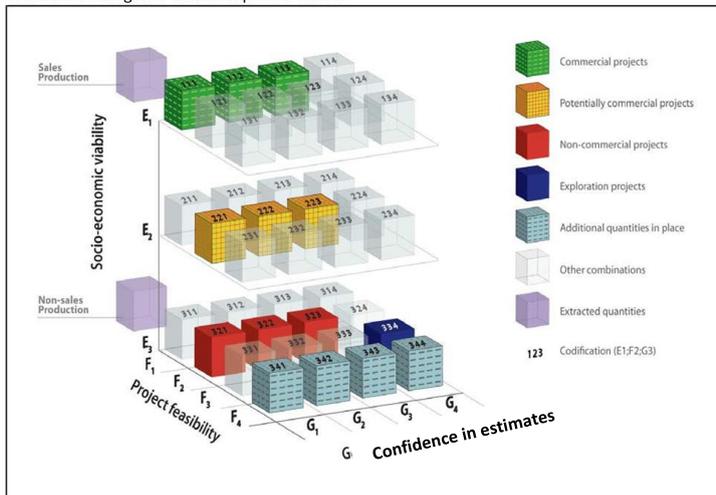
Categories (e.g. E1, E2, E3) and, in some cases, sub-categories (e.g. E2.1) are defined for each of the three criteria as set out and defined in [Sections VII and VIII](#).

The first set of categories (the E categories) designates the social, environmental and economic conditions in establishing the commercial viability of the project, including consideration of market prices and relevant legal, regulatory, social, environmental and contractual conditions. The second set (the F categories) designates the maturity of studies and commitments necessary to implement development projects. These extend from early conceptual studies and exploration efforts before a Resource Source has been confirmed to exist through to a project that is producing and selling, or directly using, one or more Product Types, and reflect standard value chain management principles. The third set of categories (the G categories) designates the level of knowledge and/or confidence in estimates in the potential recoverability of the quantities. The G categories are used in conjunction with the E and F categories to classify the estimated quantities of a product type that are associated with a specific Resource Source in a specific geographic location.

The categories and sub-categories are the building blocks of the system, and combine to form “classes”. UNFC can be visualized in three dimensions.

**Figure 1**

**UNFC Categories and Examples of Classes**



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## II. CLASSES

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 Hindu-Arabic numerals.

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 **Figures 2 and 3.**

**Figure 2**

**Abbreviated Version of UNFC, showing Classes**

		Class	Minimum Categories		
			E	F	G
Estimated Quantities Initially in Resource Source	Produced	Sales Production			
		Non-Sales Production			
	Future production by commercial projects	Commercial Projects	1	1	1, 2, 3
	Potential future production by contingent projects	Potentially Commercial Projects	2	2	1, 2, 3
		Non-Commercial Projects	3	2	1, 2, 3
	Additional quantities in place associated with known resource sources		3	4	1, 2, 3
	Potential future production	Exploration Projects	3	3	4
	Additional quantities in place associated with potential resource sources		3	4	4

**Figure 3**  
**UNFC Classes and Sub-Classes**

	E3.3	E3.2	E3.1	E2	E1
F1.1					<b>1</b>
F1.2					<b>2</b>
F1.3					<b>3</b>
F2.1				<b>4</b>	
F2.2		<b>7</b>		<b>5</b>	
F2.3	<b>8</b>		<b>6</b>		
F3.1		<b>9</b>			
F3.2		<b>10</b>			
F3.3		<b>11</b>			
F4	<b>12</b>				

<i>Code</i>	<i>Class</i>	<i>Sub-class</i>
<b>1</b>	Commercial Projects	On Production
<b>2</b>		Approved for Development
<b>3</b>		Justified for Development
<b>4</b>	Potentially Commercial Projects	Development Pending
<b>5</b>		Development on Hold
<b>6</b>	Non-Sales Production	
<b>7</b>	Non-Commercial Projects	Development Unclassified
<b>8</b>		Development Not Viable
<b>9</b>	Exploration Projects	[Prospect], [Target Outline]
<b>10</b>		[Lead], [Early Exploration]
<b>11</b>		[Play], [Grassroots]
<b>12</b>	Additional Quantities in Place	

**Note:** UNFC Classes and Sub-classes are shown in the E-F matrix in the upper part of the figure. The name of some of the most used classes are shown in the lower part. The E and F categories of the named classes are minimum categories.)

As shown in Figures 2 and 3, the total estimated quantities in a Resource Source are classified at a given date in terms of the following:

- (a) Produced quantities that have been sold– Sales Production<sup>5</sup>.
- (b) Produced quantities that have not been sold– Non-sales Production.
- (c) Quantities associated with a known Resource Source that may be produced in the future. Technical and commercial evaluation studies based on defined projects constitute the basis for the classification.
- (d) Quantities associated with a potential Resource Source that may be produced in the future provided that the Resource Source is confirmed.
- (e) Additional quantities in place associated with a known or potential Resource Source that will not be produced by any currently defined development project.

Material, or energy, balance of total quantities can be maintained by full application of the classification.

Except for past production that may have been 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). 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.

Where relevant, known quantities that may be produced in the future are subdivided into quantities that are forecast to be sold and quantities that are forecast to be produced but not sold.

Quantities may be potentially produced 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, environmental and economic conditions are expected to be acceptable for implementation (Potentially Commercial Projects) and those where they are not (Non-Commercial Projects). In the former case, contingency is caused by the project not being sufficiently matured to proceed to development, which would then provide the basis for a commitment to produce and sell the product it at a commercial scale. In the latter case, neither the project nor the social, environmental and economic conditions are sufficiently viable to indicate a reasonable potential for commercial production, sale and/or utilization in the foreseeable future. A Resource Source may give rise to several projects with different status..

### III. SUB-CLASSES AND ATTRIBUTES

For further clarity additional generic UNFC sub-classes are defined based on the granularity provided by the sub-categories included in Annex II. These are illustrated in Figures 2 and 4. Evaluators may add

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<sup>5</sup> This does not prescribe that the produced quantities must be sold. For example, own-use quantities (within the defined Project) can be included and classified under UNFC, even though they are not being sold.

information for users by assigning attributes to classes and subclasses. This may include identifying quantities that are calculated on alternative premises, such as alternative prices or alternative estimation methods required by some but not all users, simply relationships between projects, or status relative to local legislation not applicable globally.

## IV. HARMONIZATION OF RESOURCE INVENTORIES

Classifications other than the one shown in Figures 2 and 3 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.

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.

## V. SOCIAL AND ENVIRONMENTAL CONSIDERATIONS

UNFC is designed to take account of the importance of social and environmental issues that affect the realization of projects arising, including requirements specified in the 2030 Agenda for Sustainable Development, the Sustainable Development Goals (SDGs). In classifying estimated quantities that may be produced in the future by a project, the E-axis Categories are explicitly defined to include both social and environmental issues that may be relevant to the commercial viability of such a venture, in addition to economic, legal and other non-technical factors.

In particular, the identification and consideration at the time of the estimate of all known social or environmental aspects to the project during its entire life cycle is recognized as an integral part of the project assessment. The presence of social or environmental factors can prevent a project from proceeding or it can lead to the suspension or termination of activities in an existing project. In some cases, the presence of positive social or environmental externalities can be amongst the key drivers for starting a project. The classification will reflect the extent to which decisions are impacted by these concerns, i.e. whether they need to be satisfied or not for the project to proceed.

## VI. ADAPTING TO REGIONAL, NATIONAL OR LOCAL NEEDS

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

**Figure 4**  
**UNFC Classes and Sub-classes defined by Sub-categories**

<b>UNFC Classes Defined by Categories and Sub-categories</b>						
	Class	Sub-class	Minimum Categories			
			E	F	G	
<b>Estimated Total Quantities in Resource Source</b>	<b>Produced</b>	<b>Sales Production</b>				
		<b>Non Sales Production</b>				
	<b>Known Resource Source</b>	<b>Commercial Projects</b>	<b>On Production</b>	1	1.1	1, 2, 3
			<b>Approved for Development</b>	1	1.2	1, 2, 3
			<b>Justified for Development</b>	1	1.3	1, 2, 3
		<b>Potentially Commercial Projects</b>	<b>Development Pending</b>	2	2.1	1, 2, 3
			<b>Development On Hold</b>	2	2.2	1, 2, 3
		<b>Non-Commercial Projects</b>	<b>Development Unclarified</b>	3.2	2.2	1, 2, 3
			<b>Development Not Viable</b>	3.3	2.3	1, 2, 3
		<b>Additional Quantities in Place</b>		3.3	4	1, 2, 3
	<b>Potential Resource Source</b>	<b>Exploration Projects</b>	[See Generic Specifications for sub-classes]	3.2	3	4
		<b>Additional Quantities in Place</b>		3.3	4	4

## DEFINITION OF CATEGORIES AND SUPPORTING EXPLANATIONS

### E – Social, Environmental and Economic Viability

Category	Definition	Supporting Explanation
E1	Production for sale has been confirmed to be socially, environmentally and economically viable.	Production for sale is socially, environmentally and economically, viable on the basis of current market conditions and realistic assumptions of future conditions. All necessary conditions have been met or there are reasonable expectations that all necessary conditions will be met within a reasonable timeframe and there are no impediments to the delivery of the product to a market. Economic, social and environmental viability is not affected by short-term adverse market conditions provided that longer-term forecasts remain positive.
E2	Production for sale expected to become socially, environmentally and economically viable in the foreseeable future.	Production for sale has not yet been confirmed to be socially, environmentally and economically viable but, on the basis of realistic assumptions of future conditions, there are reasonable prospects for economic, social and environmental viability in the foreseeable future.
E3	Production for sale not expected to become socially, environmentally and economically viable in the foreseeable future or evaluation is at too early a stage to determine economic, social and environmental viability.	On the basis of realistic assumptions of future market conditions, it is currently considered that there are not reasonable prospects for , social, environmental or economic viability in the foreseeable future; or, this cannot yet be determined due to insufficient information. Also included are quantities that are forecast to be produced, but which will not be available for sale.

## F - Field Project Status and Feasibility

Category	Definition	Supporting Explanation
<b>F1</b>	Feasibility of production by a defined project has been confirmed.	Production is currently taking place; or, implementation of the project is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of production by implementing a defined Project <sup>6</sup> .
<b>F2</b>	Feasibility of production by a defined project is subject to further evaluation.	Preliminary studies demonstrate the existence of quantities that the feasibility of production by a defined (at least in broad terms) project can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of production.
<b>F3</b>	Feasibility of production by a defined development project cannot be evaluated due to limited technical data.	Very preliminary studies which may be based on a defined project (at least in conceptual terms), indicate the need for further data acquisition in order to confirm the existence of quantities of a Resource Source so that the feasibility of production can be evaluated.
<b>F4</b>	No development project has been identified.	Quantities of a Resource Source that will not be produced by any currently defined Project.

<sup>6</sup> Guidance Note to support the United Nations Framework Classification for Resources Definition of a Project.

## G - Level of Knowledge or Confidence in Estimates

<b>G1</b>	Quantities associated with, or can be produced from, a known resource source that can be estimated with a high level of confidence based on direct evidence.	Quantities may be categorized discretely as G1, G2 and/or G3 (along with the appropriate E and F categories), based on the level of confidence in the estimates (high, moderate and low confidence, respectively) based on direct evidence. Alternatively, quantities may be categorized as a range of uncertainty as reflected by either (i) three specific deterministic scenarios (low, best and high cases) or (ii) a probabilistic analysis from which three outcomes (P90, P50 and P10) <sup>7</sup> are selected. In both methodologies (the “scenario” and “probabilistic” approaches), the quantities are then classified on the G Axis as G1, G1+G2 and G1+G2+G3 respectively.  In all cases, potential production quantities are those associated with a defined Project.  Additional Comments  The G axis reflects the level of confidence in the potential recoverability of the quantities. Thus, the G axis categories are intended to reflect all significant uncertainties impacting the estimated quantities that are forecast to be produced by the Project. Uncertainties include both variability and the efficiency of the production methodology (where relevant). Typically, the various uncertainties will combine to provide a full range of possible outcomes. In such cases, categorization should reflect three scenarios or outcomes that are equivalent to G1, G1+G2 and G1+G2+G3.
<b>G2</b>	Quantities associated with, or can be produced from, a known resource source that can be estimated with a medium level of confidence based on direct evidence.	
<b>G3</b>	Quantities associated with, or can be produced from, a known resource source that can be estimated with a low level of confidence based on direct evidence.	

<sup>7</sup> Where P90 means that there is a 90 per cent probability that the actual production quantity will exceed this estimate. Similarly, P50 and P10 reflect 50 per cent and 10 per cent probability respectively that the actual production quantity will exceed the estimate.

<p><b>G4</b></p>	<p>Estimated quantities associated with, or could be produced from, a potential resource source, based primarily on indirect evidence.</p>	<p>A potential resource source is one where the existence of quantities of socio-environmental-economic interest is based primarily on indirect evidence and has not yet been confirmed. Further data acquisition and evaluation would be required for confirmation.</p> <p>Where a single estimate is provided, it should be the expected outcome. Further subdivision, comparable to the G1/G2/G3 categories, is optional and is addressed through the use of sub-categories (G4.1, G4.2 and G4.3) as set out in <b>Specification S</b> of UNFC.</p> <p>In addition, it is recommended that the chance (probability) that the potential resource source will eventually lead to a Commercial Project is assessed and documented.</p>
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## VII. DEFINITION OF SUB-CATEGORIES

### E – Social, Environmental and Economic Viability

Category	Sub-Category	Sub-Category Definition
E1	No Sub-Categories defined	Production for sale is socially, environmentally and economically viable on the basis of current conditions and realistic assumptions of future market conditions.
E2	E2.1	Not all social, environmental and economic contingencies have been resolved, but there a high probability that they will be resolved within the foreseeable future.
	E2.2	Not all social, environmental and economic issues have been resolved, but there is a medium probability that they will be resolved within the foreseeable future.
E3	E3.1	Quantities that are forecast to be produced, but which will not be available for sale.
	E3.2	Social, environmental and economic viability cannot yet be determined due to insufficient information.
	E3.3	It is currently considered that there are not reasonable prospects for social, environmental and economic viability in the foreseeable future.

## F - Field Project Status and Feasibility

<b>F1</b>	F1.1	Production is currently taking place.
	F1.2	Capital funds have been committed and implementation of the project.
	F1.3	Sufficiently detailed studies have been completed to demonstrate the feasibility of production by implementing a defined project.
<b>F2</b>	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.
<b>F3</b>	F3.1	Where site-specific studies have identified the potential for an individual product type with sufficient confidence to warrant further testing.
	F3.2	Where local studies indicate the potential for one or more resource source in a specific part of an area, but requires more data acquisition and/or evaluation in order to have sufficient confidence to warrant further testing.
	F3.3	At the earliest stage of studies, where favourable conditions for the potential discovery of a resource source in an area may be inferred from regional studies.
<b>F4</b>	F4.1	The technology necessary to recover some or all of the these quantities is currently under active development, following successful pilot studies on other resource sources, but has yet to be demonstrated to be technically feasible for the style and nature of resource source in which that product type is located.
	F4.2	The technology necessary to recover some or all of the these quantities is currently being researched, but no successful pilot studies have yet been completed.
	F4.3	The technology necessary to recover some or all of these quantities is not currently under research or development.

## G - Level of Knowledge / Confidence in Estimates

In some situations, it may be helpful to express a range of uncertainty for quantities that are classified on the G axis as G4, e.g. Exploration Projects. In such cases, the following specification shall apply:

<b>G4</b>	<b>G4.1</b>	Low estimate of the quantities.
	<b>G4.2</b>	Incremental amount to G4.1 such that G4.1+G4.2 equates to a best estimate of the quantities.
	<b>G4.3</b>	Incremental amount to G4.1+G4.2 such that G4.1+G4.2+G4.3 equates to a high estimate of the quantities.

Category G4, when used alone, shall reflect the best estimate and is equal to G4.1+G4.2. When category G4 is used, the probability of confirming the quantity should be given.

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## PART II

### GENERIC SPECIFICATIONS FOR THE APPLICATION OF THE UNITED NATIONS FRAMEWORK CLASSIFICATION FOR RESOURCES (UNFC)

Part II provides the generic specifications, which are rules that are applicable to all resources.

In these generic specifications, the following words have specific meanings:

- “Shall” is used where a provision is mandatory;
- “Should” is used where a provision is preferred; and,
- “May” is used where alternatives are equally acceptable.

Where a generic specification is defined below, this sets a minimum standard for classification under UNFC.

## I. GENERIC SPECIFICATIONS APPLICABLE TO ALL CATEGORIES

### A. Use of numerical codes

While the defined Classes and Sub-classes shown in **Figures 2, 3 and 4** may be used as supplementary terminology, the relevant Numerical Code(s) shall always be reported in conjunction with the estimated quantity. For example, these may be documented in the form 111, 111+112, or 1.1;1.2;1, as appropriate.

Note that some Sub-categories are defined below that are in addition to those provided in Part I UNFC. These optional Sub-categories have been identified as potentially useful in certain situations and have been defined herein in order to ensure consistency in their application. Nothing in this document shall preclude the possible use of additional Sub-classes in the future that may be deemed to be useful in particular cases.

### B. Bridging documents and aligned systems

UNFC may be aligned with some other classification systems. A Bridging Document explains the relationship between the UNFC and another classification system, including instructions on how to classify estimates generated by application of that system using the UNFC Numerical Codes. If the application of UNFC is performed through a Bridging Document, it shall be mentioned.

### C. Effective date

Classified quantities are estimates of remaining quantities as at the Effective Date of the evaluation. The Effective Date shall be clearly stated in conjunction with the reported quantities. The evaluation should take into account all data and information available to the evaluator prior to the Effective Date. If information becomes available subsequent to the Effective Date, but prior to classification, that could have significantly changed the estimated quantities as at the Effective Date, the likely effect of this information shall be mentioned.

## D. Product type

Estimated quantities should be classified separately for each product type that will be sold, transferred or disposed of separately. Where estimates for different product types have been aggregated for classification purposes, and separate estimates are not provided, the aggregated estimates shall be accompanied by a statement clarifying which product types have been aggregated and the conversion factor(s) used to render them equivalent for the purposes of aggregation.

## E. Basis for estimate

Estimated quantities may be those quantities attributable to the project as a whole, or may reflect the proportion of those quantities that is attributable to the classifying entity's socio-environmental-economic interest in the project. The reporting basis shall be clearly stated in conjunction with the reported quantities. Government royalty obligations are often treated as a tax to be paid in cash and are therefore generally classified as a cost of operations. In such cases, the reported quantities may include the proportion attributable to the royalty obligation. Where the reported quantities exclude the proportion attributable to the royalty obligation, this shall be disclosed.

## F. Reference point

The Reference Point is a defined location within a production operation at which the classified quantities are measured or estimated. The Reference Point may be the product sales point from the operation, or it may be an intermediate stage, in which case the reported quantities account for losses prior to but not subsequent to the delivery point. The Reference Point shall be mentioned in conjunction with the classified quantities. Where the Reference Point is not the point of sale to third parties (or where custody is transferred to the entity's downstream operations), and such quantities are classified as E1, and does not regard direct use, the information necessary to derive estimated sales quantities shall also be provided. Quantities flowing out of the reference points shall where possible be defined to be coherent with the definition in general statistics of quantities entering the economy.

## G. Aggregation of quantities

Estimated quantities associated with projects that are classified in different Categories on the Socio-Environmental-Economic or Feasibility axis shall not be aggregated with each other without proper justification and mention of the methodology adopted. In all cases, the specific Classes that have been aggregated shall be mentioned in conjunction with the classified quantity (e.g. 111+112+221+222) and a footnote added. The footnote shall state how projects with different E and F categories have been aggregated to account for the likelihood that not all will be realised. It shall also state, when relevant how quantities with different G categories have been aggregated (arithmetically or stochastically, and if stochastic aggregation is used, how).

Where estimated quantities have been aggregated from multiple projects, consideration should be given to sub-dividing the aggregated totals by type and by location (e.g. offshore vs. onshore).

## H. Evaluator qualifications and accountability

Evaluators must possess an appropriate level of expertise and relevant experience in the estimation of quantities associated with the type of resource source under evaluation. (More guidance on Evaluators and Competent Person can be found in [Part III Section V and Section VI](#)). The evaluator will always be accountable for the correct use of the classification and the correctness of the estimates reported irrespective of who have prepared them.

## I. Units and conversion factors

In order to facilitate global comparability of resource estimates, it is recommended that the *Système International d'Unités* (SI units) is used for reporting of resource quantities. However, it is recognized that there are traditional measurement units that are widely used and accepted for certain product types; where such units are used, conversion factors to SI units shall be provided. Similarly, where quantities are converted from volume or mass to energy equivalents, or other conversions are applied, the conversion factors shall be disclosed.

## J. Documentation

Estimates of resource quantities shall be documented in sufficient detail that would allow an independent evaluator or auditor to clearly understand the basis for estimation of the classified quantities and their classification.

# II. GENERIC SPECIFICATIONS APPLICABLE TO E-AXIS CATEGORIES

## K. Socio-Environmental-Economic assumptions

In accordance with the definitions of E1, E2 and E3, socio-environmental-economic assumptions shall be based on current market conditions and realistic assumptions of future market conditions. Except where constrained by regulation, assumptions of future market conditions should reflect the view of either:

- a) The organization responsible for the evaluation;
- b) The view of a competent person or independent evaluator; or,
- c) An externally published independent view, which is considered to be a reasonable forecast of future market conditions.

The basis for the assumptions (as opposed to the actual forecast) shall be disclosed. Where the use of alternative assumptions is required, the alternative estimates shall be identified with an attribute, i.e. E1F1G1<sub>sec</sub>, and accompanied by an explanation of the assumptions used.

## L. Distinction between E1, E2 and E3

The distinction between quantities that are categorized on the Socio-Environmental-Economic axis as E1, E2 or E3 is based on the phrase “reasonable prospects for social, environmental and economically viable production for sale in the foreseeable future”. The definition of “foreseeable future” can vary depending on the product type and hence more detailed specifications can be found in relevant sector-specific specifications.

The Socio- Environmental-Economic axis Categories encompass all non-technical issues that could directly impact the viability of a project, including product type prices, operating costs, legal/fiscal framework, environmental regulations and known environmental or social impediments or barriers. Any one of these issues could prevent a new project from proceeding (and hence quantities would be classified as E2 or E3, as appropriate), or it could lead to the suspension or termination of production activities in an existing operation. Where production activities are suspended, but there are “reasonable prospects for social, environmental and economically viable production for sale in the foreseeable future”, remaining quantities that can be technically produced shall be recategorized from E1 to E2. Where “reasonable

prospects for social, environmental and economically viable production for sale in the foreseeable future” cannot be demonstrated, remaining quantities shall be reclassified from E1 to E3.

### **M. Produced quantities that may be saleable in the future**

The Sub-categories of E3 permit a distinction to be made between those quantities that may be forecast to be produced, but which will not be available for sale (E3.1) and those for which there are currently no reasonable prospects for social, environmental and economically viable production for sale in the foreseeable future (E3.3). In the former case, the quantities are those that will be stored, lost, destroyed or otherwise disposed of during the production process, and hence will not be made available for sale. In some situations, however, quantities may be produced and then stored in some way for possible economic sale in the future and these may be assigned to E3.3 (and subsequently moved to E2 and E1 as appropriate). Depending on how the project is shaped and changed going forward, the future non-sales production may in part or on the whole be forecasted to be sold and upgraded to E2 or E1 or constitute the resource source of another project.

## **III. GENERIC SPECIFICATIONS APPLICABLE TO F-AXIS CATEGORIES**

### **N. Classification of projects based on level of maturity**

Where it is considered appropriate or helpful to sub-classify projects to reflect different levels of project maturity, based on the current status of the project, the optional Sub-classes shown in Figure 2 and 3 of UNFC (see Part I) may be adopted. Additional guidance on the distinction between the Sub-classes of UNFC is provided in **Part III Section II.**

### **O. Distinction between quantities that can be potentially produced and in situ (in-place) quantities**

Other than quantities that are classified on the Feasibility axis as F4, all classified quantities shall be limited to those quantities that are potentially produced on the basis of existing technology or technology currently under development, and are associated with actual or possible future projects. In the absence of any consideration of potential production, all reported quantities shall be classified as F4. The information carrier for the F4 quantities is the resource source and not the project. The F4 category is important when classifying non-renewable resources as it allows for material balance. This will add quality to the estimates by constraining the aggregate of recoverable quantities and otherwise. For stocks of resources affected by both inflow and outflow, e.g. anthropogenic resources it may be used to quantify the expected resource inflows during the project term.

### **P. Classification of quantities associated with Exploration Projects**

In some situations, it may be helpful to sub-classify Exploration Projects on the basis of their level of maturity. In such cases, the following specification shall apply:

- a) F3.1: where site-specific studies have identified a potential resource source and product (s) with sufficient confidence to warrant further testing;
- b) F3.2: where local studies indicate the potential for one or more resource source in a specific part of an area, but requires more data acquisition and/or evaluation in order to have sufficient confidence to warrant further testing;
- c) F3.3: at the earliest stage of studies, where favourable conditions for the potential discovery of a resource source in an area may be inferred from regional studies.

## Q. Classification of additional quantities in place

In some situations, it may be helpful to sub-classify Additional Quantities in Place on the basis of the current state of technological developments. In such cases, the following specification shall apply:

- a) F4.1: the technology necessary to produce some or all of the these quantities is currently under active development, following successful pilot studies on other resource sources, but has yet to be demonstrated to be technically feasible for the style and nature of resource source in which that product type is located;
- b) F4.2: the technology necessary to produce some or all of the these quantities is currently being researched, but no successful pilot studies have yet been completed;
- c) F4.3: the technology necessary to produce some or all of these quantities is not currently under research or development.

# IV. GENERIC SPECIFICATIONS APPLICABLE TO G-AXIS CATEGORIES

## R. Confidence levels for G1, G2 and G3

The level of confidence for quantities that are classified on the G axis as G1, G2 and G3 is defined as “high”, “medium” and “low”, respectively. These are not specified more precisely at a generic level because there are fundamental differences between the approaches that are appropriate for different product types. More detailed specifications can therefore be found in relevant sectoral specifications.

## S. Expansion of G4 to account for uncertainty

In some situations, it may be helpful to express a range of uncertainty for quantities that are classified on the G axis as G4, e.g. Exploration Projects. In such cases, the following specification shall apply:

- a) G4.1: low estimate of the quantities;
- b) G4.2: incremental amount to G4.1 such that  $G4.1+G4.2$  equates to a best estimate of the quantities;
- c) G4.3: incremental amount to  $G4.1+G4.2$  such that  $G4.1+G4.2+G4.3$  equates to a high estimate of the quantities.

Category G4, when used alone, shall reflect the best estimate and is equal to G4.1+G4.2.

## T. Optional labels for estimates

Where it is considered appropriate or helpful to use labels in addition to the numerical codes for a range of estimates for a specific project, the terms “Low Estimate”, “Best Estimate” and “High Estimate” may be used to correspond to quantities that are classified on the G axis as G1, G1+G2 and G1+G2+G3 respectively.

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## PART III

# GENERIC GUIDELINES FOR THE APPLICATION OF THE UNITED NATIONS FRAMEWORK CLASSIFICATION FOR RESOURCES (UNFC)

Part III provides the generic guidelines that are applicable to all resources.

## I. DEFINITION OF A PROJECT

### Introduction

The intent of the guidance note is to supplement the definition of a project as documented in UNFC principles and specifications. The guidance note provides additional guidance on the application of the Project definition, as set out in UNFC, to enhance the consistency of application of UNFC by its users. It is for guidance only and does not constitute a specification (rule). The guidance applies to all applications of UNFC, including energy, minerals, renewable energy, anthropogenic resources and injection projects for geological storage.

### UNFC definition of a Project

A Project<sup>8</sup> is a defined development or operation aiming to produce sales and non-sales quantities. In the early stages of evaluation, including exploration or preliminary investigation, the Project might be defined only in conceptual terms, whereas more mature Projects will be defined in significant detail. Where no development or operation can currently be defined for all or part of a resource-source, based on existing technology or technology currently under development, all quantities associated with that resource source (or part thereof) are classified in Category F4.

### Principles

UNFC has been designed as a Project-based system for the evaluation and classification of energy and mineral resources located on or below the Earth's surface. Further development has demonstrated that the system can also be applied to renewable energy sources, anthropogenic resources as well as for injection projects for the purpose of geological storage<sup>9</sup>.

A Project comprises a defined activity, or set of activities<sup>10</sup>, and carries the information defining these activities including, but not limited to investments, operating costs, revenues, labor demands, materials, emissions and other related information. These estimates, together other relevant commercial considerations, such as legal, environmental and social issues and the risks and opportunities associated with the Project can then be used to support the decision on whether or not to proceed with the Project. Since future potential revenues will be based on estimated future product(s) quantities that can be produced

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<sup>8</sup> This definition is taken verbatim from UNFC

<sup>9</sup> The guidance presented herein is applicable to all resources.

<sup>10</sup> Typical activities can include: e.g. remote sensing surveys, exploration drilling, core analyses, flow testing, geological, pre-feasibility and feasibility studies, installation of facilities for production including drilling production and injection wells, processing (where required) and export, plus all activities required for good environmental management. For renewable energy projects, such activities may also include meteorological studies, crop yield modelling and surveys, crop field trials, land preparation activities, pilot/demonstration plant trials, and full-scale production/operations.

and sold, and the efficiency of the production process will depend on the design of the Project itself (production methodology, infrastructure, processing requirements, etc.) these three issues – costs, produced quantities and revenues – are inextricably linked by the nature of the defined Project.

As noted above, the level of detail with which a Project is defined will be dependent on the maturity of the Project. For example, at the exploration or initial investigation stage the expected production methodology may be defined in broad conceptual terms only, whereas a development commitment will generally require very detailed documentation of the production methodology, processing requirements (where required), export route(s), capital and operating costs, environmental protection procedures, social licence considerations, etc.

## Guidelines

The activity or set of activities which constitute the defined Project will always include some consideration of the operation or development scheme that could or will be implemented, or has been implemented, without which no estimate of potential production quantities can be made.

At an early stage of Project evaluation, the level of detail in such a consideration may be limited to making a preliminary judgement as to the extent of quantities in a resource source that may be assumed to be socially, environmentally and economically producible and/or by assuming an appropriate range of potential production factors, which may be based on analogues for the type of resource source and likely production/development strategy.

As a Project matures in its scope and definition towards an investment decision, it will often change in character and becomes better defined.<sup>11</sup> There may be several stages of data acquisition and/or studies prior to reaching a “final investment decision”, at which point there would be a firm commitment to proceed with installation of the necessary facilities to produce and sell product(s). In many companies, these stages are separated by formal “decision gates” often signaling a change in the mode of operation. Both decisions and operational modes are observable and often aligned with Project Maturity Sub-classes<sup>12</sup>.

These decision gates typically require one or more of the following, where a failure to obtain any one of these approvals could stop the Project (as currently defined and proposed) from proceeding to the next stage (which would then be reflected in a move to a different Project Maturity Sub-class):

- a) Confirmation of social, environmental, economic and technical viability<sup>13</sup>;
- b) Approval by one or more governmental entities to proceed with the next phase of the Project<sup>14</sup>;

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<sup>11</sup> The initial, conceptual, Project may become more explicitly defined, or it may subdivide into two or more smaller Projects, or it may combine with other Projects to form a single, larger, Project.

<sup>12</sup> See Part III Section II.

<sup>13</sup> If some aspects/phases of the Project are less likely than others to satisfy local environmental and social concerns, this would indicate that there are at least two distinct Projects subject to separate E/F classification, each with its own estimates for the relevant G axis categories.

<sup>14</sup> If some aspects/phases of a proposed project are approved, but others are not, this would indicate that there are at least two distinct Projects subject to separate E/F classification, each with its own estimates for the relevant G axis categories.

- c) Approval by the operating company (and its partners) for the expenditure of significant costs<sup>15</sup>;  
and,

Once a Project has received all the necessary approvals for production to commence, decisions for routine operational activities that do not require any of the above approvals would generally not constitute a discrete Project.

A single Project can reflect the development of part, or all, of a resource source or the development of multiple adjacent resource sources (if they are all subject to the same investment decision and approvals based on a single integrated development plan, pre-feasibility or feasibility study). Where an investment decision is made with respect to part of a resource source, then the infrastructure, costs and estimated production quantities associated with that investment decision will constitute a single Project. Any potential for additional production from that resource source would be subject to one or more subsequent and discrete Projects, to the extent that each one required a separate decision and/or approval process. In such a case, incremental production associated with each subsequent defined Project is classified separately from the initial Project in accordance with the appropriate category (or sub-category) on the E, F and G axes for that specific incremental Project as at the Effective Date.

Sales quantities associated with an individual Project will always be classified under a single category (or sub-category) on the E axis and a single category (or sub-category) on the F axis. However, quantities associated with that Project could be, and in most cases will be, classified in more than one G axis category<sup>16</sup>. The relationship between the Project and classification on the G axis depends on the nature of the production process, as noted in the Supporting Explanation for the definitions of the G1, G2 and G3 categories<sup>17</sup>.

## II. USE OF PROJECT MATURITY TO SUB-CLASSIFY PROJECTS USING UNFC

UNFC provides scope to sub-classify projects by applying the full range of Sub-category definitions. The application of this level of granularity of the system is optional, though the concept of project maturity is becoming widely recognized as a powerful tool for portfolio management purposes, both by corporates and at a national level. The Sub-classes reflect the concept of classification on the basis of project maturity, which broadly corresponds to the probability that the project will eventually achieve commercial operation and product type sales.

The Category and Sub-category definitions, as well as all generic specifications and relevant sectoral specifications necessary for the high-level classification into Commercial Projects, Potentially Commercial Projects and Non-commercial Projects, must be satisfied before consideration is given to assignment to the appropriate Sub-class.

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<sup>15</sup> Practice will vary between companies regarding thresholds for approval levels: the key point is whether or not the progression to the next level of Project Maturity Sub-class requires a level of approval for the defined Project that it does not yet have.

<sup>16</sup> 11 For Projects associated with a known Resource Source, the estimated quantities may be reported discretely as G1, G2 and/or G3 or, where appropriate, in combination: i.e. G1, G1+G2 and G1+G2+G3.

<sup>17</sup> See Part I, Section VII.

The project maturity Sub-classes are based on the associated actions (business decisions) required to move a project towards commercial production. The boundaries between different levels of project maturity are designed to align with internal (corporate) project “decision gates”, thus providing a direct link between decision-making and the capital value process within a company, and the characterization of its portfolio of assets through resource classification.

It is important to note that while the goal of the developer is always to move projects “up the ladder” toward higher levels of maturity, and eventually to commercial production, a change in circumstances (e.g. a change to local environmental, social or market considerations, or to the applicable fiscal regime, or disappointing results from further data acquisition) can lead to projects being “downgraded” to a lower Sub-class.

If the Sub-classes in Figures 2 and 3 of UNFC (see Part I) are adopted, the following guidelines should be applied.

## Commercial Projects

**On Production** is used where the project is actually producing and selling one or more product types to market as at the Effective Date of the evaluation. Although implementation of the project may not be 100 per cent complete at that date, the full project must have all necessary approvals and contracts in place, and capital funds committed. If a part of the project development plan is still subject to separate approval and/or commitment of capital funds such that it is not currently certain to proceed, that part should be classified as a separate project in the appropriate Sub- class.

**Approved for Development** requires that all approvals/contracts are in place, and capital funds have been committed. Construction and installation of project facilities should be underway or due to start imminently. Only a completely unforeseeable change in circumstances that is beyond the control of the developers would be an acceptable reason for failure of the project to be developed within a reasonable time frame.

**Justified for Development** requires that the project has been demonstrated to be technically feasible and commercially viable, and there must be a reasonable expectation that all necessary approvals/contracts for the project to proceed to development will be forthcoming.

## Potentially Commercial Projects

**Development Pending** is limited to those projects that are actively subject to project-specific technical activities, such as acquisition of additional data or the completion of project feasibility studies and associated socio-environmental-economic analyses designed to confirm project commerciality and/or to determine the optimum development scenario. In addition, it may include projects that have non-technical contingencies, provided these contingencies are currently being actively pursued by the developers and are expected to be resolved positively within a reasonable time frame. Such projects would be expected to have a high probability of achieving commerciality within near future.

**Development On Hold** is used where a project is considered to have at least a reasonable chance of achieving commerciality (i.e. there are reasonable prospects for eventual socially, environmentally and economically viable production), but where there are currently major non-technical contingencies (e.g. environmental or social issues) that need to be resolved before the project can move towards development. The primary difference between Development Pending and On Hold is that in the former case the only significant contingencies are ones that can be, and are being, directly influenced by the developers (e.g. through negotiations), whereas in the latter case the primary contingencies are subject to the decisions of

others over which the developers have little or no direct influence and both the outcome and the timing of those decisions is subject to significant uncertainty.

## Non-commercial Projects

**Development Unclassified** is appropriate for projects that are still in the early stages of technical and commercial evaluation (e.g. a recent new discovery), and/or where significant further data acquisition will be required, in order to make a meaningful assessment of the potential for a commercial development, i.e. there is currently insufficient basis for concluding that there are reasonable prospects for eventual social, environmental and economically viable production.

**Development not Viable** is used where a technically feasible project can be identified, but it has been assessed as being of insufficient potential to warrant any further data acquisition activities or any direct efforts to remove commercial contingencies. In such cases, it can be helpful to identify and record these quantities so that the potential for a commercial development opportunity will be recognized in the event of a major change in technology or commercial conditions.

## Additional Quantities in Place

Quantities should only be classified as Additional Quantities in Place where no technically feasible projects have yet been identified that could lead to the production of any of these quantities. Some of these quantities may subsequently be produced in the future due to the development of new technology. It can apply to estimates of known and an, as yet, unknown Resource Source.

# III. SOCIAL AND ENVIRONMENTAL CONSIDERATIONS IN UNFC

## Introduction

Our society depends on the availability of many types of resource, and for any resource development project to proceed to production, many social, environmental, economic and technical issues must be addressed. Successful resolution of these issues is essential for responsible development and use of resources, and thus essential to achieving the benefits that stem from resource development and use.

Social and environmental issues are complex, broad in scope, and dynamic, and comprehensive guidance on their application cannot be provided within the limited scope of this document. This guidance addresses issues that are common to all resource types.

## Scope

This guidance is concerned with the social and environmental aspects of resource classification and does not address the following related and important factors:

- (a) The processes of resolving social and environmental issues that are encountered during the development of a project as it matures to implementation;
- (b) How social and environmental issues should be reported in a resource report;
- (c) The social or environmental merits, or otherwise, of resource development;
- (d) The economic aspects of E-axis.

Resource evaluation and classification traditionally focused on the immediate production process, by considering measures such as a Net Present Value (NPV) while ignoring externalities such as social and environmental issues. An externality is described as:

*“An externality is a cost or benefit resulting from an action that is borne or received by parties not directly participating in the action.” (the United States Environmental Protection Agency (U.S. EPA), 2010) ”.*

Although there may not be agreement on what should be included, nor on whether the effect of an externality is positive or negative, social and environmental externalities have become an increasingly important factor in decisions on resource production projects, and hence on classification. What was previously considered an externality may now have become an internality that must be resolved for a project to proceed. For classification under UNFC, it is recommended that only those externalities that directly impact the project that is being assessed should be considered.

There is a high degree of commonality in the social and environmental aspects of different types of resources, and the guidance provided here is intended to be relevant for all resources to which UNFC applies. However, there will also be issues that are specific to a resource or jurisdiction, in which case, reference should be made to the relevant resource-specific or jurisdictional guidance.

## E Axis

### *Introduction*

The current E-axis Categories and Sub-categories can be found in **Part I, Section VII and VIII**. UNFC also sub-classifies projects based on the level of maturity (UNFC **Specification N**).

### *The relationship between social, environmental, and other factors*

The UNFC E axis is labelled as “socio-environmental-economic” and combines three fundamental criteria of social, environmental and economic viability . A project may meet all the requirements of the F and G axes and the economic component of the E axis, but unless it is also socially and environmentally acceptable, it often cannot proceed.

The various factors involved in resource classification do not exist in isolation, and the distinction between them may not be clear. Some of the social and environmental factors that affect the E axis may also affect the progress made on the F axis. For instance, such as ownership, contract terms, legal, regulatory issues, and in some cases, fiscal terms (taxes, royalties, etc.) may delay or accelerate the mobilization of efforts and industries to mature the technical definition of projects or develop and operate their facilities. A change or delay in the development costs of projects, due to social and environmental issues, can have a significant impact on the near-term financial value of a project, even making it no longer viable. Likewise, a reduction of costs or more efficient fiscal arrangements may accelerate developments and make them (more) attractive economically. Subsidies may allow an otherwise uneconomic project to proceed as part of a social initiative.

### *Other guidance on social and environmental factors*

There is considerable literature on social and environmental matters, mainly on how to address them when developing a project, but little that is related to classification. Most of these discuss social and environmental factors, but none contain significant guidance on classification. This is unlike the F and G axes, which are covered in considerable detail in resource-specific guidance and associated publications.

The World Bank and the International Finance Corporation (IFC), must rate projects to assess their risk and uncertainty before making loans. Although their publications do not classify projects in the same way as UNFC, they provide a useful view on social and environmental classification. The System of Environmental-Economic Accounting (SEEA), which is overseen by the United Nations Committee of Experts on Environmental-Economic Accounting (UNCEEA) under the United Nations Statistical Commission, refers to UNFC as the standard for mineral and energy resource classification. Although SEEA refers to environmental and social factors, it defers to UNFC when it comes to classifying these resources.

The evaluation and classification of resources according to UNFC assume that it is carried out by a person with an appropriate level of expertise. However, the assessment of social and environmental contingencies falls outside the historic resource evaluation and classification process and the expertise of most evaluators, and it will often be necessary to involve others with the appropriate expertise to assess the social and environmental aspects of resource classification.

## Guidance on E-axis social and environmental categorisation

### *Social and environmental classification factors*

Contingencies are conditions that must be resolved before a project can proceed to the next stage of project maturity as it advances to execution. Assignment into one of the UNFC Categories or Sub-Categories depends on the extent to which relevant contingencies, including the social and environmental issues that are required for a project to proceed have been resolved. While almost all projects involve social and environmental issues, they will not always be contingencies that would affect classification. The discussion below focuses mainly on social and environmental issues that may be contingencies.

The resolution of a contingency requires action by the relevant parties. Simple examples would be a sales contract that allows product sales, attainment of access to markets, or testing an exploration well to confirm that it could produce at economically viable rates. For social and environmental issues, it may require action such as the application for, or receipt of, regulatory approval, agreements to limit operations during periods of environmental sensitivity (e.g. limiting or curtailing wind power generation during bird migration or breeding).

Environmental and social contingencies can be considered under two headings:

- (a) Formal. Contingencies subject to formal legal and regulatory processes, such as the granting of environmental approval, approval to drill, explore, develop, or construct. Resolving these contingencies would generally lie within the control of an operator, partnership, or government. In this case, estimating the probability that a project will proceed with or without active engagement with stakeholder may be relatively straightforward, and in developed areas, regulatory approval may be a matter of routine and not considered to be a contingency;
- (a) Informal. Formal approval may not be sufficient to allow a project to proceed, since there may be obstacles to the implementation of a project that lies outside a formal process. The probability of the resolution of this type of contingency will usually be more difficult to assess, and it may lie beyond the control or influence of an asset owner or even a government. For example, concerns of local communities about the positive or negative impacts of a project on the community, or of organisations that would not be directly affected by a project and could involve informal civil activity ranging from protests to violent action. These issues would typically be dealt with by discussion and negotiation between stakeholders, which could trigger further activity within a

formal legal or regulatory setting. These are often referred to as Social Licence but could include force majeure due to civil unrest and war. Informal processes produce contingencies to the extent that they impact the formal processes i.e. changes the formal actions.

### *Steps in categorisation*

The steps in the categorization process include:

- (a) Identifying the relevant social and environmental contingencies;
- (b) Estimating the probability that social and environmental issues will be resolved and maintained over the life cycle of the project. This will depend on the specifics of a project and the legal, regulatory and social environment in which it is proposed to be carried out. When there is a history of similar project developments, they may be used as analogues. Although an assessment of the probability of resolving social, environmental and economic contingencies is likely to be subjective, it should be based as much as possible on a documented analysis;
- (c) Consideration of the level of activity needed and the status of this, to resolve social and environmental issues at the time of an evaluation and classification. This will depend on the project:
  - i. When no or only routine activity is required, social and environmental issues may not be a contingency;
  - ii. In other cases, a high level of effort and active engagement with stakeholders may be required over an extended period.
  - iii. Evidence of active engagement with stakeholders towards the resolution of social and environmental contingencies must be based on substantial documentation, and would not be satisfied by an unsubstantiated claim or a token effort. The nature of this will depend on the project and on the social and environmental issues that are involved. It could include, for example, documented proof that an Environmental and Social Impact Assessment (ESIA) was being carried out or has been submitted for approval, that there are constructive discussions with interested parties, the establishment of training and other social programmes, etc.;
  - iv. Lack of active engagement with stakeholders in the resolution of social and environmental contingencies. The consequences of a lack of engagement will depend on the situation. In an established area with a history of resource development, project approval may be a matter of routine and require little or no effort. In other cases, it will result in a project not receiving approval and it being put on hold or abandoned.
  - v. Active engagement with stakeholders does not necessarily mean that this will lead to successful resolution of the contingencies. Similarly, a lack of engagement at the time of an evaluation does not necessarily mean that a project will be unable to proceed.

The following points should be noted:

- (a) The assessment of social and environmental factors for resource categorisation has not been common resource evaluation practice. Evaluators should ensure that they apply an appropriate level of expertise for an evaluation, which may require consulting with those who have such expertise;
- (b) Evaluation and classification can only be based on the information that is available at the time of the evaluation. Subsequent changes may require a re-evaluation and reclassification;

- (c) An estimate of probability should be at a level needed to classify to a UNFC sub-category (e.g., the resource Category may be the same whether the probability is 60 per cent or 70 per cent). It does not necessarily require formal calculation or great precision, and subjective estimation of probability (at different levels of sophistication) will usually be more appropriate;
- (d) The uncertainty associated with any estimate should be recognized;
- (e) There will usually be multiple contingencies and the lowest ranking one should be assigned to the overall project classification, as illustrated in the example in [Table 1](#);
- (f) The method used to estimate a probability should be documented. This will be particularly important when the information is to be used for investment decisions or raising of funds for a project.

## E-axis social and environmental categories and sub-categories

E-axis Categories and Sub-categories are summarized in the following text.

- (a) E1: Production and sale has been confirmed to be socially, environmentally and economically viable.
- (b) E2: Production and sale is expected to become economically, socially, and environmentally viable in the foreseeable future.

Two Sub-categories are based on the probability of approval, a significant aspect of which is the effort directed towards resolving the relevant contingencies. The level of engagement required for their resolution depends on the project, the formal regulatory requirements and the informal situation regarding social and environmental issues. However, the activity does not automatically relate to the probability of approval. A high level of active stakeholder engagement could be tied to a low probability of approval, but in some cases, such as in a well-developed area with considerable prior, analogous, activity, there may be a high probability of approval because little, or only routine, activity is needed.

E2.1 Issues are yet to be resolved, but there is a high probability of their resolution evidenced by an active attempt to resolve all impediments (contingencies) with a high probability of success, a history of similar projects in the area, or other indications, within the foreseeable future.

E2.2 Issues are yet to be resolved, but there is either:

An active attempt to resolve all impediments (contingencies) with a medium probability of success, or;

No activity to resolve impediments, but based on the characteristics of the project and previous history of similar projects in the area, or other supportive information there a medium probability of their resolution within the foreseeable future.

The relationship of E2.1 and E2.2 to the Project Maturity sub-classes is discussed below, but it should be noted that it is not a simple one-to-one relationship.

- (c) E3: Production and sale is not expected to become socially, environmentally and economically viable in the foreseeable future, or evaluation is at too early a stage to determine social, environmental and economic viability

E3.1: No additional guidance

E3.2: Whether or not there is an active effort to resolve social and environmental issues, the outcome is unknown or unclarified.

E3.3: Whether or not there is an active effort to obtain approval, the probability of receiving approval is less than medium and may be zero

Classification depends on the probability of resolving all relevant contingencies. Although the estimation of probabilities will be largely subjective, the percentages given below are based on studies of common usage of terms, such as “high probability”. When it is uncertain into which category a contingency would fall, the lower one should be selected.

For social and environmental contingencies, the probability of successful resolution depends on the significance of the issues and the level of activity needed for their resolution.

The factors of Probability of Approval and the Level of Stakeholder Engagement are related and may be combined as follows:

- (a) Active Stakeholder Engagement with:
- High probability of approval (> 80 per cent)
  - Medium probability of approval (50 – 80 per cent)
  - Low (< 50 per cent), or unknown probability of approval.
- (b) No Active Stakeholder Engagement:
- High probability (> 80 per cent) of approval based on a demonstrated history of outcomes in analogous situations.
  - Medium probability (50 – 80 per cent) of approval based on a demonstrated history of outcomes in analogous situations
  - Low (< 50 per cent) or unknown probability of approval.

The application of the above to classification in UNFC is summarized in **Table 2**.

**Table 1**

Categorisation based on Level of Stakeholder Engagement and Probability of Approval

<i>Stakeholder Engagement</i>	<i>Active</i>	<i>Not Active</i>
<i>Probability of Approval</i>		
High (> 80%)	E2.1	E2.2
Medium (50 – 80%)	E2.2	E3.3
Low (< 50%)		E3.3
Unknown or unclarified		E3.2

This is not a requirement for a specific probability estimate, but for a determination of which range, < 50 per cent, ≥50 – 80 per cent or ≥ 80 per cent, is appropriate. In most cases, this will be a qualitative, not a quantitative, estimate. When there is doubt, the lower probability should be assigned.

When determining the appropriate resource class or sub-class, the evaluator should consider the significance of the social and environmental contingencies, the level of concern of regarding these issues by stakeholders and the activities, including the necessary level of engagement, between them that is required to resolve them.

## Related contingencies

As noted above, other E-axis criteria may be affected by social and environmental issues. The effect of these on classification is likely to vary between different operators and others with different Realms of Discourse. For example:

- (a) Ownership and regulatory approval are unlikely to be factors for governments but will be significant for others;
- (b) The decision to commit to executing a project usually lies with an owner, not with a government.

This may result in different classifications for the same project. This is recognized in **Part III Section VII** National Resource Reporting, although that focuses mainly on aggregation. They may include the following:

- (a) Legal framework. The right to produce and sell (or benefit) from a resource.
  - E3 if there is no legal right to produce and sell, as is the case for many exploration activities, and no negotiation or application in process.
  - E2 if the legal right to produce and sell is being negotiated but not finalized, or is in dispute.
  - E1 if the legal right to produce and sell is established and not in dispute.
- (b) Regulatory approval. This is required for many aspects of production operations, ranging from major environmental approval to routine minor issues such as individual well abandonment approvals.
  - E3 if required but not applied for or applied for and not approved.
  - E2 if applied for but not yet received.
  - E1 if received or, located in areas and jurisdictions where there is an established history of approval indicates that approval can be expected.

Classification may be relatively straightforward for formal legal and regulatory processes since they have either:

- (a) Not been initiated (i.e., not been applied for);
- (b) Been initiated and in the process of being considered;
- (c) Been initiated and approval has not been granted;
- (d) Been approved.

Other E-axis non-economic factors mentioned in UNFC, for which classification may be less clear, include:

(a) Fiscal framework. The terms regarding taxes, royalties, production sharing, or other fiscal provisions under which production operations are carried out may be influenced by social and environmental considerations.

- E3 if not determined.
- E2 if it is being negotiated but not finalized, is in dispute, or there is uncertainty due to the possibility of a change that could affect the commercial viability of a project.
- E1 if established, not in dispute or uncertain, and allows a decision to implement a project to be made.

(b) Contractual conditions. These are specific to an asset or project, but may contain terms beyond those of the legal or fiscal framework (e.g., a requirement to use local labour, private sector contracts, lease expiry after a specific time, abandonment and reclamation obligations, etc.). A contract may not always be required, but if it is:

- E3 if it does yet not exist.
- E2 if they are being negotiated but not finalized, are in dispute, or there is uncertainty due to the possibility of a change that could affect the commercial viability of a project.
- E1 if established, not in dispute or uncertain in any manner, and is expected to be concluded with a high degree of certainty.

The contingencies relevant for a specific project will vary, and there may be others that are not listed previously. An environmental or social contingency that results in the delay of a project can have a major impact on the economic viability (e.g. a decrease in the NPV) that may warrant a reclassification. Users of UNFC may elect to use attributes to distinguish between projects where the contingencies are within their control and where they are not. This may be done, for instance, to improve information to government or others of what the quantitative effects of changes in the framework conditions they control may be.

## Project Maturity Sub-Classes

Part I Section III refers to Sub-Classes that are illustrated in Figure 4. Classes and Sub-Classes are defined by Sub-Categories. These are described in detail in the Guidelines on the Use of Project Maturity to Sub-classify Projects using UNFC as contained in Part III, Section II, which states that the Categories and Sub-Categories of UNFC reflect the probability of a project attaining commerciality. “The Project Maturity Sub-Classes are based on the associated actions (business decisions) required to move a project towards commercial production”.

The relation between the suggested E2 Sub-categories and the Project Maturity Sub-Classes of On Hold and Development Pending is not straightforward. Project Maturity describes the current status of a project, but a project that is On Hold or Development Pending could have a probability of the resolution of the relevant issues that range from low to high but provides no indication of the probability that the relevant contingencies will be resolved.

## Example of E-axis categorization

The overall ranking shown in **Table 2** is that of the lowest potential E Category.

**Table 2**

<i>Issue / potential contingency</i>	<i>Level of engagement</i>	<i>Probability of approval</i>	<i>Potential E Category</i>
Legal	Relevant licences	done	E1
Regulatory	Relevant permissions	granted	E1
Market access	Local use	99%	E1
Social	No objections expected	90%	E1
Economic	Project screened economic	95%	E1
Political	No worries expected	99%	E1
Internal & external approvals/commitments	Commitments made	100%	E1
Environmental	Licence approval in process. Issue with the black-rimmed beetle frog habitat	50%	E2
Timing (<5 years or >5 years)	<5 years	Uncertain (see environmental)	E2
<b>Total = lowest ranking issue</b>			<b>E2</b>

## IV. DISCLOSURE

UNFC is a voluntary system for classification of natural resource endowments. UNFC is the core of the UNRMS, which is a tool-kit for sustainable management of resources. UNFC as such is not a public reporting code. However, UNFC could be used as the basis for reporting if it mandated in a particular jurisdiction by the competent authority.

UNFC does not impose any rules regarding which Categories of resources (Classes or Sub-classes) should be disclosed for any purpose whatsoever. Unless mandated or restricted by a government or other regulatory body, the disclosure of resource quantities is entirely at the discretion of the owner of the information (reporter).

# V. EVALUATOR QUALIFICATIONS

## Introduction

This guidance note provides additional information regarding the specification for Evaluator Qualifications (**Specification H**) as documented in **Part II**.

## Purpose of guidance note

The specification for Evaluator Qualifications, as set out in UNFC (and reproduced verbatim in the next sub-Section), is intentionally limited to a generic requirement for an Evaluator to have appropriate competency. The primary purpose of this note is to explain why **Specification H** is not more specific or detailed, and to provide a link to a companion guidelines (**Section IV**) which is not an integral part of UNFC, but which has been prepared on behalf of the Expert Group and contains detailed guidance on appropriate quality assurance mechanisms, qualification standards and/or disclosure obligations that can be adopted in circumstances where explicit mandatory competency requirements are considered desirable.

## UNFC specification for Evaluator Qualifications

Evaluators must possess an appropriate level of expertise and relevant experience in the estimation of quantities associated with the type of resource source under evaluation.

## Discussion

In the context of this note, an Evaluator is a person, or persons, performing resource estimation and/or classification. Where relevant, this definition should be understood to encompass the reporting of such data as well as its estimation and/or classification, since there may be specific regulations covering which classes of resource sources that may or may not be reported publically, for example.

The term Competent Person is widely used in association with regulations addressing public corporate resource reporting in the resource industries. These regulations are established or adopted by individual stock exchanges or by all exchanges within a single jurisdiction such as the European Union. Consequently, the requirement for, and definition of, a Competent Person varies between industries and jurisdictions. In other contexts, such as companies reporting directly to a government body and then that body making those estimates public (often, but not always, in an aggregated form), there is generally no explicit requirement for a Competent Person. Similarly, there is generally no requirement for a Competent Person within government bodies when publishing their own technical reports. Company internal resource management functions also do not generally require a Competent Person, though the company is in any event likely to have internal controls to ensure that those involved have the necessary training and experience.

A Competent Person requirement (or equivalent) has long been a common facet of stock exchange rules pertaining to prospectuses issued for a range of company transactions. In recent years, a number of stock exchanges have extended this requirement (or some other form of quality assurance) to cover at least annual reporting, but it can extend to all public reporting by a corporate entity, including (but not limited to) annual and quarterly company reports, press releases, information memoranda, technical papers, website postings and public presentations.

Since different applications may require different quality assurance mechanisms, it is inappropriate to incorporate these into the classification system itself. The responsibility for establishing the appropriate mechanism lies with the user of the estimates and hence, where these systems are accepted for stock

exchange reporting purposes, for example, the individual stock exchanges have developed their own definition of, and requirements for, a Competent Person or equivalent.

UNFC is a voluntary classification system with broad applicability and it does not impose limitations on who may apply it<sup>18</sup>. Consequently, it would be inappropriate for the United Nations to impose mandatory competency requirements for all Evaluators using UNFC. Nevertheless, it is recognized that government agencies, stock exchanges or other organizations may wish to adopt UNFC as a mandatory reporting system, or explicit option, within their own jurisdiction. If so, it may be appropriate by that body or organization to impose more detailed specifications regarding the type of quality assurance process and/or level of experience of the Evaluator(s) that will provide users with greater confidence in the published estimates and their classification.

In recognition of requests by potential users of UNFC for assistance in the development of Competent Person (or equivalent) standards, the Expert Group has prepared detailed guidance (See **Part III Section VI**) on appropriate quality assurance mechanisms, qualification standards and/or disclosure obligations that can be adopted in circumstances where explicit mandatory competency requirements are considered desirable.

The guidelines contained in **Part III Section VI** reflect options that could be selected, refined and imposed by an organization where, for example, UNFC has been adopted as one of the accepted reporting systems. The guidelines have been prepared in the light of current practices and are intended to facilitate consistency, but not to constrain alternative approaches that may be considered more appropriate by the relevant organisation especially where the industry or product-type concerned has special/unusual characteristics.

## VI. COMPETENT PERSON REQUIREMENTS AND OPTIONS FOR RESOURCES REPORTING

### Introduction

This guidance note follows Section IV Guidance Note to support the United Nations Framework Classification for Resources (UNFC) Specification for Evaluator Qualifications, which provides additional information regarding the Specification for Evaluator Qualifications (**Specification H**) as documented in **Part II**.

### Purpose

This guidance note is provided for organizations or entities such as national governments, financial institutions and companies, who may wish to establish appropriate quality assurance mechanisms, qualification standards and/or disclosure obligations that can be adopted in circumstances where explicit mandatory competency requirements are considered desirable.

A Competent Person is essential for certain types of reporting functions, especially in the disclosures required by many institutions. However, this may not be essential for the application of a classification system such as UNFC. Hence, this guidance note is not essentially part of UNFC, but could be considered as an option by entities who may wish to apply UNFC for resource classification and resource management functions.

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See **Part III Section IV**.

The guidelines contained are only options that could be selected, refined or imposed by an organization or entity.

## Scope

A Competent Person can be specified for:

- (a) Estimation of quantities or volumes, and
- (b) Classification of resources for reporting for:
  - i. national resource management functions;
  - ii. public reporting by companies;
  - iii. financial reporting functions of companies; and
  - iv. internal resource management functions of organizations.

The scope of any Competent Person guidelines should be clearly specified by the authority/regulator that is enforcing the requirements.

## Definition

A Competent Person is one who has the ability to put skills, knowledge and experience into practice in order to perform activities or a job in an effective and efficient manner for resource classification, management and reporting.

Classification, management and reporting of resources may be a team effort involving several technical disciplines. In the case of a team effort, it is recommended that there is a clear division of responsibility in a team where each Competent Person and his or her contribution should be identified and responsibility accepted for their particular contribution. If a single Competent Person accepts responsibility for the whole of the documentation, he or she should be satisfied that the supporting work prepared in whole or part by others is acceptable.

## Competent Person requirements

Competency requirements are differentiated as:

- (a) Generic competencies, which are applicable for any sector for which resource reporting is carried out, such as petroleum, minerals, uranium, renewables (geothermal, bioenergy, solar, wind, hydro and others), injection projects, and anthropogenic resources; and
- (b) Specific functional competencies, which are applicable to the particular sector for which reporting is carried out.

## Generic requirements

The generic requirements for a Competent Person are listed below:

- (a) *Single Person or Group*: Competent Person may be a single person or a team of experts with different backgrounds performing resource management functions. For complex projects where knowledge in different areas are required, reporting should be performed by a team of Competent Persons, each having appropriate education, experience and continuous training in relevant areas.
- (b) *Disclosure*: The full name, affiliation, education and experience of the Competent Person providing the evaluation should be disclosed. If a group is performing the actions, each member of the group should satisfy all the generic requirements and the specific requirements of the sector for which the person is responsible. All members of the group should disclose their full name,

affiliation, education and experience and indicate which specific part of the reporting they are responsible for.

- (c) *Responsibility*: The responsibility of the reporting should in all cases rest on the accountable authorized authority, i.e. organization or entity reporting the quantities or volumes.
- (d) *Education*: A Competent Person should have undergone a managed process of individual learning at a university or academic institution which provides basic knowledge that underpins the science, technology and socio-environmental-economics of the sectors for which quantity or volume assessment is being carried out. At a minimum, a Competent Person should have a relevant tertiary degree.
- (e) *Experience*: A Competent Person should have relevant experience in resource management functions or activities for the specific technical discipline in the sector for which the resource evaluation and reporting is being carried out.
- (f) *Continuous Training*: A Competent Person should undergo Continuous Professional Development (CPD). This is a managed process that is focused on the continuous development of specialized knowledge needed to meet resource management functions.
- (g) *Licences*: A Competent Person should hold appropriate licences issued by a competent authority if required in the jurisdiction in which he or she is reporting.
- (h) *Professional body affiliation*: For the purpose of public reporting, a Competent Person should be affiliated with a professional body or association with an enforceable code of ethics and performance expectations. The regulator/authority could specify the acceptable professional bodies or associations acceptable for the purpose.
- (i) *General guidance*: Persons being called upon to act as a Competent Person should be clearly satisfied in their minds that they could face their peers and demonstrate competence in the particular activity and sector under consideration. Should doubt exist, the person should seek opinions from appropriately experienced colleagues or should decline to act as a Competent Person.

## Specific functional requirements

Competencies required for the discharge of resource management functions specific to different sectors may vary. Specific functional requirements may be provided as detailed guidance notes if necessary by sectors such as petroleum, minerals, nuclear fuel resources, renewable energy (bioenergy, geothermal, hydro, solar, wind and others), injection projects, and anthropogenic resources.

## Governance

Competent Person and disclosure requirements may be governed by a body, regulator or authority in appropriate jurisdictions. The governance may at the national level be a Ministry or a Commission mandated by the Government for this task. For financial reporting, the Stock Exchange Commission or a banking sector regulator may govern these requirements. An individual body such as a company may establish its own governance oversight answerable to an independent Board of Directors, trustees or other stakeholders.

## Discussion

The guidelines contained in this document reflect options that could be selected, refined and imposed by an organization where UNFC may be adopted as a mandatory reporting system. The guidelines have been prepared in the light of current practices and are intended to facilitate consistency, but not to constrain alternative approaches that may be considered more appropriate by the relevant body or organization particularly when the industry or product type concerned has special/unusual characteristics.

## VII. NATIONAL RESOURCE REPORTING

At a government level, national resource estimates may be based on an aggregation of reported or published corporate and other estimates for individual projects. However, such estimates may not cover all known or potential resources in the country and may not include Government entitlements. Further, where government organizations have a responsibility for developing resource estimates at a regional or national level, the estimates may be different from corporate estimates on an individual project basis. In such cases, regional or national inventory estimates using UNFC shall be derived using an appropriate methodology based on the nature and extent of available data. When aggregated classes are reported the aggregation methodology shall be mentioned in accordance with Generic **Specification G**.

When classifying aggregated estimates using UNFC, it is mandatory that the relevant Numerical Codes for the individual Classes are mentioned. For example, it may be useful at a national level to determine the sum of estimated quantities for Commercial Projects and Potentially Commercial Projects at a “best estimate” level, though it is preferred that the breakdown by Class is also provided.

## VIII. RELATIONSHIP WITH ALIGNED SYSTEMS

Application of UNFC to classify quantities based on an Aligned System can be performed either by first generating estimates using the Aligned System and then assigning those estimates to the appropriate UNFC Class or Sub-class, or by generating the estimates directly in UNFC by applying the relevant specifications from the Aligned System. However, in both cases, this still requires adherence to both the Principles (Definitions) and Generic Specifications of UNFC, and the sector-specific requirements that are included in the Aligned System.

PART IV  
EXPLANATORY NOTE TO THE UNITED NATIONS FRAMEWORK  
CLASSIFICATION FOR RESOURCES

## CHANGES TO UNFC (2019) update

The core value and purpose of UNFC is derived from the principles of sustainable development. Introduction is expanded to include reference to 2030 Agenda on Sustainable Development, Paris Agreement, Africa Mining Vision and similar high-level frameworks such as SEEA.

The following changes are made throughout the document to make the system equally applicable to all resource sources and product types. All specific references to particular product types have been removed, except where required for illustrative purposes. Following are the major changes:

- “Resource source” instead of “deposit” or “accumulation”
- “Produced” instead of “extracted”
- “Product type” instead of “commodity”

### Part I

Figure 1 – G-axis label changed to Confidence in Estimates

Figure 3 –Two-dimensional E-F axes matrix UNFC Classes and Sub-Classes Based of E and F Minimum Categories introduced.

**Section V** Environmental and Social Considerations added.

Part I Annexes I and II in UNFC-2009 changed to **Section VII and VIII** in this document.

Definitions of E categories updated based on recommendations of Social and Environmental Considerations Task Force inputs.

Sub-category E1.1 and E1.2 has been deleted.

E2 sub-categories E2.1 and E2.2 added based on social and environmental considerations.

### Part II

Generic Guidelines for the Application of the United Nations Framework Classification for Resources now include only generic specifications. Some of the other sections of guidance nature are moved to Part III (see below). The generic specifications are re-arranged based on its relevance to (I) all categories; (II) E-axis; (III) F-axis; and (IV) G-axis.

## **Part III**

Generic Guidelines for the Application of the United Nations Framework Classification for Resources introduced by including some of the sections of Generic Specifications; Part II Annex II and Part II Annex V from UNFC-2009.

Annex III and IV of UNFC-2009 are not included in this update as all product type specifications and bridging documents will be updated and published separately.

Additional guidance note prepared during 2016-2018 on Project definition, Social and Environmental Considerations, Evaluator Qualifications and Requirements for Competent Persons included in Part III.

## **Part IV**

Changes to current update of UNFC is presented here, briefly. Refer to notes provided in UNFC-2009 for background notes on the evolution of the classification.

## **Annex I**

An updated Glossary of Terms is provided in Annex I.

## **Bibliography**

Includes only the previous three versions of UNFC. See the other versions for more background references.

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# ANNEX I

## GLOSSARY OF TERMS

Term	Definition
Abandonment	Seal off to ensure safety of Project site.
Aligned System	A classification system that has been aligned with UNFC as demonstrated by the existence of a Bridging Document that has been endorsed by the Expert Group on Resource Management.
Bridging Document	A document that explains the relationship between UNFC and another classification system, including instructions and guidelines on how to classify estimates generated by application of that system using the UNFC Numerical Codes.
Category	Primary basis for classification using each of the three fundamental Criteria of social, environmental and economic viability (related Categories being E1, E2, and E3), field project status and feasibility (related Categories being F1, F2, F3 and F4), and level of knowledge and/or confidence in estimates of quantities (related Categories being G1, G2, G3 and G4). Definitions of Categories are provided in UNFC Part I.
Class(es)	Primary level of resource classification resulting from the combination of a Category from each of the three Criteria (axes).
Classify (according to UNFC)	To assign estimated quantities to a specific Class (or Sub-class) of UNFC by reference to the definitions of Categories or Sub-categories for each of the three Criteria and taking into account both the Generic Specifications and the Sectoral Specifications or requirements that are included in the Aligned System, as set out in the relevant Bridging Document.
Competent Person	Competent Person is one who has the ability to put skills, knowledge and experience into practice in order to perform activities or a job in an effective and efficient manner for resource classification, management and reporting.
Commercial	A project is commercial when it has been confirmed to be socially, environmentally, economically and technically feasible and satisfies all the relevant criteria of the E, F, and G axes that are required for it to proceed.
Contingencies	Criteria or conditions that must be satisfied before a project can proceed.

Criteria	UNFC utilizes three fundamental Criteria for resource classification: social, environmental and economical viability (E axis); field project status and feasibility (F axis); and, level of knowledge/confidence in estimates (G axis). These Criteria are each subdivided into Categories and Sub-categories, which are then combined in the form of Classes or Sub-classes.
Decommissioning	The closing and potentially removing facilities associated with a project. These could include anything from minor local facilities, to major facilities such as large processing plants, or offshore structures
Economic	A project is economic when the anticipated monetary revenues equal or exceed the costs by a margin that satisfies financing requirements, taking the risks and opportunities into account, and provides a positive return on investment, often measured by a monetary criterion, such as having a positive NPV at a particular discount factor.
Environmental	The physical, chemical, and biological impact on, or changes to, the surrounding pre-existing environment, due to a project (e.g. heavy metal contamination in soils or water, disruption of wildlife habits and migration characters, etc.).
Evaluator	Person, or persons, performing resource estimation and/or classification.
Exploration Project	A Project that is associated with one or more Potential Resource Sources (See Potential Resource Source).
Generic Specifications	Specifications that apply to the classification of quantities of any resource using UNFC.
Guidelines	Additional instruction on how UNFC should be applied in specific circumstances.
Harmonization of Classification Systems	To identify significant differences between systems, if any, by mapping and then, if necessary, to adjust definitions and/or specifications of one system so that they lead to comparable results. A system that is harmonized with UNFC can become an Aligned System through the development and endorsement (by the Expert Group on Resource Management) of a Bridging Document.
Known Resource Source	A Resource Source that has been demonstrated to exist by direct evidence. More detailed specifications can be found in relevant sectoral specifications.
Mapping Document	The output of a comparison between another resource classification system and UNFC, which highlights the similarities and differences between the systems. A Mapping Document can provide the basis for assessing the potential for the other system to become an Aligned System through the development of a Bridging Document.
Numerical Code	Numerical designation of each Class or Sub-class of resource quantity as defined by UNFC. Numerical Codes are always quoted in the same sequence (i.e. E;F;G).

Political	Action by a controlling organization that may influence, impede, prevent, or facilitate the ability to proceed with a project.
Potential Resource Source	A Resource Source that has not yet been demonstrated to exist by direct evidence, but is assessed as potentially existing based primarily on indirect evidence. More detailed specifications can be found in relevant sectoral specifications.
Product	The output from a Project that is directly linked to (or a direct replacement of) a Product Type and is saleable in an established market. (See also Product Type)
Product type	Cluster or group of outputs of potential socio-environmental-economic interest from a Project such as Petroleum, Minerals, Nuclear Fuels, Renewable Energy, Anthropogenic Resources or Geological Storage. A Product Type may include multiple products. (See also Product)
Project	A Project is a defined operation which provides the basis for socio-environmental-economic evaluation and decision-making. In the early stages of evaluation, the Project might be defined only in conceptual terms, whereas more mature Projects will be defined in significant detail. Where no operation can currently be defined for all or part of a resource source, based on existing technology or technology currently under development, all quantities associated with that resource source (or part thereof) are classified in Category F4.
Realms of Discourse (ROD)	Realms of Discourse (ROD) describes the context and the reason for evaluating and classifying a resource project. The same project is likely to be assessed under different conditions by various organisations. An organisation such as an operating company is likely to assess all its projects under the same ROD; a government agency will have its own, but different, ROD for all the projects that it assess.
Regeneration	Site is returned to or reconstituted for productive use (not necessarily measured by its economic value), for example, a rock quarry used as a reservoir or lake for recreation.
Remediation (or Reclamation)	The restoration of a project site conditions that are required by regulatory or other provisions.
Resource	The cumulative quantities of Products produced from the Resource Source, measured at the Reference Point.
Resource Source	A Resource Source is the initial form in which a Resource is found and a Product Type may be derived. In the case of minerals, the Resource Source would generally be termed a mineral deposit, whereas for oil and gas it would be an accumulation or reservoir. For renewable energy the primary energy (e.g. sun, wind, biomass, earth thermal energy, river flow, tides, waves) available for extraction of (and conversion into) Renewable Energy Products. For injection

	<p>projects for geological storage it is a site with the availability of porosity. Anthropogenic Resources Sources can be sites with availability of mine tailings, buildings, infrastructure, consumer goods, and from residues at all material life cycle stages, including production, use and end-of-life. (See also Resource; Product Type)</p>
Sector/Sectoral	Pertaining to a specific Product Type (See Product Type)
Social	<p>The resulting impact on humans and society, from a project, such as:</p> <ul style="list-style-type: none"> <li>(a) Effects stemming from environmental changes (e.g. health issues due to heavy metal contamination).</li> <li>(b) Changes in social systems and structures, (e.g. ownership claims, traditional land usage, land and other value changes, changes in local population community structures, the creation of jobs and economic activity, etc.).</li> </ul>
Specifications	Additional details (mandatory rules) as to how a resource classification system is to be applied, supplementing the framework definitions of that system. Generic Specifications provided for the UNFC ensure clarity and comparability and are complementary to the sectoral requirements, including in Aligned Systems, as set out in the relevant Bridging Document.
Sub-categories	Optional subdivision of Categories for each of the fundamental Criteria of social, environmental and economic viability, field project status and feasibility, and level of knowledge/confidence in estimates. Definitions of Sub-categories are provided in Part I Section VIII.
Sub-classes	Optional subdivision of resource classification based on project maturity principles resulting from the combination of Sub- categories. Project maturity Sub-classes are discussed further in Part III Section III.

## BIBLIOGRAPHY

The previous versions of UNFC are provided below.

ECE, (1997), United Nations International Framework Classification for Reserves/Resources - Solid Fuels and Mineral Commodities (UNFC-1997) [https://www.unece.org/energy/se/unfc\\_fc\\_sf.html](https://www.unece.org/energy/se/unfc_fc_sf.html)

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