

UNFC

How it works in practice

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IAEA-CYTED-UNECE
Workshop on recent developments
in evaluation of uranium and
thorium resources

Lisbon, Portugal
15-18 October 2012

UNFC – 2009

- **What is it?**
- **How it works**
- **Alignment**
- **Current status**

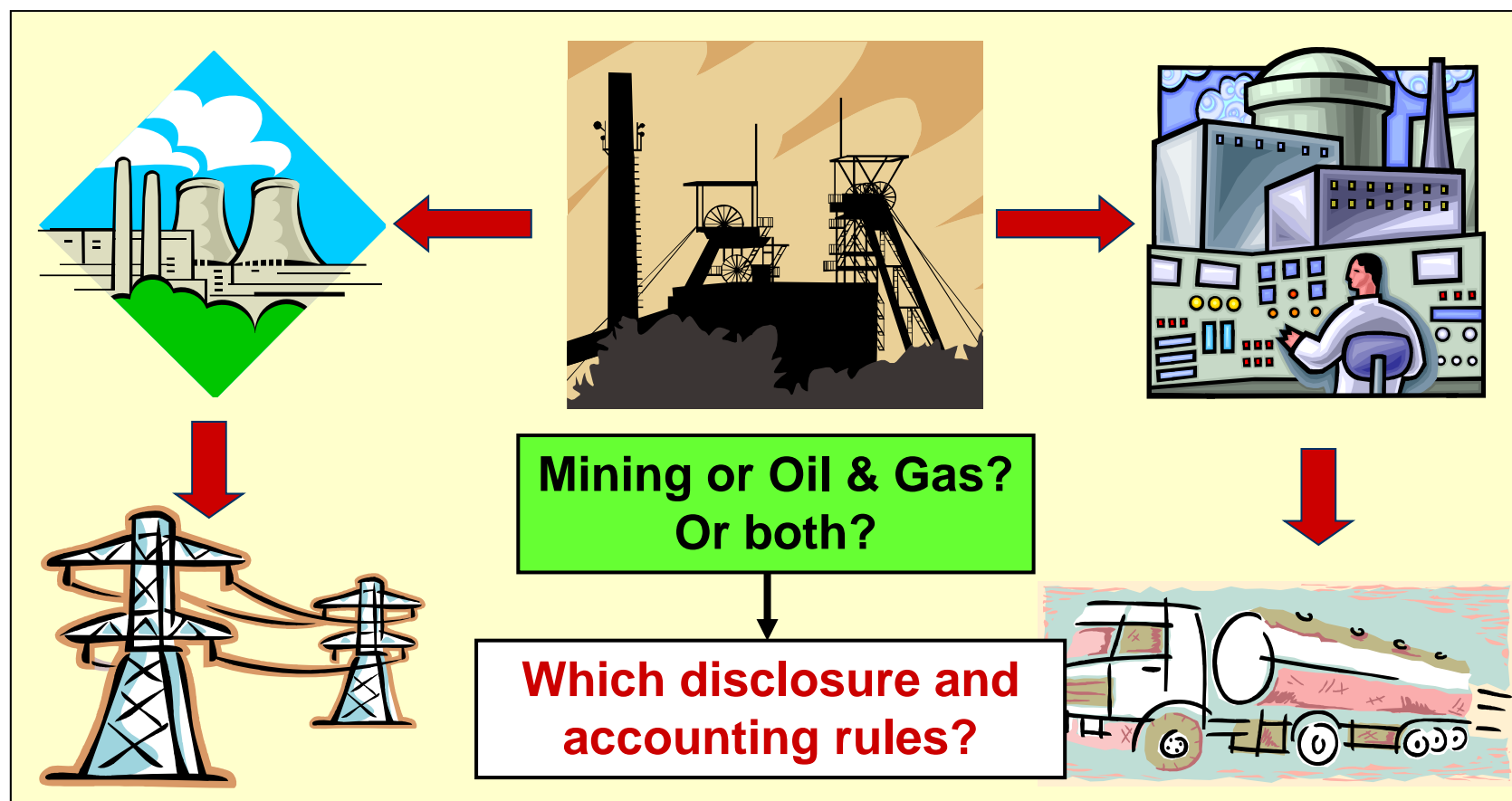
UNFC – 2009

- **United Nations Framework Classification for Fossil Energy and Mineral Reserves and Resources**
- **Generic, principles-based system**
 - Applicable to both solid minerals and fluids
- **Based on three criteria**
 - **E**conomic and social viability
 - **F**ield project status and feasibility
 - **G**eological knowledge

Why is the UNFC needed?

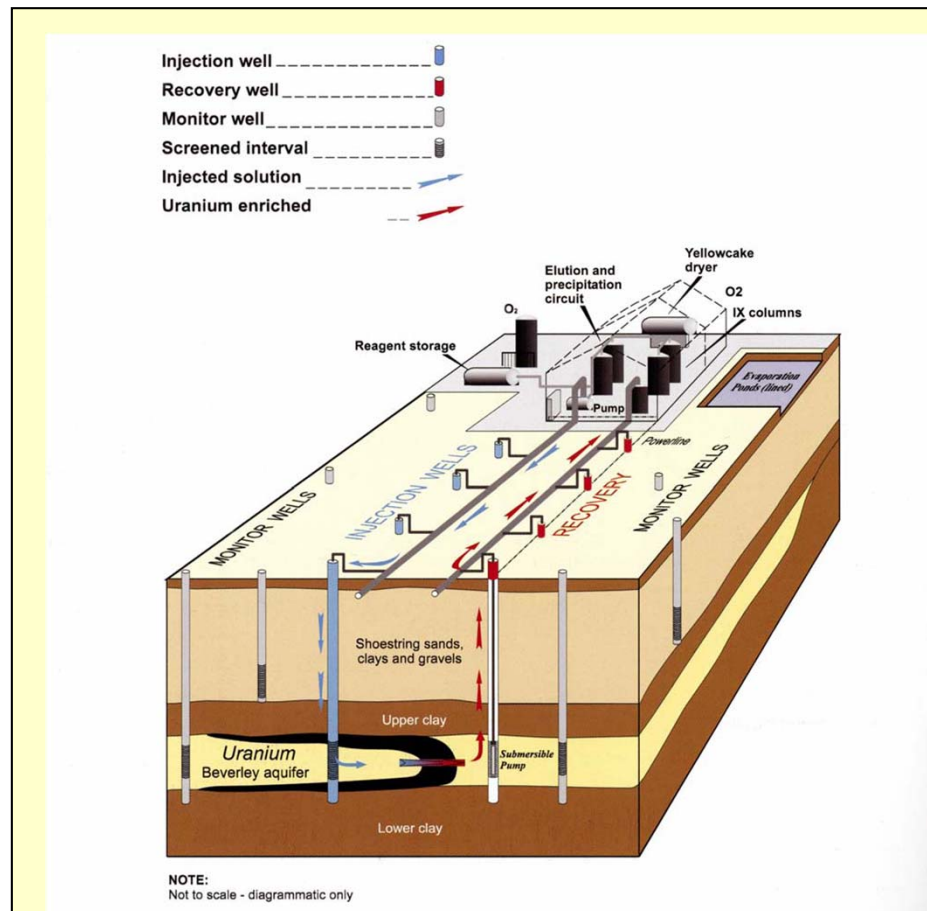
- **Need for common global language for energy and mineral resource estimates**
 - What are “proved reserves”?
 - What are “resources”?
- **Increasing overlap between mining and oil & gas industries**
 - Major issue with respect to “unconventional” resources
 - SPE-PRMS is designed for fluids
 - CRIRSCO Template is designed for mined solids
- **Increasing need to be able to compare renewable energy resources with non-renewable resources**

Coal mining: an oil & gas producing activity?



THE DISTINCTION BETWEEN INDUSTRIES IS NOT CLEAR

Uranium in-situ leaching: a mining activity?



**Commercially producing
uranium project**

**Looks like an oil & gas
operation to me!
Project would have
reserves under PRMS**

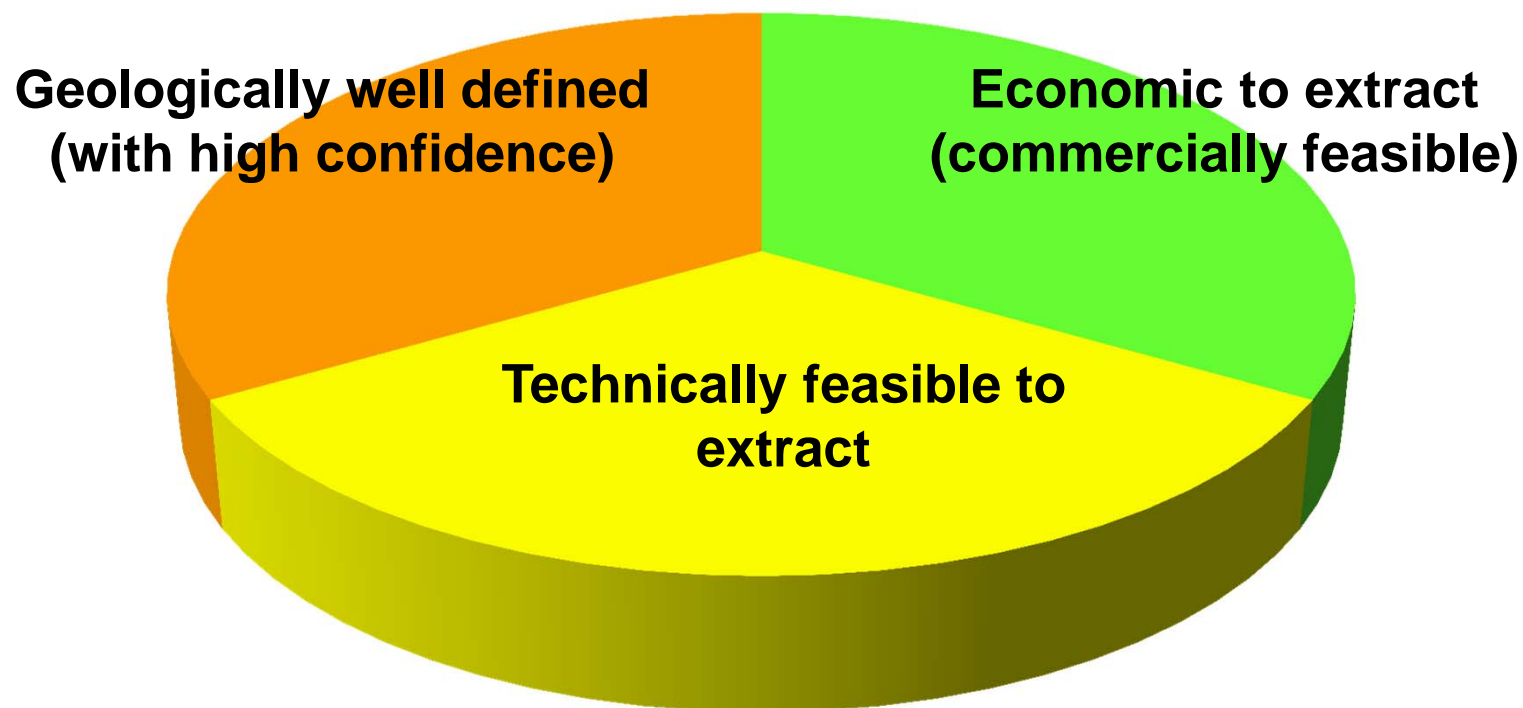
**Mining Rules:
NO RESERVES due to
uncertainty in
recoverable quantities**

Schematic of in situ leach uranium mine (Heathgate Resources, 1999)

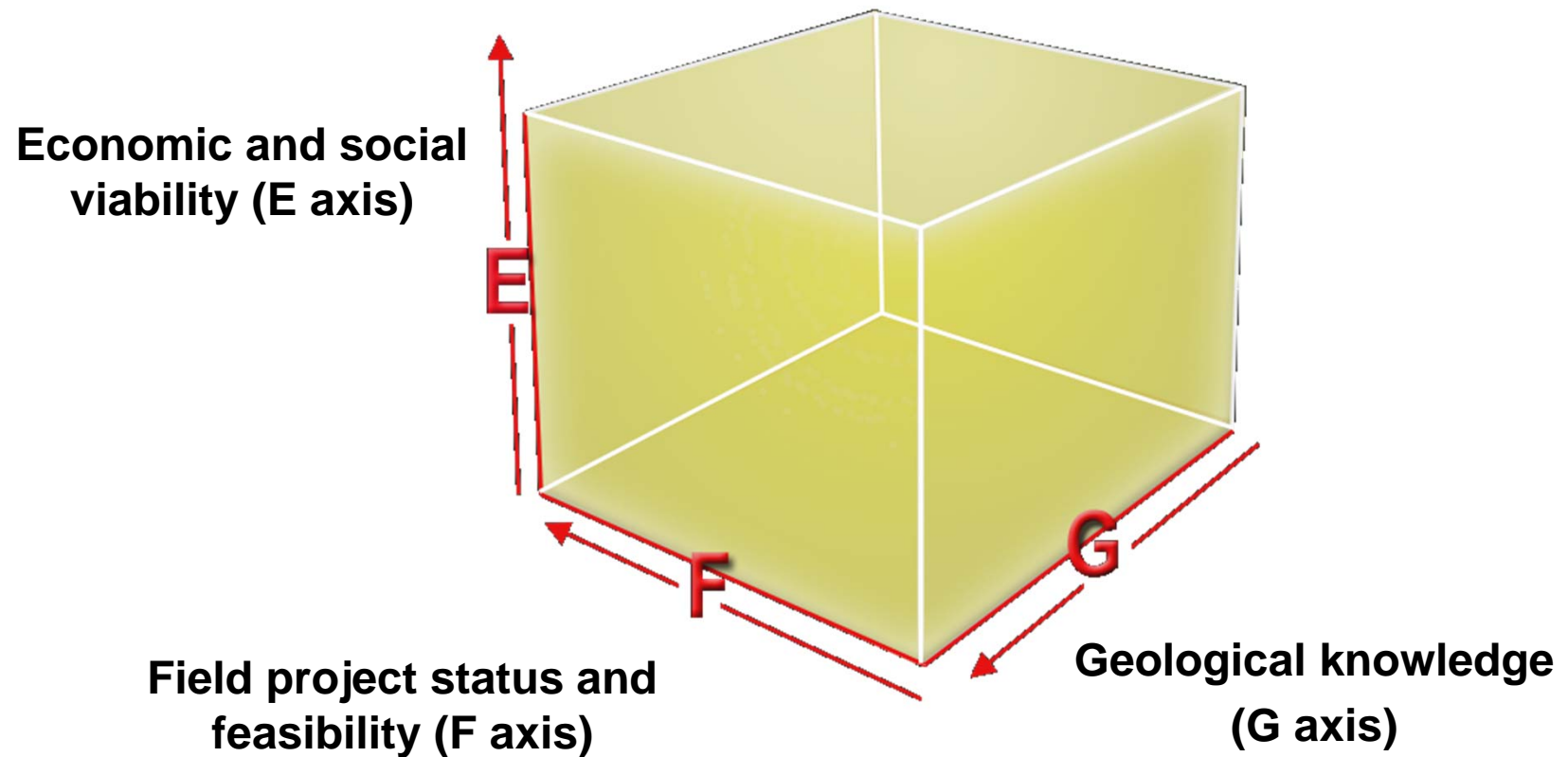
UNFC – 2009

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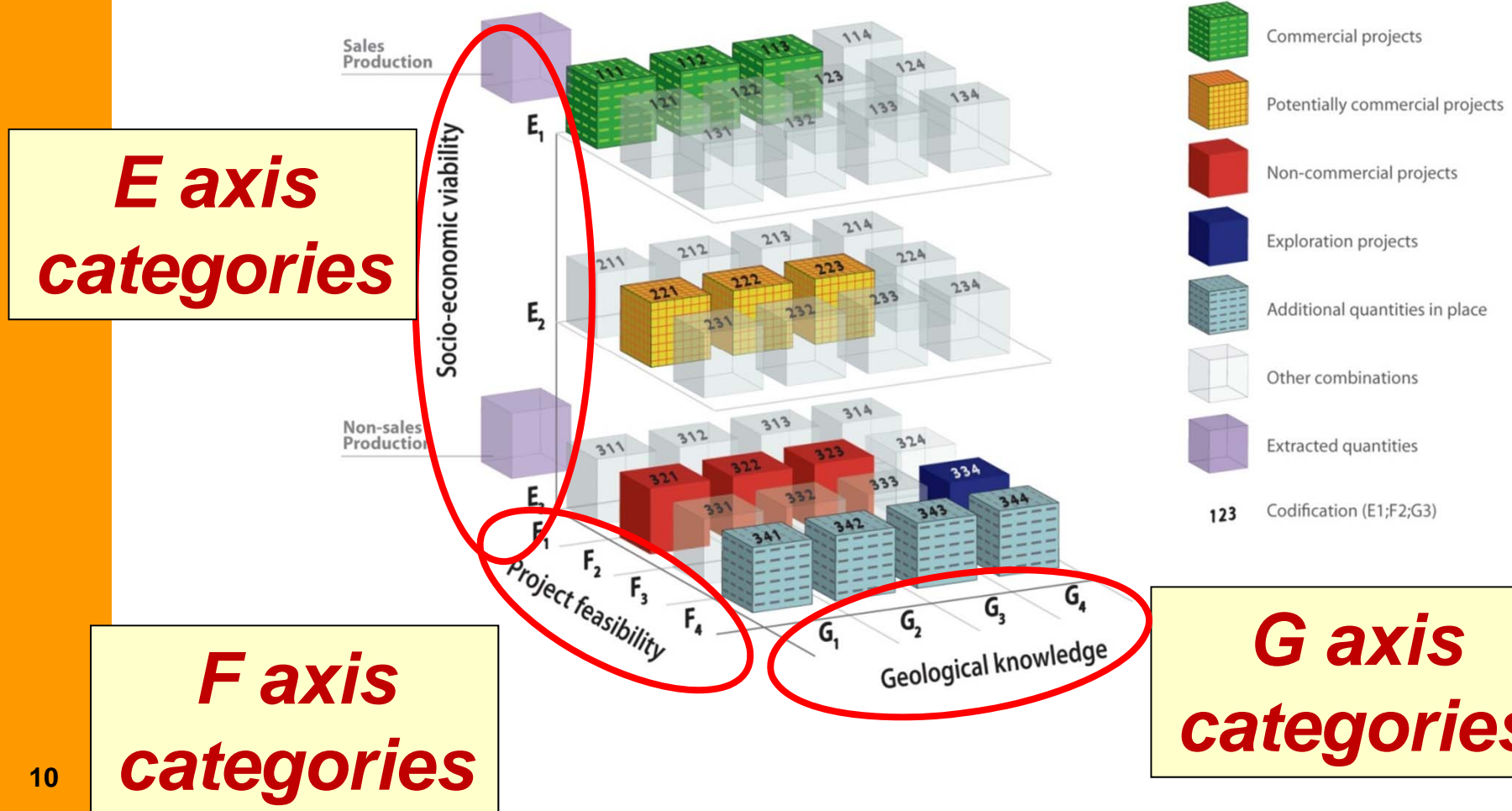
Proved reserves must be ...



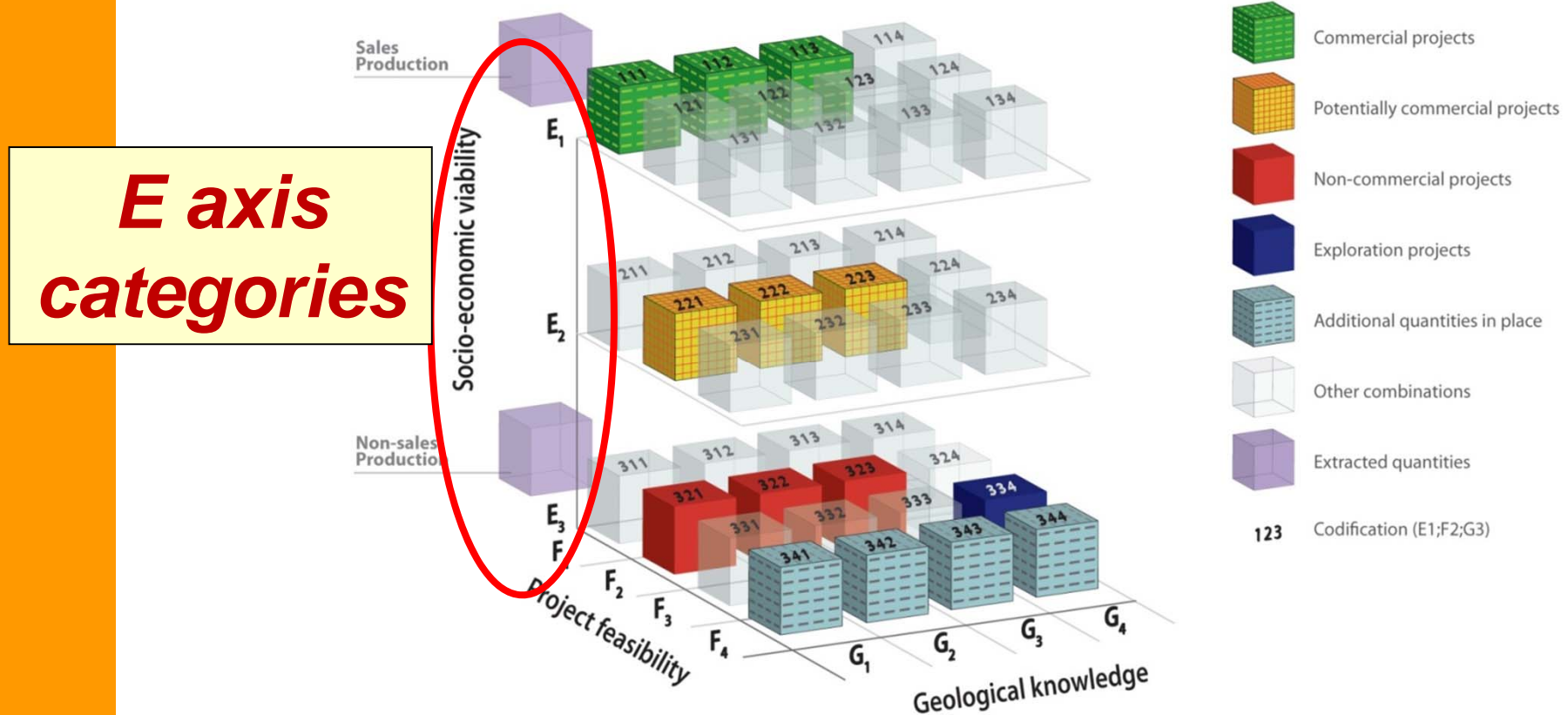
UNFC – Three Criteria



UNFC-2009 – How it works



UNFC – Categories



UNFC – E axis

- Degree of favourability of social and economic conditions in establishing the commercial viability of the project
- Includes consideration of market prices and relevant legal, regulatory, environmental, social and other non-technical factors
- E1, E2 and E3 categories
- E1 is “best”

E axis category definitions

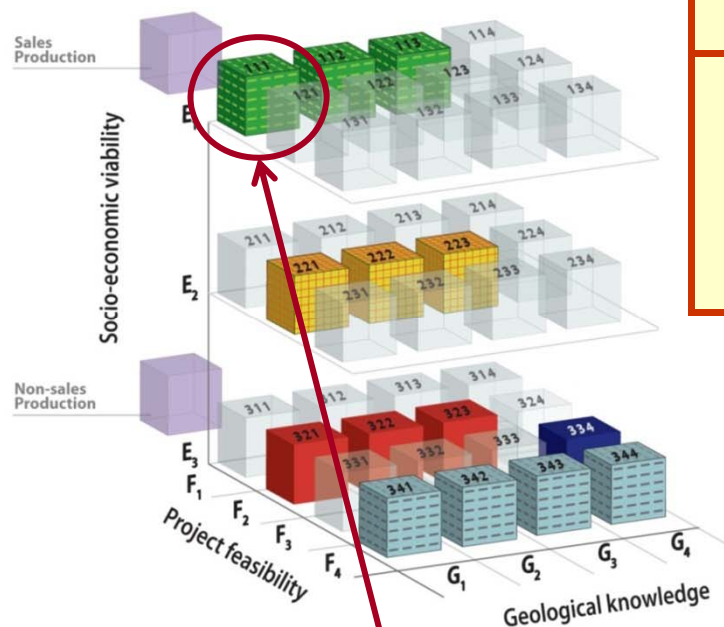
Category	Definition
E1	Extraction and sale has been confirmed to be economically viable.
E2	Extraction and sale is expected to become economically viable in the foreseeable future.
E3	Extraction and sale is not expected to become economically viable in the foreseeable future or evaluation is at too early a stage to determine economic viability.

Note that UNFC document also provides supporting explanations

UNFC – How it works

- The category definitions are the building blocks of the system
- These are combined (E, F, G) in the form of classes
- **Class 111** means that the reported quantities have satisfied the definitions for:
 - E1, F1 and G1
- There are no constraints on combinations, but not all will be meaningful

UNFC – How it works



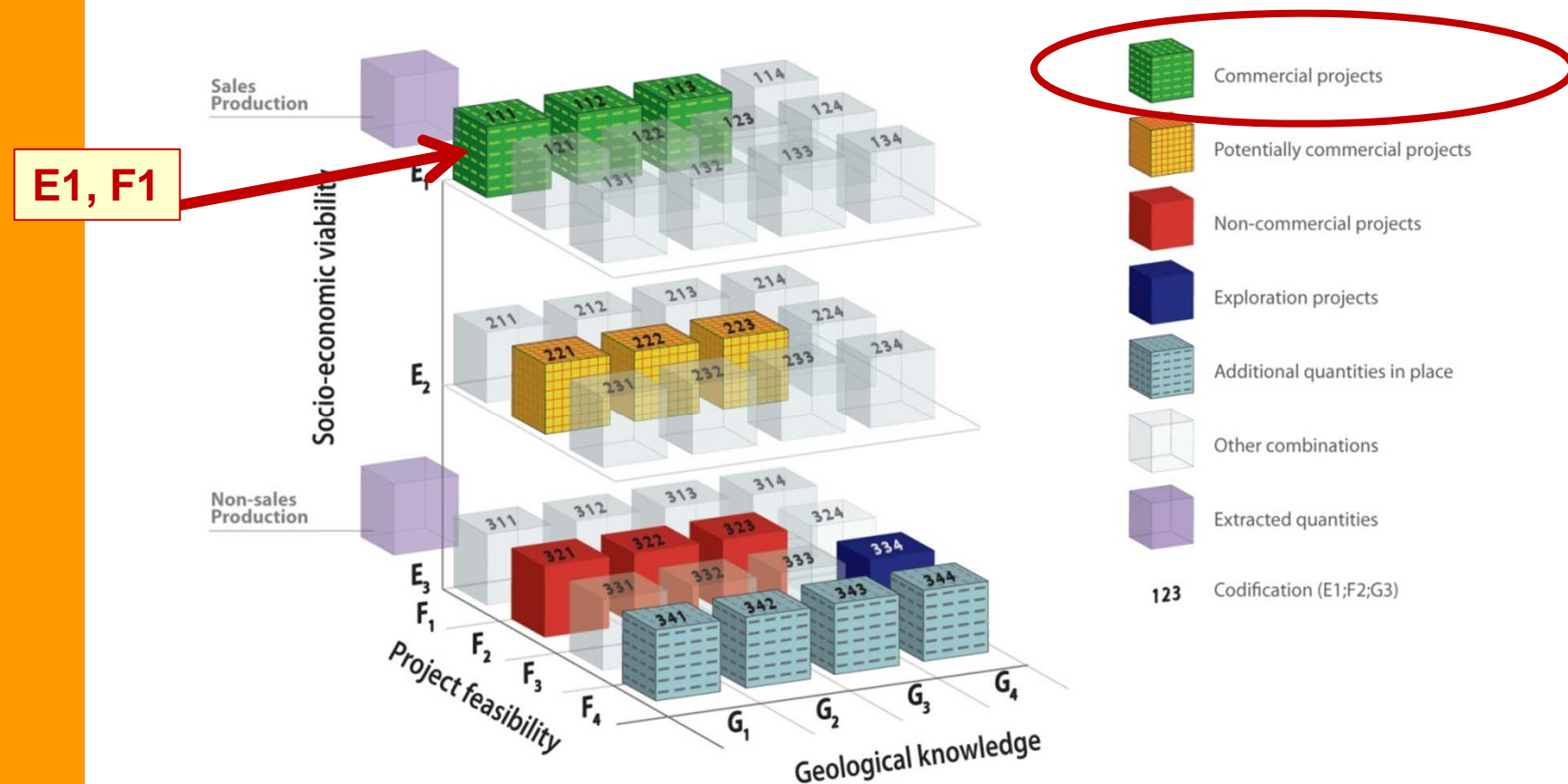
UNFC Class: 111

Category	Definition
E1	Extraction and sale has been confirmed to be economically viable.

Category	Definition
F1	Feasibility of extraction by a defined development project or mining operation has been confirmed.

Category	Definition
G1	Quantities associated with a known deposit that can be estimated with a high level of confidence.

UNFC – Examples of classes

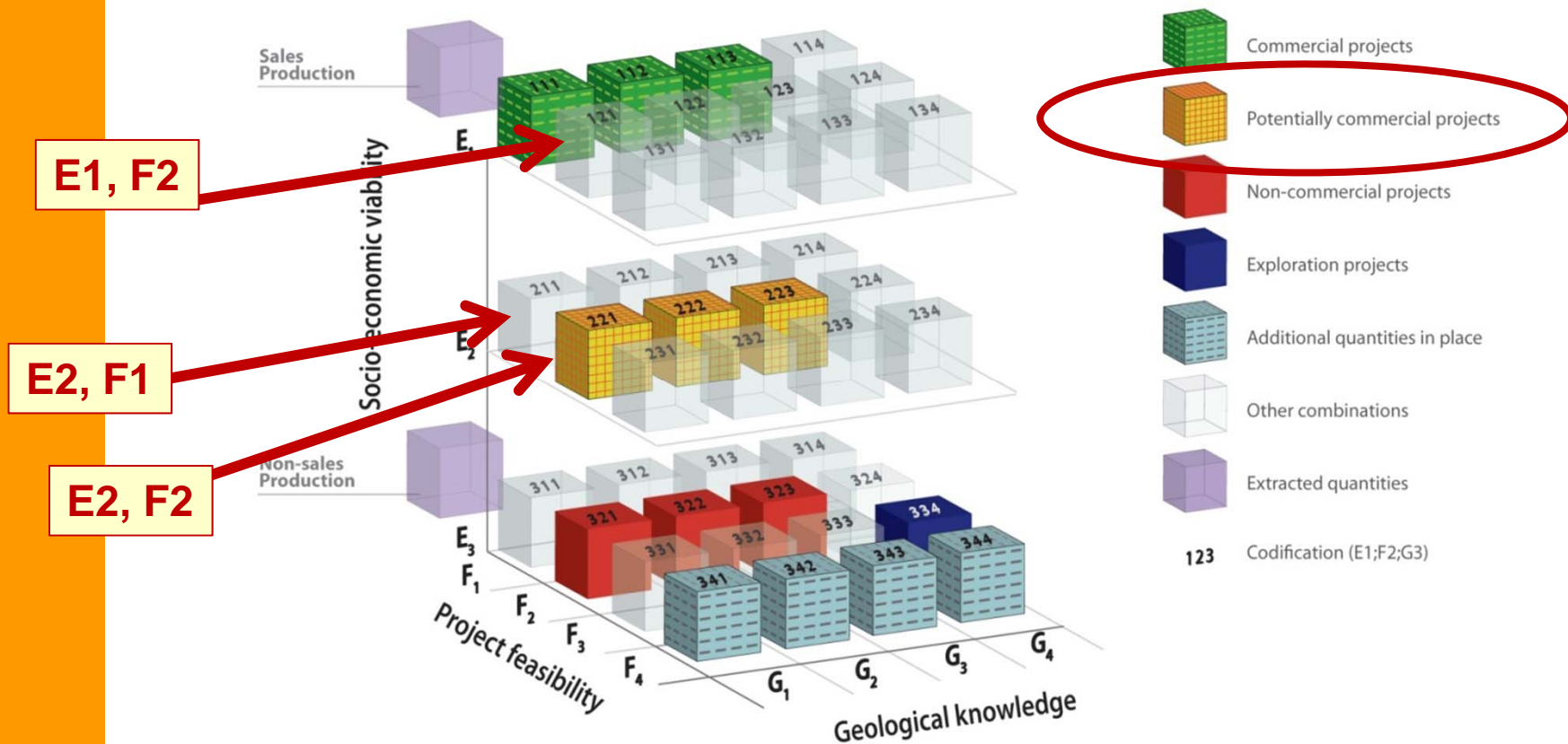


UNFC – 2D representation

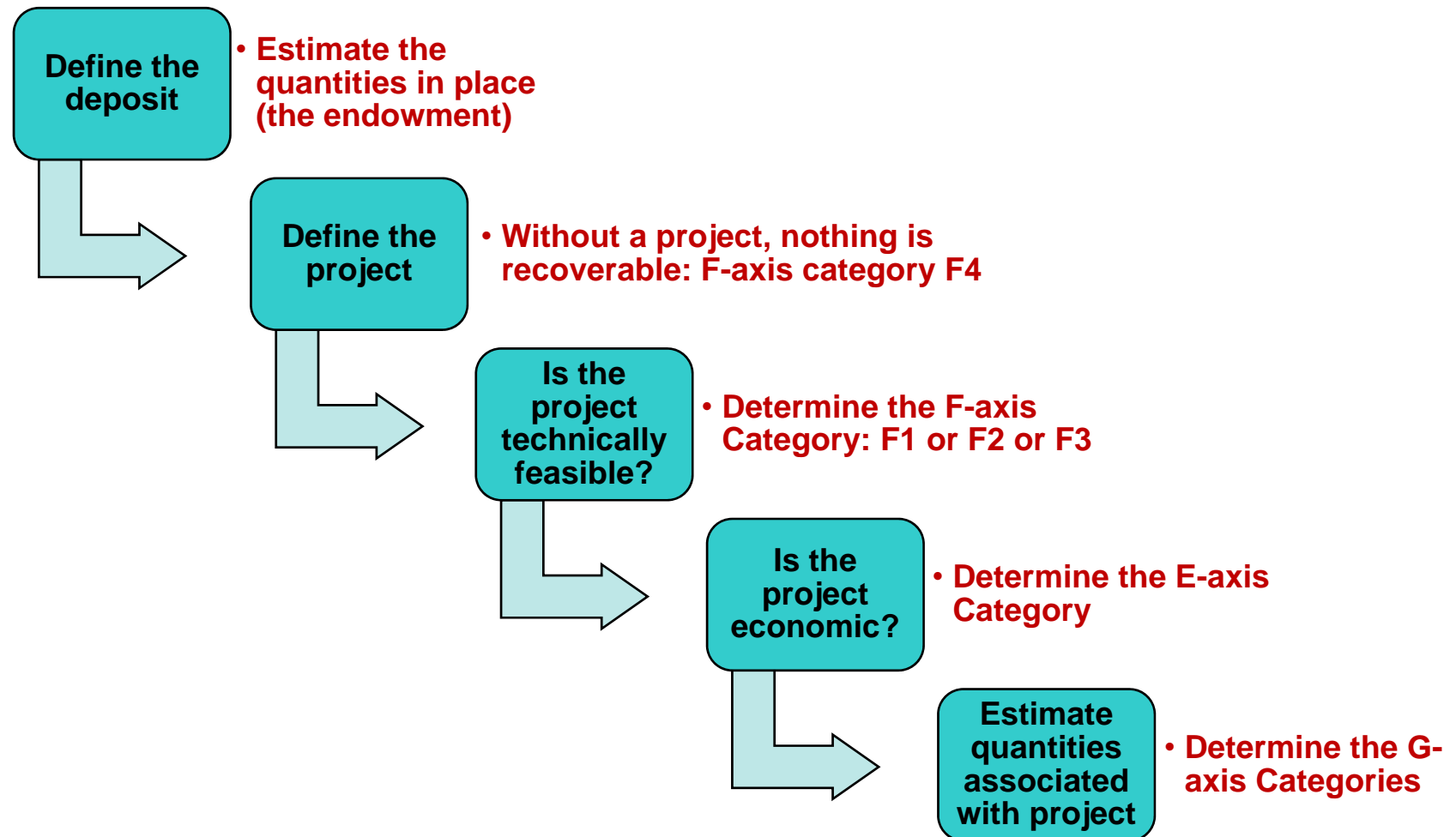
Total commodity initially in place	Extracted	Sales Production			
		Non-sales Production			
		<u>Class</u>	<u>Categories</u>		
			E	F	G
	Future recovery by commercial development projects or mining operations	Commercial Projects	1	1	1, 2, 3
	Potential future recovery by contingent development projects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

Each class is uniquely defined by its code(s)

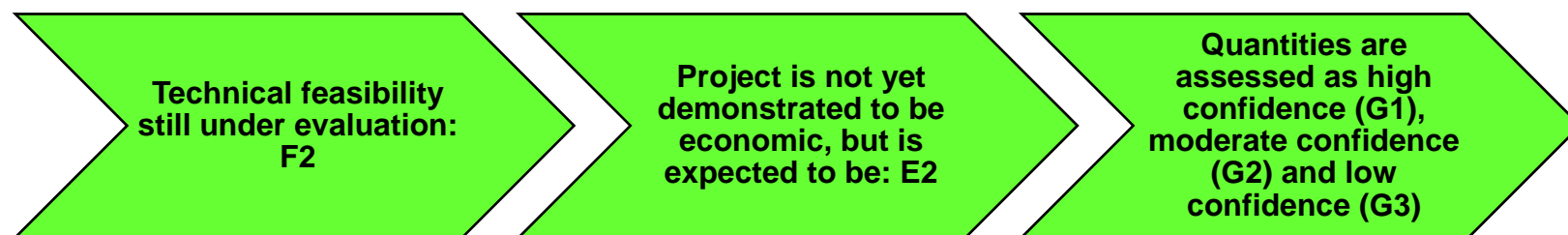
UNFC – Additional Granularity



UNFC – How it works



UNFC – How it works



Project has quantities in three classes: 221, 222 and 223

**Can other projects be defined
for the same deposit?**

UNFC – 2009

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Alignment of systems (schematic)

UNFC-2009

Total commodity initially in place	Sales Production
	Non-sales Production
	<u>Class</u>
	Commercial Projects
	Potentially Commercial Projects
	Non-Commercial Projects
	Additional quantities in place
	Exploration Projects
	Additional quantities in place

SPE-PRMS

Production
<u>Class</u>
Reserves
Contingent Resources
Unrecoverable
Prospective Resources
Unrecoverable

CRIRSCO

Extracted
<u>Class</u>
Mineral Reserves
Mineral Resources
Not reported
Not reported
Exploration Results
Not reported

UNFC – Sub-categories

- **The system allows further granularity through sub-categories**
- **These are optional**
- **They facilitate mapping with the project maturity sub-classes of SPE-PRMS**
- **These sub-classes also align with some mining companies' reporting practices and with the IAEA classification of production centres**

F axis sub-category definitions

Category	Definition
F1	Feasibility of extraction by a defined development project or mining operation has been confirmed.

Sub-Category	Definition
F1.1	Extraction is currently taking place.
F1.2	Capital funds have been committed and implementation of the development project or mining operation is underway.
F1.3	Sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a defined development project or mining operation.

UNFC – Using all sub-categories

UNFC Classes defined by categories and sub-categories						
Total commodity initially in place	Extracted	Sales Production				
		Non-sales Production				
	Class	Sub-class	Categories			
			E	F	G	
	Known Deposit	Commercial Projects	On Production	1	1.1	1, 2, 3
			Approved for Development	1	1.2	1, 2, 3
			Justified for Development	1	1.3	1, 2, 3
		Potentially Commercial Projects	Development Pending	2	2.1	1, 2, 3
			Development On Hold	2	2.2	1, 2, 3
		Non-Commercial Projects	Development Unclassified	3.2	2.2	1, 2, 3
			Development Not Viable	3.3	2.3	1, 2, 3
		Additional quantities in place		3.3	4	1, 2, 3
	Potential Deposit	Exploration Projects	[No sub-classes defined]	3.2	3	4
		Additional quantities in place		3.3	4	4

Alignment of systems (schematic)

UNFC-2009		Rio Tinto Corporate Reporting	IAEA Production Centres
Commercial Projects (E1, F1)	On Production (E1, F1.1)		
	Approved for Development (E1, F1.2)		
	Justified for Development (E1, F1.3)		

Alignment of systems (schematic)

UNFC-2009		Rio Tinto Corporate Reporting	IAEA Production Centres
Commercial Projects (E1, F1)	On Production (E1, F1.1)	Reserves at operating mines	
	Approved for Development (E1, F1.2)	Reserves at development projects	
	Justified for Development (E1, F1.3)	Other undeveloped reserves	

Alignment of systems (schematic)

UNFC-2009		Rio Tinto Corporate Reporting	IAEA Production Centres
Commercial Projects (E1, F1)	On Production (E1, F1.1)	Reserves at operating mines	Existing
	Approved for Development (E1, F1.2)	Reserves at development projects	Committed
	Justified for Development (E1, F1.3)	Other undeveloped reserves	Planned

How can we use alignment?

- **Quantities can be estimated using current well-established commodity-specific systems**
- **Reporting under these systems can continue unchanged**
- **But the same quantities can also be reported under UNFC using the numerical codes**
- **The reporting is then independent of commodity type, extraction methodology and ambiguous terminology (e.g. “reserves”)**

UNFC – 2009

- What is it?
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What are Specifications?

Definitions

**Classification
Framework**



Specifications

**Application
Rules**

Guidelines

**Non-
Mandatory
Guidance**

Summary of Development Process

- UNFC-2009 simplification with generic definitions only 
- Survey of stakeholder requirements for specifications 
- Development of specifications
 - Generic specifications
 - Commodity-specific specifications (petroleum, solid minerals)
- Public comment period

Draft completed

***Mid-October for
two months***

Generic Specifications for UNFC-2009

Two documents in preparation in draft form:

- Specifications document, including:
 - Generic specifications
 - Bridging documents with CRIRSCO Template and SPE-PRMS
- Specifications task force report, outlining process and basis for recommendations

Draft Specifications Document

Draft Table of Contents

- Introduction
- Environmental and social considerations
- Commodity-specific specifications and the relationship with other resource classification systems
- National resource reporting
- Disclosure
- Generic specifications (20 issues)
- Annexes

Draft Specifications Document

DRAFT text

- 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.

Draft Specifications Document

Examples of generic specification issues

- Use of numerical codes
- Bridging documents
- Effective date
- Commodity or product type
- Basis for estimate
- Reference point
- Units and conversion factors
- Etc.

Draft Specifications Document

Document annexes

- I. **Glossary of terms**
- II. **Guidelines on the application of key instructions in UNFC-2009**
- III. **Bridging document between the CRIRSCO Template and UNFC-2009**
- IV. **Bridging document between SPE-PRMS and UNFC-2009**
- V. **Guidelines on the use of project maturity to sub-classify projects**

UNFC

Classification Framework and Category Definitions

Generic Specifications

*Bridging
Document*

*Bridging
Document*

*Bridging
Document*

Solid Mineral
Specifications
CRIRSCO

Petroleum
Specifications
SPE-PRMS

Other Aligned
Systems

What's next?

- **Publish specifications document and task force report on UNECE website for public comment**
 - Cover letter will explain process and any current differences of opinion between task force members
 - Period for comment: mid-October – mid-December
- **Review comments and revise as necessary**
- **Submit to EGRC Bureau for approval**
 - Deadline is early February
- **Submit to EGRC for endorsement**
 - EGRC meeting in Geneva, 24-26 April 2013

In summary ...

- **INFC-2009 is a generic, principles-based system**
 - Applicable to both solid minerals and fluids
 - Uses a numerical coding system
- **Based on three criteria**
 - Economic and social viability
 - Field project status and feasibility
 - Geological knowledge
- **Direct linkage to SPE-PRMS and the CRIRSCO Template**
 - Quantities can be estimated using these systems and reported using the UNFC numerical codes
- **Key goal is to provide a tool to facilitate global communications**
 - Other systems can be linked to it (e.g. the “Red Book” system)
 - Potential to use system for renewable energy and for CCS projects

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