# Introduction to UNFC-2009, how it works and current status

**Presented by**
**David MacDonald**
**Chairman, Expert Group on Resource Classification and BP**

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# 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**
    - **Economic and social viability**
        - **Field project status and feasibility**
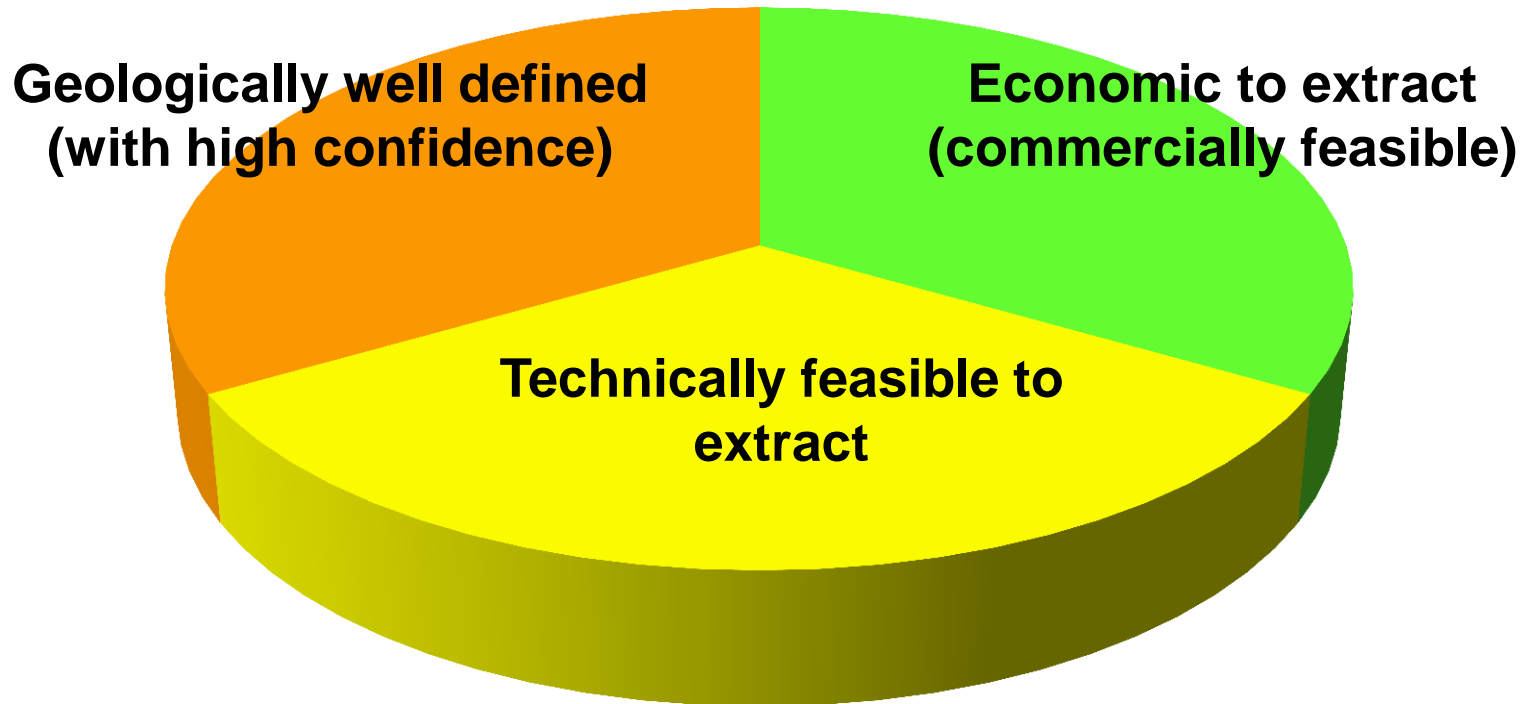            - **Geological knowledge**

3

# 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**
    - **Which system applies to mined petroleum solids?**

- **Increasing need to be able to compare renewable energy resources with non-renewable resources**
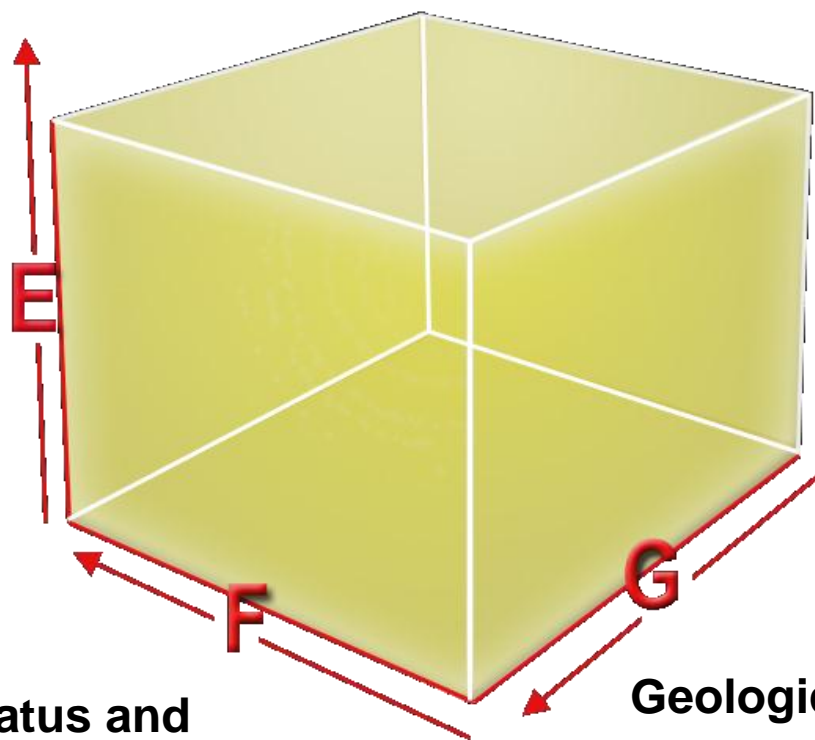
# UNFC – 2009

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# Proved reserves must be …

**Geologically well defined (with high confidence)**

**Economic to extract (commercially feasible)**

**Technically feasible to extract**

# UNFC – Three Criteria

**Economic and social viability (E axis)**
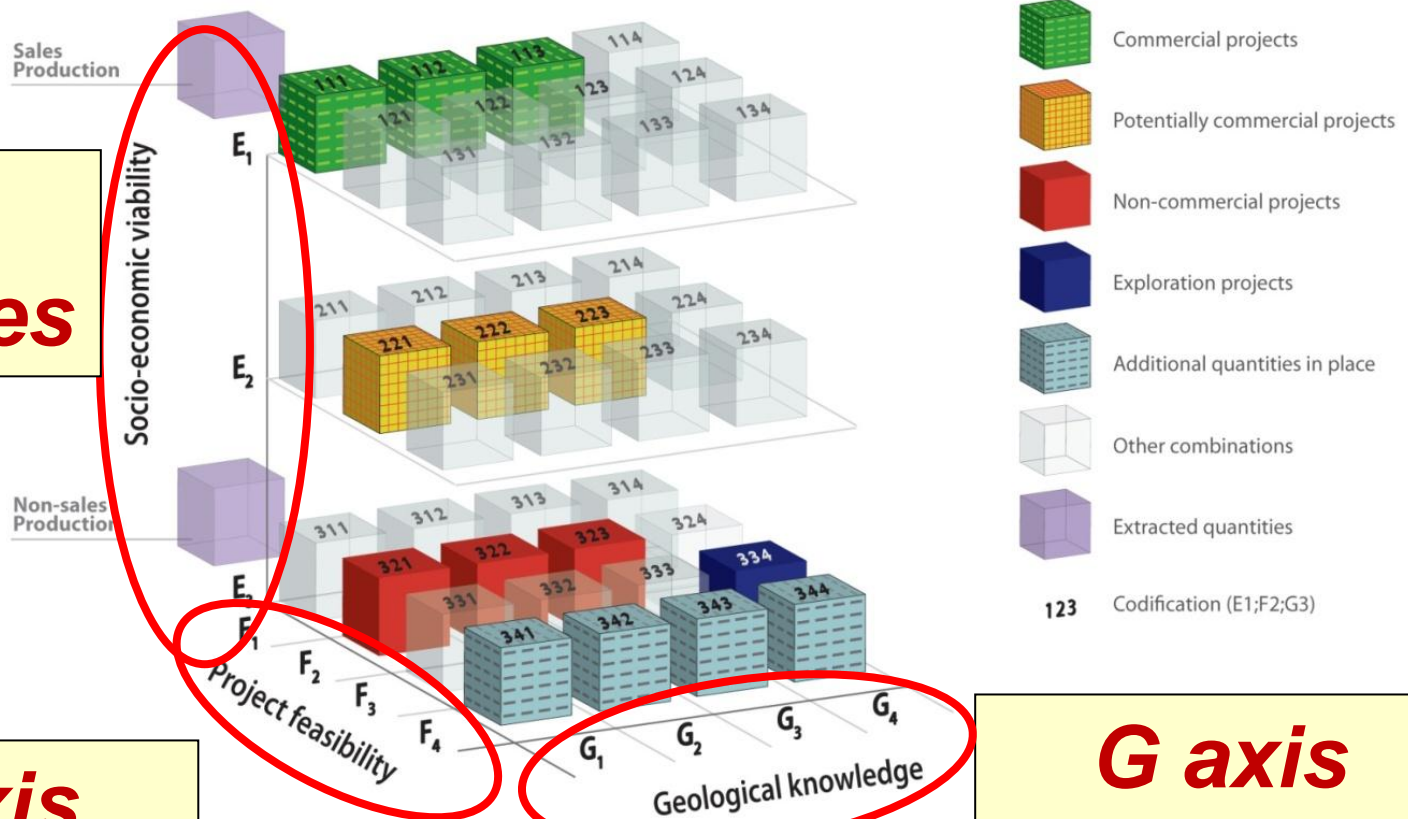
E

F

G

**Field project status and feasibility (F axis)**

**Geological knowledge (G axis)**

# UNFC-2009 – How it works
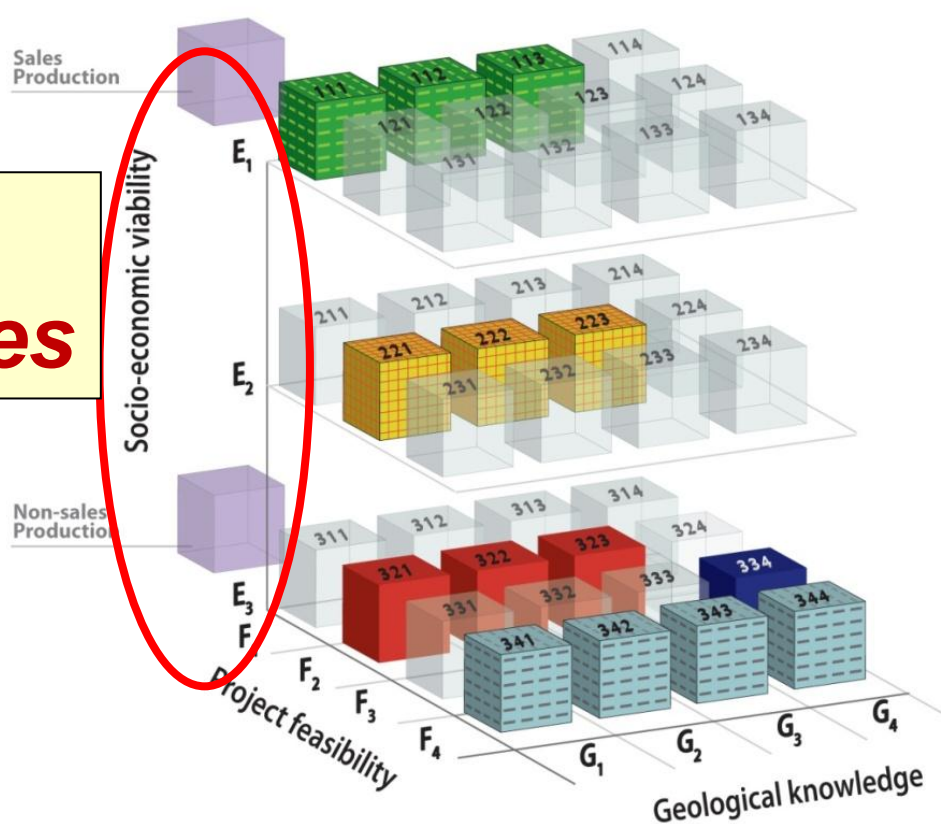


E axis categories

F axis categories

G axis categories

Commercial projects

Potentially commercial projects

Non-commercial projects

Exploration projects

Additional quantities in place

Other combinations

Extracted quantities

123    Codification (E1;F2;G3)

# UNFC – Categories



**E axis 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 and contractual conditions**

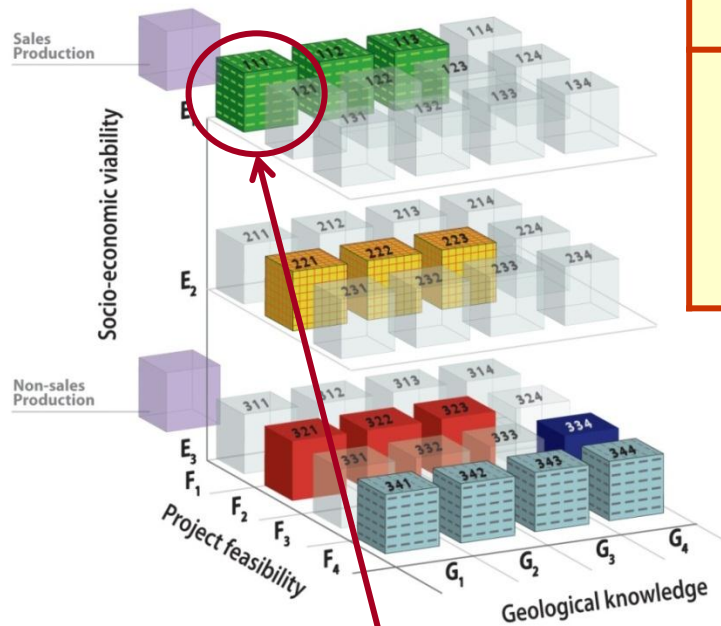- **E1, E2 and E3 categories**

- **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. |

11

# 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 – How it works

- **Some users prefer the 3D representation of UNFC**

- **Other users prefer a 2D representation**

- **Consensus meant we needed both!**

- **They are simply different visualisations of the same system**

- **Classes may be a single code (e.g. 111) or groups of codes (e.g. 111, 112 and 113)**

# UNFC – Examples of classes
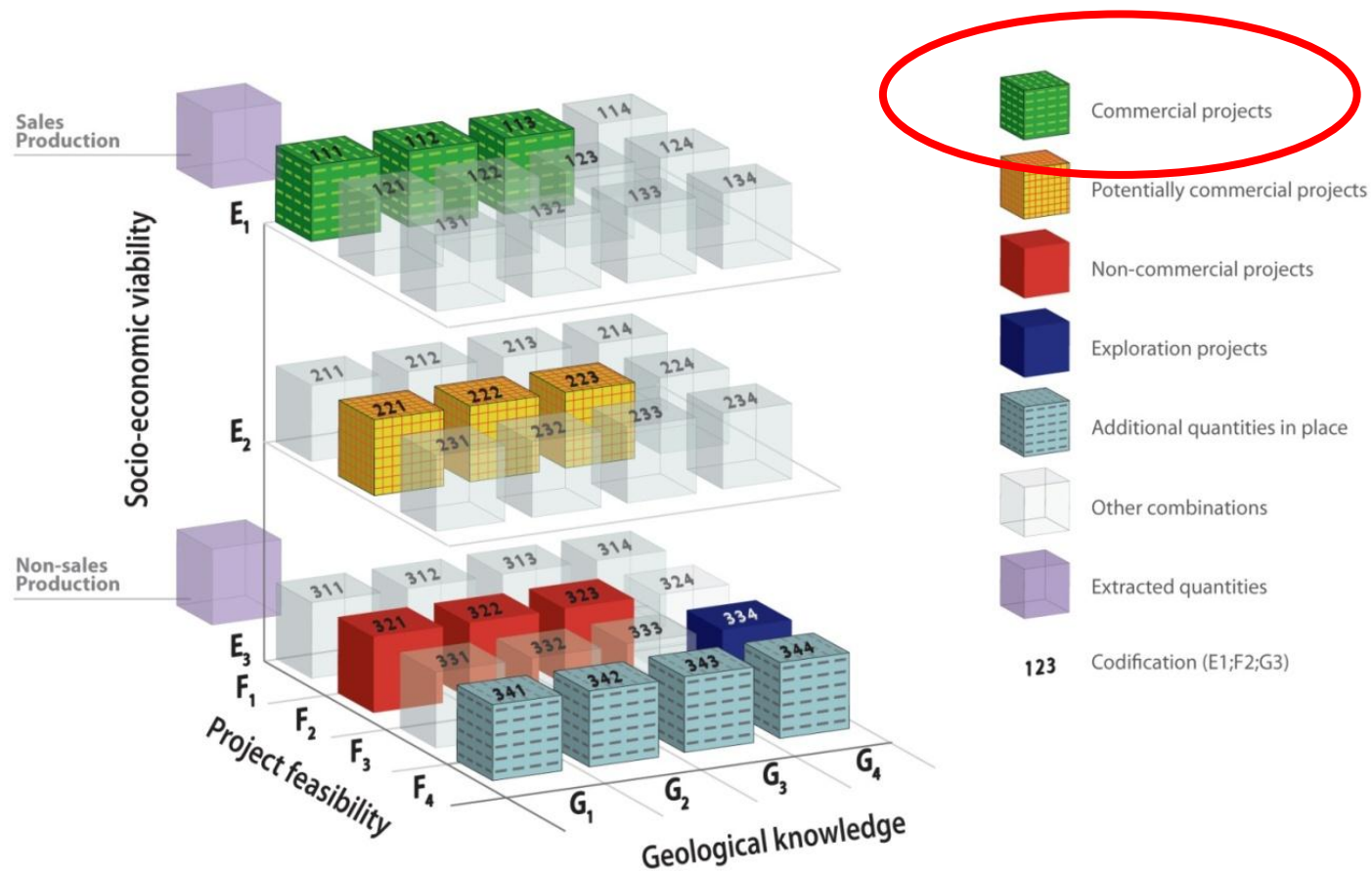
# UNFC – 2D representation

| Total commodity initially in place | Extracted | | Sales Production | | |
|---|---|---|---|---|---|
| | | | Non-sales Production | | |
| | | _Class_ | _Categories_ | | |
| | | | 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_

# UNFC

- **What is it?**

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# Alignment of systems (schematic)

| UNFC-2009 | PRMS | CRIRSCO |
|---|---|---|
| **Sales Production** | **Production** | **Extracted** |
| **Non-sales Production** | | |
| *Class* | *Class* | *Class* |
| **Commercial Projects** | **Reserves** | **Mineral Reserves** |
| **Potentially Commercial Projects** | **Contingent Resources** | **Mineral Resources** |
| **Non-Commercial Projects** | | Not reported |
| Additional quantities in place | Unrecoverable | Not reported |
| **Exploration Projects** | **Prospective Resources** | **Exploration Results** |
| Additional quantities in place | Unrecoverable | Not reported |

**Total commodity initially in place**

# UNFC – Sub-categories

- **The system allows further granularity through sub-categories**

- **These are optional**

- **They facilitate mapping with the project maturity sub-classes of 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 | | | | | |
|---|---|---|---|---|---|
| **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 Unclarified** | 3.2 | 2.2 | 1, 2, 3 |
| | | **Development Not Viable** | 3.3 | 2.3 | 1, 2, 3 |
| | **Additional quantities in place** | | 3.3 | 4 | 1, 2, 3 |
| **Potential Deposit** | **Exploration Projects** | **[No sub-classes defined]** | 3.2 | 3 | 4 |
| | **Additional quantities in place** | | 3.3 | 4 | 4 |

*(Row label: Total commodity initially in place)*

# 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")

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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** ✓
  - **Public comment period**

- **Final draft of specifications document** ✓
  - **Generic specifications**
  - **Bridging documents with CRIRSCO Template and PRMS**

25

# UNFC

## Classification Framework and Category Definitions

### Generic Specifications

*Bridging Document*

*Bridging Document*

*Bridging Document*

**Petroleum Specifications PRMS**

**Solid Mineral Specifications CRIRSCO**

**Other Aligned Systems**

# 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 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. IAEA "red book" system)**
  - **Potential to use system for renewable energy and CCS projects**