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**Application of UNFC-2009 to Renewable  
Energy Resources  
“Draft Renewables Specifications”**

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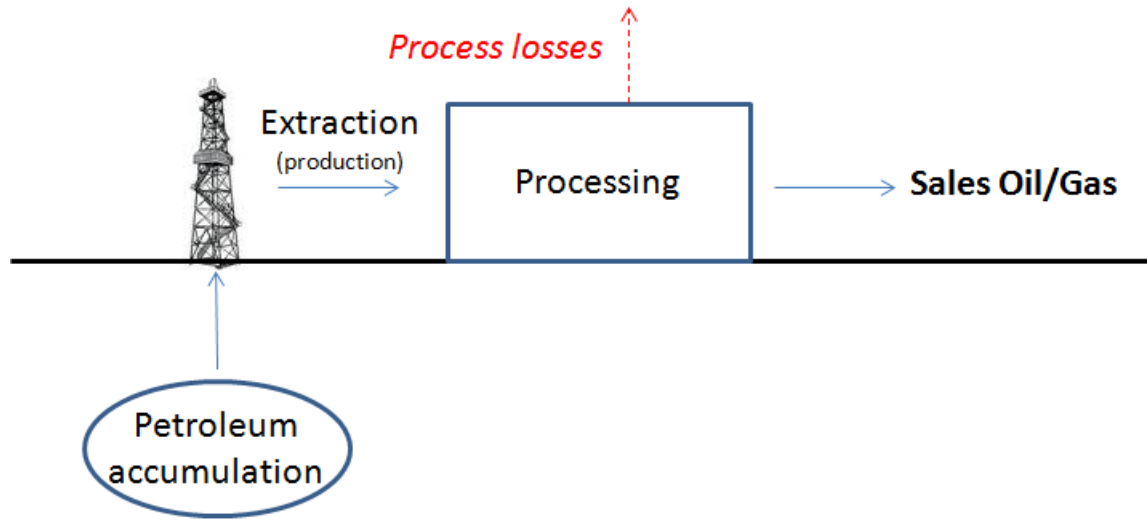


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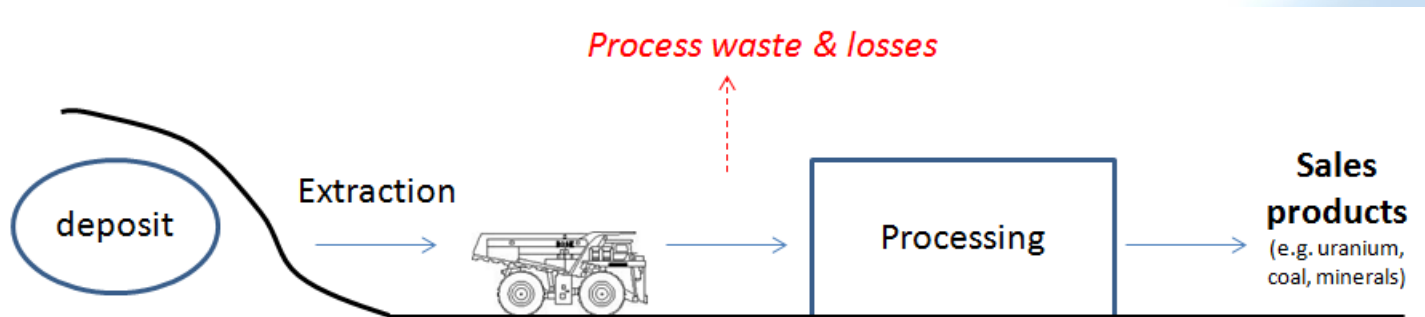
# Presentation contents

- Application of UNFC-2009 to Renewable Energy Resources
  - Non-renewable vs. Renewable Energy Projects
  - What are Renewable Energy Resources?
  - Differences and common characteristics
- Renewables Specifications: Application of E, F, G-axes
- Renewables Specifications: Document set-up

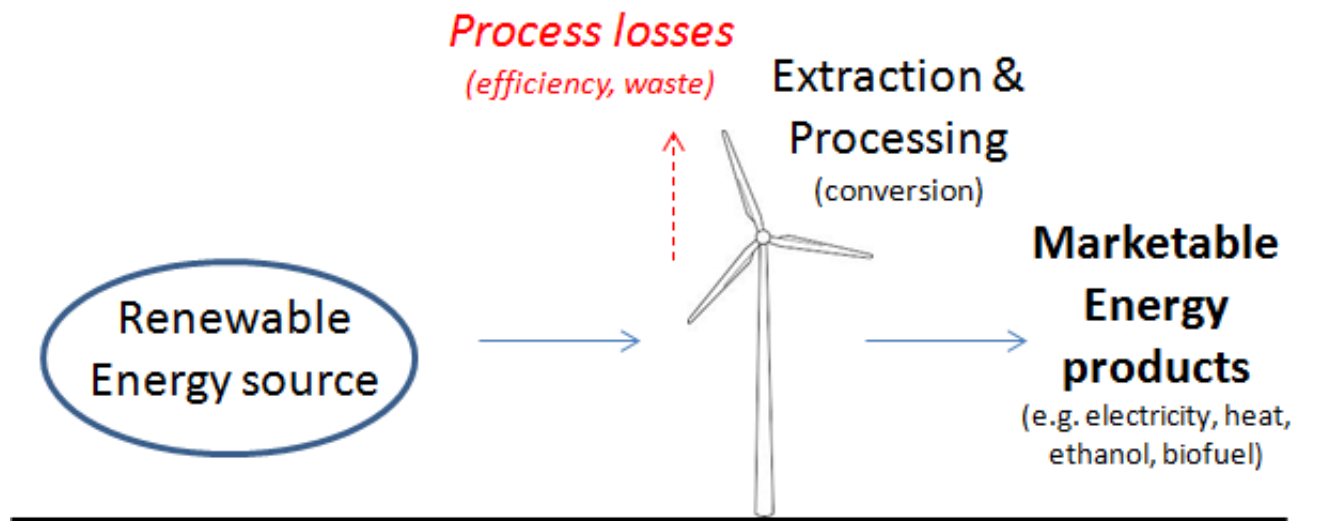
# Typical elements of Fossil/Mineral projects



The **project** generally represents the level at which a decision is made whether or not to proceed (i.e., spend more money)



# Renewable energy projects are very similar to fossil energy or mineral projects

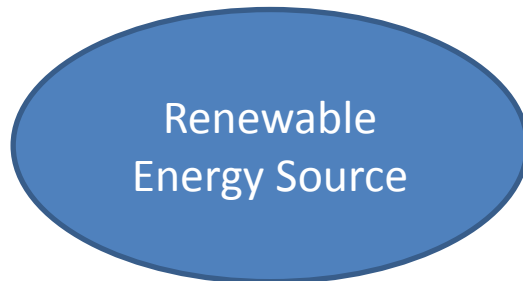


The Project is the link between the Renewable Energy Source and sales quantities of Energy Products and provides the basis for economic evaluation and decision-making

# What are “Renewable Energy Resources”?

## Renewable Energy Source:

The primary energy available for extraction/conversion



Examples: sun, wind, bio mass, earth heat, river flow, tides etc

Extraction / Conversion



Process/project:  
Wind park, solar park, hydro power plant, sugar cane mill, geothermal project

## Renewable Energy Resources:

cumulative quantities of extracted and marketable Energy Products from the Renewable Energy Source, measured at a Reference Point



Examples:  
Electricity

Heat

Biofuel

# Renewables vs. Non-renewables

Common characteristics	Key differences
Comparable "sales" products (energy)	"Infinite" vs. "Finite" deposit/accumulation/source
Projects have a defined level of investment, with an expected production (and revenue) profile	Production profile "replenishment" vs. "depletion"
As the project develops, risk and uncertainties reduce	Geological risks do not apply to most Renewable energy projects, but similar uncertainties exist (e.g. meteorological variations, seasonal variations etc)

# Socio-economic viability (E-axis)

- *The social and economic conditions used to establish the commercial viability of the Project, including consideration of market prices and relevant legal, regulatory, environmental and contractual conditions.*

<b>E1</b>	Extraction and sale has been confirmed to be economically viable
<b>E2</b>	Extraction and sale is expected to become economically viable in the foreseeable future.
<b>E3</b>	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

- Equally applicable to Renewables: “Extraction” converts the primary energy source into a marketable energy product
- Current market conditions and realistic assumptions for future market conditions include “policy support mechanisms”

# Project status and feasibility (F-axis)

- *The maturity of studies and commitments necessary to implement the Project*

<b>F1</b>	Feasibility of extraction by a defined development Project or mining operation has been confirmed.
<b>F2</b>	Feasibility of Extraction by a defined development Project or mining operation is subject to further evaluation.
<b>F3</b>	Feasibility of production by a defined development Project or mining operation cannot be evaluated due to limited technical data.
<b>F4</b>	No development Project or mining operation has been Identified (i.e. “in-situ (in place) quantities)

- Equally applicable to Renewable Energy projects, in which “development Project” is “Renewable Energy Project”



# F-axis: category F4

- Category F4, i.e. in situ (in place) quantities, can be used to classify the currently non-extractable quantities at the geographical location of the defined Project due to, for example, site/area constraints, technology limitations and/or other constraints.
- *Examples:*
  - *Water over the spillways for hydroelectric projects*
  - *Only partial availability of the leased land for a solar project due to heavy vegetation*

# Geological knowledge / uncertainties (G-axis)

- The level of confidence in the available data and potential recoverability of the quantities*

<b>G1</b>	Quantities associated with a <b>known</b> Deposit that can be estimated with a <b>high level of confidence</b> .
<b>G2</b>	Quantities associated with a <b>known</b> Deposit that can be estimated with a <b>moderate level of confidence</b> .
<b>G3</b>	Quantities associated with a <b>known</b> Deposit that can be estimated with a <b>low level of confidence</b> .
<b>G4</b>	Estimated quantities associated with a <b>potential</b> Deposit, based primarily on indirect evidence (= exploration projects)

- Uncertainties impacting the level of confidence in the estimated quantities of Renewable Energy Resources includes areas such as meteorology, climatology, ecology, geography as well as geology (for Geothermal Projects).*

# G-axis: category G4

- Category G4 (Exploration Projects) is equally applicable to Renewable Energy products, based on the definition “Estimated quantities associated with a potential Deposit, based primarily on indirect evidence”
- G4 could be used to classify Renewable Energy from Resource Mapping studies (indirect evidence) that generally require more detailed and further (on-site) data acquisitions and evaluation to confirm the (economic) potential of the Renewable Energy Source (the “Deposit”) at location.

# Renewables Specifications Set-Up

## CONTENTS

PART I: INTRODUCTION.....	3
PART II: RENEWABLE ENERGY DEFINITIONS.....	3
A. Renewable Energy Resources.....	3
B. Defining the Project.....	3
C. Project Life Time .....	4
D. Entitlement .....	4
E. Development Plan.....	4
PART III: DEFINITION OF CATEGORIES AND SUPPORTING EXPLANATIONS .....	5
PART IV GENERIC SPECIFICATIONS.....	10
A. Use of numerical codes.....	10
B. Bridging document .....	10
C. Effective date .....	10
D. Commodity or product type.....	10
E. Basis for estimate .....	11
F. Reference point .....	11
G. Classification of Projects based on level of maturity .....	11
H. Distinction between E1, E2 and E3 .....	11
I. Confidence levels for G1, G2 and G3 .....	12
J. Distinction between recoverable quantities and <i>in situ</i> (in-place) quantities .....	12
K. Aggregation of quantities .....	13
L. Economic assumptions.....	13
M. Evaluator qualifications.....	13
N. Units and conversion factors .....	13
P. Expansion of G4 to account for uncertainty .....	14
Q. Optional labels for estimates .....	14
R. Classification of quantities associated with Exploration Projects .....	14
S. Classification of additional quantities in place .....	14
T. Extracted quantities that may be saleable in the future .....	15
ANNEX 1 – GLOSSARY OF TERMS .....	16

*Key definitions*

*UNFC-2009: E,F,G tables*

*Generic specifications*

*Glossary of key terms*

# Renewables Specification (draft)

Category	Definition	Supporting Explanation (UNFC-2009 ANNEX I)	Additional Renewables Energy context
F1	Feasibility of extraction by a defined development Project or mining operation has been confirmed.	Extraction is currently taking place; or, implementation of the Renewable energy Project is underway; or, sufficiently detailed studies have been completed to demonstrate the feasibility of extraction by implementing a development Project or mining operation.	The term "development Project" is the "renewable energy Project" as described in Part II Category F4, i.e. in situ (in place) quantities in the absence of a defined Project, is in the context of Renewable Energy Sources only relevant when the quantity is limited in time. Otherwise this quantity is by definition "replenished at a higher rate than consumed" and therefore infinite.
F2	Feasibility of Extraction by a defined development Project or mining operation is subject to further evaluation.	Preliminary studies demonstrate the existence of a Project in such form, quality and quantity that the feasibility of extraction by a defined (at least in broad terms) development Project or mining operation can be evaluated. Further data acquisition and/or studies may be required to confirm the feasibility of extraction.	
F3	Feasibility of production by a defined development Project or mining operation cannot be evaluated due to limited technical data.	Very preliminary studies (e.g. during the assessment phase), which may be based on a defined (at least in conceptual terms) development Project or mining operation, indicate the need for further data acquisition in order to confirm the existence of a Project in such form, quality and quantity that the feasibility of production can be evaluated.	
F4	No development Project or mining operation has been identified.	In situ (in-place) quantities that will not be produced by any currently development Project or mining operation.	

## PART IV GENERIC SPECIFICATIONS

This section presents the Generic Specifications for the Application UNFC-2009 (noted in grey) with additional guidance and clarification provided with respect to application in the context of Renewables where required.

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 reporting under UNFC-2009. However, where a specification for the same issue exists in the Aligned System, and it fully meets the requirements of the generic specification defined below, that specification may be adopted.

### A. Use of numerical codes

While the defined Classes and Sub-classes shown in Figures 2 and 3 of UNFC-2009 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 Annex II of UNFC-2009. 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 Subclasses in the future that may be deemed to be useful in particular cases, especially where such Sub-classes facilitate the linkage to other systems and which may be defined in Bridging Documents.

### B. Bridging document

Application of UNFC-2009 requires reference to a Bridging Document for the relevant commodity-specific specifications. The Bridging Document that was used as the basis for the evaluation shall be disclosed in conjunction with the reported quantities.

#### Renewables – additional guidance:

The application of the UNFC-2009 to Renewable Energy Resources will be supported by a set of commodity-specific specifications and/or bridging documents for Bioenergy, Solar/Wind/Hydro and Geothermal energies.

Text in grey is the UNFC-2009

Renewables context is provided where deemed required for these "rules of application"

# Questions??