**United Nations Framework Classification for Resources**

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### Intro

**Motivation**
- Imagine, you are an investor and you want to budget a secondary commodity sector. But what about the risks? How do you balance the benefits and challenges of secondary versus primary raw materials?
- Imagine, you are a government agency and you have to make estimates whether the needs of society for resources can be satisfactorily met in the future. How can this be achieved if the standards for communicating inventory data differ among resource types, companies and countries?
- Imagine that you are in the government and you need to approve new recovery projects in the region. How can you make fact-based decisions? How can you inform worried citizens objectively about the environmental and social consequences and avoid emotional resistance?

**Goal**
- Comparable estimates on the recovery potential of materials with respect to upcoming and future recovery projects.

**Achieving by**
- Harmonizing national and commodity-specific classifications
- Classifying resources that are not covered by existing classifications

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### Tool

**United Nation Framework Classification for Resources (UNFC) to classify energy and material resources**

The UNFC is a principle-based system in which quantities, associated with a potential or known resource source, are classified.

The classification uses standard categories and provides a common terminology and guiding principles.

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### Defining the recovery project

**Extracted materials**
- Total material quantities at the source

**Sales production**
- Extraction and processing
- Market

**Non-sales production**
- (disposable residues, emissions)

**Consider the mass balance**
- Total quantities at the source
- Past production
- Future production
- Sales production
- Non-sales production

**Allocating the material quantities at the source to the “categories” on the E-, F- and G-Axis**

**E-Axis**

**Socio-economic viability**
- Production and sale expected to become economically, socially and environmentally viable in the foreseeable future or evaluation at an early stage to determine economic, social and environmental viability.

**F-Axis**

**Field exploration & assessment feasibility**
- Feasibility of production by a defined project has been confirmed
- Feasibility of production by a defined project is subject to further evaluation
- Feasibility of production by a defined development project cannot be evaluated due to limited technical data
- No development project has been assessed

**Positioning the recovery project along the UNFC value chain**

**Maturity level**
- Exploration project
- Non-commercial project
- Pot. commercial project
- Commercial project

**Quantities**
- Sales production (E3-E4-G1)
- Non-sales production
- Additional quantities in place (E3-F2-G2)

**The UNFC benefits to the recovery project development**
- The investor and the project developer get an overview of the estimated production volumes and the maturity of the recovery projects. They get a list of contingencies that need to be resolved to advance the recovery projects.
- This enables risk assessment of the project development and future investments.
- At the national level, the government gets an overview of the recovery potential of resources. Thus, the national framework for the development of future recovery projects can be defined.
- The government and citizens can ensure that the social and environmental impacts during a project development are considered.

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### Integrating UNFC

**Reporting Code**

**UNFC Reporting Standard**

**The UNFC is a classification that can be integrated into a reporting standard (if reporting has to fulfill requirements) and a reporting code (if reporting is regulated by law).**

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### The UNFC history

1979: “International (UN) classification for natural resources” under the lead of Prof. Dr. Günter Fettweis.
1991: UNFC 1st version for solid fossil fuels and mineral resources initiated by Federal Institute for Geosciences and Natural Resources (Hannover) and German government in 1991.
2004: UNFC 2nd version. Petroleum, gas, uranium have extended the UNFC scope.
2009: UNFC 3rd version
2014: UNFC 4th version
2018-19: Renewable energies, underground storage and anthropogenic resources have extended the UNFC scope.

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### Methodology

**Positioning the recovery project along the UNFC value chain**

Before a recovery project can reach commercial maturity along the value chain of the UNFC, a list of contingencies needs to be clarified.

**Results**

**Quantities**
- Sales production (E3-G1)
- Non-sales production
- Additional quantities in place (E3-F2-G2)

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