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UNECE's framework for ressources classification (UNFC) in France – a tool for structuring information and policymaking

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For France and the EU, critical raw materials are essential to the clean energy transition

4 French presidency events on industrial resilience and critical raw materials

Both domestically (**Varin Report, France 2030 investment plan, calls for funding for critical raw materials and recycling**) and at the EU level, including during its **presidency of the Council**, France supports increasing industrial resilience to ensure the clean energy transition.

# Regional UNECE cooperation can facilitate transition

United nations ressources classification framework (UNFC) is a useful tool for policy development, both at a French and EU level

Geological ressources in metropolitan France : metals and other critical raw materials

General directorate for housing, planning and nature

- UNECE, EU and voluntary member states are coordinating to identify and quantify critical raw materials ressources using UNFC Framework
- Classification of French ressources is work in progress, with cooperation with France's geological survey, BRGM
- Clear potential for lithium, tungsten
- UNFC is a practical tool for policymaking and international cooperation with other countries
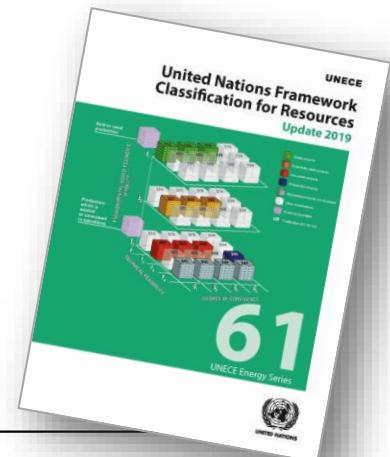
UNFC 111 – A number of existing extractive activities

- Bauxite, gold, salt, and industrial minerals (talc, andalusite…)
- Existing quarries that could produce magnesium and high purity silicon

FRANCE MINING OPERATIONS

France : rock salt, bauxite, niobium, tantalum, tin, industrial minerals (andalusite, gypsum, talc, silica …)

World's largest talc mine at Trimouns (400 000 t/year)

World's largest **andalusite deposit**

French Guyana : gold

27 Exploration permits

Lithium

**Potentially viable projects, intermediate geological confidence (UNFC 222)**

- *Beauvoir,* Allier : 1 000 000 tonnes LCE, 8 600 tonnes de tantale, 6 000 tonnes de niobium, et béryllium

- *Outre-Forêt,* Bas-Rhin : 900 tonnes per year

- *Les Sources alcalines,* Bas-Rhin : 900 tonnes per year

Prospective projects, intermediate geological confidence (UNFC 332)

- *Plaine du Rhin,* Bas-Rhin : 900 tonnes per year

- *Illkirch,* Bas-Rhin : 900 tonnes per year

- *Treguennec,* Finistère : 163 000 tonnes de lithium (LCE), 1 600 tonnes de tantale, 1 300 tonnes de niobium et 2 400 tonnes de beryllium

**Prospective projects, first analysis (UNFC 334)**

- Aquifère *trias* alsacien, Bas-Rhin estimation historique totale : 2 200 000 de tonnes de lithium

- *Limagne,* Puy-de-Dôme

NOTE : Estimations of quantities are based mainly on historic geological survey data, and may not reflect most up-to-date information gathered by companies from recent exploration activities.
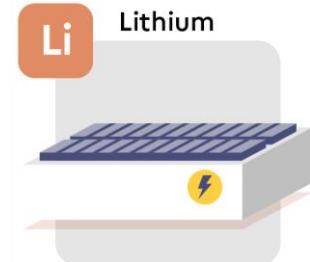
From mining exploration to downstream manufacturing, a diversity of projects are ongoing in France

Lithium

Battery raw materials value chain : French innovation leaders
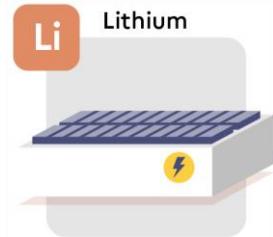
Lithium case study :
- With Stellantis (DS, Citröen, Peugeot...), Renault, Toyota and Bugatti, France is a key european player for car manufacturing - **three gigafactories** already planned in France
- **Lithium hydroxyde conversion plants** are expected
- Multiple industrial investments in the **Dunkirk region**
- **Extractive projects** both from geothermal brine (Rhine valley) and hard rock exploration
- **Chemical know-how** for lithium extraction (Eramet, Géolith, Adionics...)
- **Recycling projects** are expected in the context of EU recycling requirements for batteries

UNFC and transformation projects

The classification framework could also be used for downstream transformation plants and projects

Chrome
- *DCX chrome*
3ème producteur mondial (20%) de chrome métal
Capacité de 12 kt/an

Borates *
Borax Français
Purification à haute valeur ajoutée
Capacité de 100kt/an

Indium *
Nyrstar
1er producteur européen
Capacité de 72t/an

Nickel et Cobalt
Eramet
Sels de haute pureté
Capacité de production de 15kt/an

Tungstène *
Umicore CSM
Production de poudre et de carbures
Capacité de 200t/an

Antimoine *
SICA, PCDL
1er producteur européen de trioxyde d'antimoine
Capacité 15 kt/an

Zirconium
Framatome
Leader mondial
Capacité de 2200t/an

Terres rares *
Solvay
Leader mondial de la séparation et la concentration en éléments de terres rares
Capacité de 10 kt/an

Hafnium *
Framatome
1er producteur mondial (43%)

Sodium
Métaux spéciaux SA
Unique producteur européen
Capacité de 28kt/an (30 % de la consommation mondiale)

Titane
Ecotitanium, Timet
Site unique de recyclage en Europe
Production de lingot de titane

Silicium *
Ferropem
19% des approvisionnements européens et 5% des approvisionnements mondiaux

Métaux précieux (or, argent, palladium), de base (acier, zinc, aluminium, plomb), ferroalliages et autres métaux (lithium, vanadium, cadmium...)

* : métaux critiques pour l'Europe (2017)

comes   minéral info

- A wide range of **existing mineral transformation activities (UNFC class 111),** including for critical raw materials, already exist for France – titanium, Indium, hafnium...
- A **significant number of projects** have been announced recently by companies – for rare earths and lithium ;
- The five first selected projects for **the French Government's CRM call** have been announced, to support developments for :
  - Hard-rock lithium mining ;
  - Lithium refining ;
  - Battery recycling ;
  - 2 Electronic waste recycling projects.

Future developments, and future work on tailings and UNFC classification

Flotation pilot at the French geological survey's (BRGM) « halle pilote »

Two key projects on French tailings will use UNFC classification :
- National research agency's (ANR) « VARTA » project ;
- Horizon Europe's « Futuram » project

Tools for providing access to key informations on mineral ressources, and future developments

Camino.beta.gouv.fr: the digial mining registry, statistics and informations on existing mining rights and proceedings

Mineralinfo.fr: key reports and public information on mineral ressources, supply security, sustainability and recycling
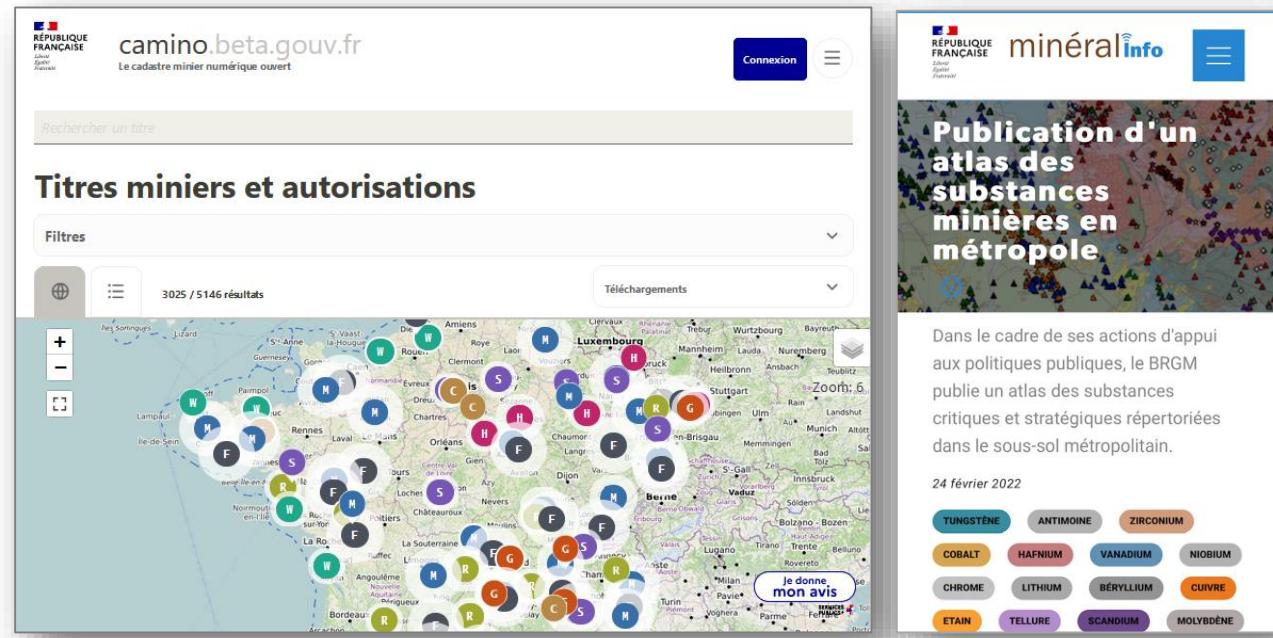
Annex - Using the three axis UNFC system
Practical comments regarding ressources classification

Geoscience for a sustainable Earth
brgm

- **Environmental-socio-economic viability « E axis » :** Challenging - largely linked with regulatory aspects - does the project have a chance of satisfying local environemental legislation ? Status of the permitting phases for exploration/exploitation can be a good proxy
- **Degree of confidence « G axis » -** France is caracterized by a significant detail of historic exploration data, but a lack of standardized reporting code. Reports frequently mention « inferred »/ « measured » ressources but lack standardized practices.