

INTELLIGENCE BULLETIN #4

Strategic Intelligence Bulletins aim to enrich strategic and managerial decisions and to engage stakeholders based on partners networks.

SecREEs POLICY WORKSHOP OUTCOMES

As part of the SecREEs project Policy Council “Analysing Critical Incidents for Rare Earth Elements Supply & Use in Europe” held hybrid from Berlin as stakeholders’ workshop on 17th September 2021, and on the fourth Policy Council on [“Obstacles, Impacts and Recommendations for the future of the European rare earth value chain”](#) held in Brussels on 2nd and 3rd June 2022 and organised by Prospex Institute vzw, SecREEs stakeholder group discussed ongoing issues and questions related to rare earth supply in Europe. These events gathered a wide range of stakeholders covering the different industries using rare earths in Europe, as well as researchers, policymakers and non-profit organisation. The outcomes of this event are an extract from the exploration of possible critical incidents which could have an impact on rare earth supply and use in Europe in the next 5 years, offering key knowledge for European critical raw materials sector and for PASSENGER project.

SecREEs PROJECT CONTEXT

SecREEs is a project started in 2018 receiving funding from European Commission Horizon 2020 programme for research and innovation and related to PASSENGER, since it consider its focus on the fact that Rare Earth Elements (REEs) are critical and non-substitutable raw materials with high economic importance for European industry, as they are crucial components for a broad range of advanced products. The main goal of the SecREEs project is to establish a stable and secure supply of critical rare earth elements based on a sustainable extraction from European apatite sources used in NPK fertiliser production. The project is coordinated by SINTEF AS (Norway).



SecREEs

Secure European Critical Rare Earth Elements
Figure 1-SecREEs project logo

SecREEs partners are developing pilot processes for a sustainable extraction, separation and manufacturing of REEs to create permanent magnets for application to areas such as electric vehicles, industrial motors, wind turbines, with replication potential in consumer products or medical equipment. The main objective of SecREEs is to set up a new integrated European value chain for extraction, refining and production of REEs. SecREEs pilots will focus on the metals Praseodymium (Pr), Neodymium (Nd) and Dysprosium (Dy) used in permanent magnets, as these are extremely critical for the European economy. These REEs will be supplied to application areas like automotive (electric vehicles), industrial motors (advanced manufacturing) and, potentially, clean energies (wind turbines).

THE BASELINE: EXERCISE ON REE SUPPLY AND USE IN EUROPE

An exercise was performed with the SecREEs stakeholders to vote the list of critical incidents identified rating on a scale from 1 (low) to 10 (high) for each incident. The aim of this exercise was to define the likelihood of the incident happening until 2026, and it resulted on the co-creation of some graphics (figure 2) showing the richness of different views and inputs.

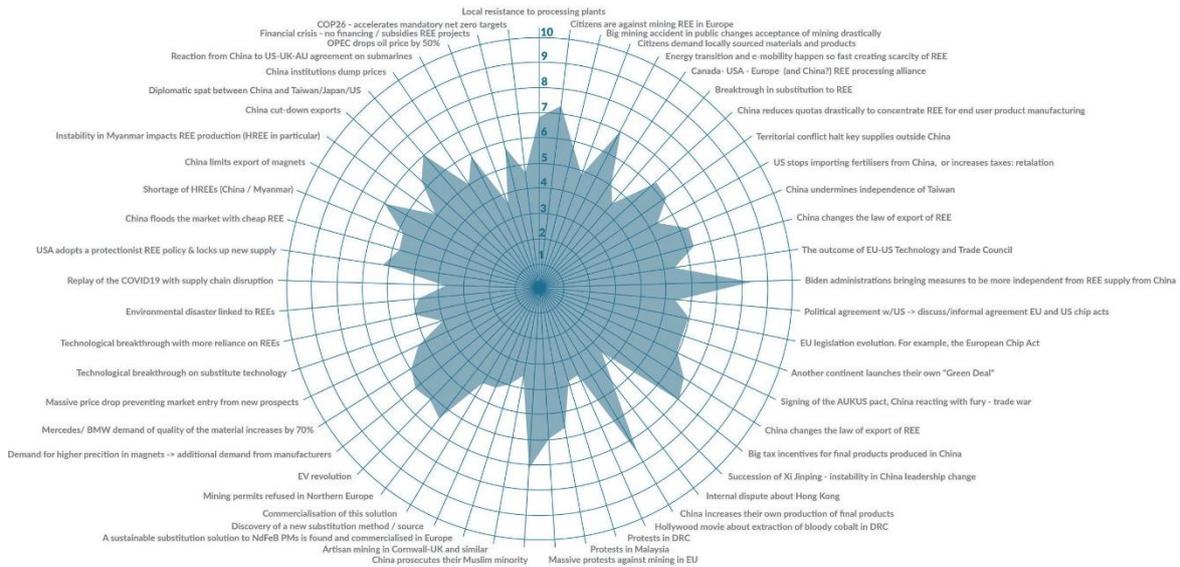


Figure 2. Likelihood of the incident on REE supply and use: Results

THE TOP POINTS RATED: HEATMAP OF HIGHEST LIKELIHOOD-IMPACT RATIO

Having the results of the likelihood votes, SecREEs stakeholders rated the impact of each critical incident mentioned in the first part of the workshop. In a second phase, likelihood and impact was combined in a chart, showing that, though some incidents might seem very likely, their impact might be considered rather low and vice versa. Thus, the critical incidents rated with the highest likelihood-impact ratio were selected (Figure 3) and some of them were analysed in detail.

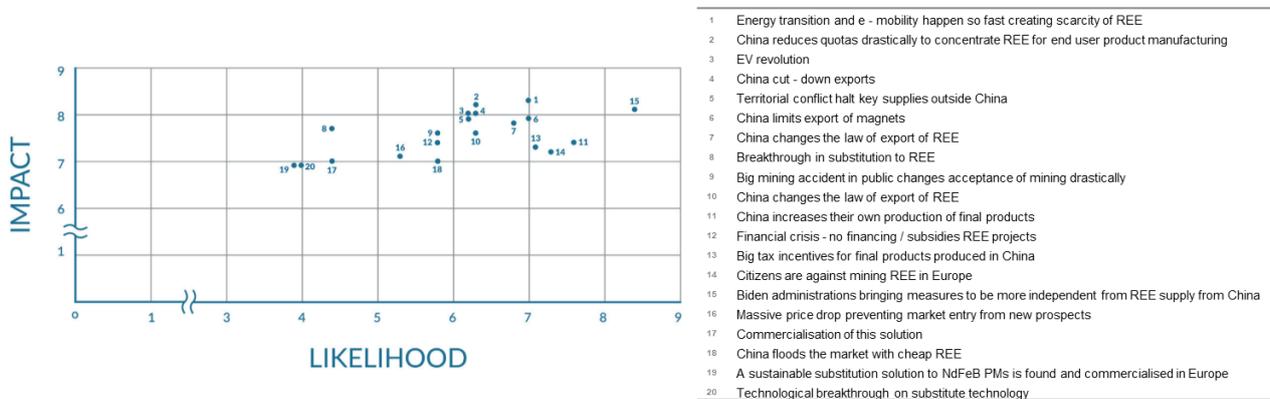


Figure 3. Heatmap top points: highest likelihood-impact ratio

MAIN CRITICAL INDICENTS DETECTED

✦ Transitioning to a carbon-neutral economy

Considering that the energy transition is happening so fast creating scarcity of REE, but also the electric vehicle (EV) revolution, the market is not able to deliver enough REEs for the energy transition and production of EV due to an unexpectedly big increase in demand. In parallel, the global supply and production of REEs is growing up too slowly to meet the demand.



 TRIGGERS	<p>Societal pressure Rise in environmental regulations accelerating the transition to a carbon-neutral economy. Rapid change in consumer behaviour, requesting more sustainable-by-design products.</p> <p>Global warming It becomes fundamental to act in.</p> <p>A promising business case Energy and mobility transition are key areas for the European economy.</p>
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 LIKELIHOOD REASON	<p>Pressure for change It affects social, economic trends and also natural forces.</p> <p>Establishment of new mining capacities It is a complex and long process, which can take more than 5 years. The attention on electromobility and the energy transition is much higher than attention on raw materials supply.</p>
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 IMPACT REASON	<p>Prioritisation of some industries and applications over others Scarcity leads to this fact. Possible domino effect on other related services and industries.</p> <p>Risk of mass redundancy of existing strategic assets Lack of resources to replace them.</p> <p>Recycling and substituting Also there is a higher risk of missing CO₂ emission targets.</p> <p>Lower production standards and higher prices Due to inflation or even social conflicts.</p>
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✦ Impact of Chinese export policies

Considering China floods in the market with affordable REE products and magnets, and the possibility of cutting down its exports, China largely overestimates the capacity of its domestic market, creating an overcapacity/overproduction in the country. In addition, Chinese economy and politics are deeply intertwined, which means the government has a role to play on how companies are behaving and could limit exports of either REEs or end-products containing REEs.



<p>TRIGGERS</p>	<p>“From cradle to grave” approach Chinese model is based on fully integrated domestic value chains. Capacity for control and leverage Value chains are led centrally in line with the ‘Made in China 2025’ strategy and China Standards 2035. Chinese less environment-friendly practices Led by domestic pressures and lower profit at extraction stage, while outsourcing extraction to focus on REE manufacturing.</p>
<p>LIKELIHOOD REASON</p>	<p>Rare earths are a diplomatic leverage for China The geopolitical situation increases the likelihood of a price drop as retaliation. REE export as a geopolitical tool Already used in the past, export speculation can happen again. Chinese control over full value chains China aims to develop or keep control from the mine to the final product.</p>
<p>IMPACT REASON</p>	<p>European industry’s pressure by a severe “price risk” Chinese products are highly competitive and its domestic industry would consolidate its monopoly while European companies might not survive and market entry would be impossible for new prospects. 98% of REE needs in the EU is covered by Chinese imports REEs are widespread in European economy and in strategic domains (e.g., defence) Europe speeds up to reach the ambitions of the EU Green Deal European needs for REEs will keep on increasing as the transition to a carbon-neutral economy and as part of its digitalisation strategy</p>

✦ Breakthrough in substitution of REE

Alternative technologies to rare earth direct drive machines could emerge and some alternative motor technologies could possibly become more competitive if the price implication of going REE-free proves beneficial. In long term, less-price-sensitive industries could carry out large-scale awareness-raising campaigns for decision-makers on risks related to REE supply chains.



Open competition on the market

Liberalism in European economy is a condition that cannot be centrally planned even on strategic markets.

Shorter-term policy perspectives

This contributes to seek for a rapid alternative as developing domestic rare earths supplies, which can easily take more than 5 years

Existence of geopolitical trigger events

Accelerating the development of substitute technologies by disrupting rare earths supply chain

TRIGGERS

No governmental support for less price-sensitive sectors

These trigger events will not have any impact on substitution technology without governments involvement

Need to have evidence for effective substitution

There is not enough evidence of the technological performance of non-REE alternatives and industries are facing raw materials constraints.

LIKELIHOOD & IMPACT REASON

 **Citizens are against mining REE in Europe**

Mining is sometimes considered negatively for the general public, with traditionally low willingness to accept mining projects in their neighbourhood due to assumed threats. Some aspects such as environmental pollution or radioactivity can also impact the public's opinion. In addition, REE are a "by-product" of mining, meaning that no mine will be operating only for REE obtention causing that the main raw material mined can induce other disturbances.




TRIGGERS

Increasing need to find REEs in Europe and demand of REE
Necessary for the energy transition and electrification of mobility.
More self-reliance and less dependency on China
Geopolitical context is leading Europe. See previous sections for more info
Fluctuation of prices and disturbances on imported supplies of REEs
Possibility of opening/reopening of mines in Europe, causing resistance due to lack of knowledge on CRMs. Possible not-in-mybackyard effect.


LIKELIHOOD REASON

Situation already happened before
Even for other large infrastructure projects.
Mass mobilisation of citizens and campaigning is easier in the digital era
Environmental regulations changes
It make it easier to stop new projects than a few decades ago.
More general environmental aware
General public is also more focused on their own quality of life than in the past.


IMPACT REASON

Pause or stop of operations
Resistance can and interrupt whole value chains.
The price of REE would rise
As a consequence the price of end-products containing REEs would rise too.
Alternatives or substitutes will need to be further researched
There is no guarantee of having better options.
Expertise on REE mining outside Europe
Same situation could apply to extractive activities.

CONCLUSIONS OF THE WORKSHOP

Counting with the perspective of stakeholders from different industries and background to share their vision for critical incidents which are likely to shape the future of European REE value chains in the short term, some incidents were perceived as critical for the majority of participants and further refined and ranked, resulting in a [Heatmap report](#).

Some suggestions were considered:

- Unified political decisions are needed following some trigger events. This will require consensus-building among EU Member States, which could take time.
- Enabling alternatives requires support.
- There is a need for a methodology and process to evaluate and certify viability of substitute technology
- Long-term planning is needed for both EU governments and companies, to counter strategic disadvantages
- Some short-term, tangible goals can help policymakers move in the right direction.

As a consequence, the critical incidents that could influence European supply and use of REEs in the coming five years are mostly categorised in the following areas, and **all interconnected through the economic aspect**:

- Geopolitics
- Environment
- Technology
- Social

SecREEs uses these detected critical incidents for contributing with other EU-funded projects and initiatives as PASSENGER to raising awareness and discussing needs and actions to address and explore solutions for the conclusions emerging from the organised workshop.



More information of SecREEs is available in the [project website](#) and in [CORDIS with ID 776559](#).