Decarbonization is not green: overcoming the unspoken issues of a low-carbon world

| SUMMARY |
The decarbonization policies of Northern economies are unsustainably increasing demand for “critical energy transition minerals”, whose deposits are mainly located in Southern countries. Improving recycling capacities will not be enough to meet these growing needs. Only equitable sufficiency policies, relocation and responsible management of mining activities are likely to make the mining future more sustainable and equitable.

| KEY FACTS AND FIGURES |
- Scenarios for the transition to a “low-carbon” world are based on economic growth, electrification and digitalization of uses, and will lead to:
  - an increase in global electricity consumption of between 50% and 84% by 2035¹
  - an unprecedented growth in demand for metals for electric cars and batteries by 2040: x40 for lithium and x20-25 for cobalt and nickel²
  - an unprecedented increase in demand for copper: by 2050, humanity will need to extract the equivalent of what it has already been extracted since Antiquity³
- The risks of metal supply disruptions by 2030 are real and could disrupt international geopolitics
- Mining potentially impacts 50 million km² of the Earth’s surface, of which 8% coincides with protected areas, 7% with key biodiversity areas and 16% with wilderness areas⁴

| CONTEXT |
DECARBONIZATION OF DEVELOPED ECONOMIES INCREASES THE EXTRACTIVIST PRESSURE ON THE GLOBAL SOUTH
“Decarbonization”, “carbon neutrality”, “net-zero emissions”, etc.: all these announcements are widely relayed in the media and only focus on reducing greenhouse gas emissions. It is true that reducing emissions is crucial to mitigate climate change, and that means reducing our reliance on fossil fuels, notably through electrification. However, these technological choices rely on the extraction of numerous minerals, notably lithium, cobalt and copper, which largest reserves of found in the Global South. The Democratic Republic of Congo holds 50% of the world’s cobalt reserves, Chile 40% of the world’s lithium reserves and 25% of the world’s copper reserves.
An energy «transition»... that isn’t a transition at all!

Far from being a “transition” from one mode of energy production and consumption to another supposedly more virtuous, the development of renewable energies and so-called “decarbonized” objects such as the electric car is an addition to other forms of energy production and consumption. There is no transition here, but rather an addition of different energy sources. Furthermore, the definition of an initial state and an end state implied by the idea of transition is rarely defined in a way that can be clearly accounted. The term “energy crisis” would better characterize the current situation and its uncertainties.

| FINDINGS |

MINING GENERATES CONSIDERABLE NEGATIVE SOCIAL, POLITICAL, ENVIRONMENTAL AND HEALTH IMPACTS

Mining is a very water-intensive activity, particularly in Chile’s salt deserts, where it is estimated that extracting 1 tonne of lithium requires 22,000 m³ of water. This is also true for copper, with the majority of deposits located in regions of strong hydric stress.

The mining industry is also a source of chemical pollution (mainly metallic) of water, soil, air and food chains, leading to major long-term health and environmental impacts. It is also one of the main causes of the destruction of terrestrial and aquatic ecosystems, particularly forests. To meet the explosion in global demand for minerals, the exploitation of the deep seabed, rich in cobalt and nickel in particular, is on the agenda. However, our knowledge of these ecosystems is still incomplete, and the potential impacts of extractive activity on these environments are unknown and uncertain.

As mining intensifies, the concentration of minerals in deposits decreases. Extracting the same quantity of metal requires more energy, which in turn generates more greenhouse gas emissions, since the energy used today for mining operations is mostly carbon-based.

The mining industry is also a source of territorial upheavals that are beyond the control of local populations and concerned stakeholders, notably urbanization processes and human displacement flows. Opening or closing a mine profoundly alters territorial development trajectories, contributing to the non-diversification of local economies and the widening of social inequalities.

Finally, mining is a matter of geopolitics and sovereignty. Regaining control over mineral resources, their extraction and processing, is an important argument in national domestic and foreign policy strategies, whether in the South or the North.
The recycling of metals such as copper, cobalt and lithium, which are essential to the electrification and digitization of applications, is often presented as a major lever for meeting the growing demand. In reality, for recycling to play a significant role in reducing the pressure on these metals, their recovery and incorporation rates in new goods must be exceptionally high, but above all, the annual growth rate of their demand must be zero or low. However, not all metals can be recycled to the same degree. For example, the ratio of recycled functional lithium to the quantity of lithium introduced into the recycling stream is less than 1%. There are many reasons for this: the collection rate for end-of-life equipment is insufficient; the use of metals in tiny quantities makes them difficult to recover; and it is very difficult to regain a sufficient level of purity for industrial re-use.

At the same time, with high growth rates in minerals demand, even if the recycling efficiency was to increase over the coming years, this would only slightly lessen the need for primary resources by a few years (just one year of mining for lithium, as shown in the following figure).

**Primary lithium extraction requirements, with or without recycling, based on an annual growth rate of demand of 10%**
A referendum on new mining concessions in Ecuador

On Sunday August 20, 2023, the inhabitants of Ecuador’s capital were invited to take part in a referendum on mining activities in the Chocó Andino region, a biosphere reserve of over 124 hectares designated by UNESCO, in parallel with a national consultation on stopping oil exploitation in the largest Amazonian Park (Yasuni). 68% of voters were in favour of banning all types of mining activities in this region, described as the “lungs” of Quito and home to the spectacled bear, emblematic of the Andes. As a result, twelve mining concessions in the exploration phase and eight planned will not be started, while the twenty current concessions are maintained.

SUFFICIENCY AND RELOCATION OF EXTRACTION: TWO ESSENTIAL HORIZONS FOR A MORE SUSTAINABLE AND FAIRER MINING FUTURE

In a scenario of massive electrification, global lithium extraction requirements would be of 6 million tonnes per year by mid-century\(^3\), compared with 0.1 million tonnes today. **The unsustainability** of this demand calls for a form of **sufficiency in the global North**. This implies a reflection on the nature of needs (physiological, safety, comfort, aesthetic, etc.) and, in parallel, a regulation of “dispensable needs” and of what generates them (advertising, online commerce, modes of transport, etc.).

Furthermore, to prevent this **extractive boom** from reinforcing the inequalities between consumers’ and producers’ countries, the former must play their part. In other words, **the mining issue must be brought back into the public debate**. A lithium mine project is currently under study in the Massif Central (France), and an inventory of French mineral resources is underway. Finland has already chosen to intensify mining on its territory – a controversial choice, as it endangers forests, wildlife and freshwater areas.

At the same time, a considerable amount of work needs to be done on **training professionals** in the mining sector, and on dialogue and consultation with the general public, in which scientists from all disciplines must participate.
CONCLUSION

The decarbonization policies of Northern economies are unsustainably increasing the demand for energy transition minerals. They are synonymous with a huge increase of extraction in the global South, where the main reserves are located, but also involve sovereignty issues. The mere argument of economic development of Southern countries, driven by the capitalist logic of extractive industries, is no longer endurable in front of current issues.

While destroying entire ecosystems and endangering the cohesion and health of local populations, this "green extractivism" risks aggravating the asymmetries between the economies of the global North and South. Improving recycling capacities for these metals will not be enough to cope with the exponential growth in demand. The risks of supply disruptions are another major concern. Only equitable sufficiency policies can make the future of mining more sustainable and just.

This new extractive boom requires the developed economies behind it to play their part. A constructive, multi-stakeholder dialogue on the issue of mining must be initiated. This should enable us to draw up desirable and sustainable mining trajectories at territorial scales.

RECOMMENDATIONS

- **Lower metal demand** in the global North by increasing equipment lifetimes, improving recycling rates and encouraging sufficiency (in every sector, especially in the car industry);

- Implement an ambitious plan to exploit the "urban mine", which starts from the design stage of objects, i.e.: **systematically collect, reuse and recycle all metals contained in all types of waste**;

- **Integrate, into their prices, the social, environmental and health impacts** of products over their entire lifecycle, including the decarbonized energies that power them;

- Apply the **precautionary principle** in situations of uncertainty, particularly in the case of deep-sea mining;

- **Train elected representatives and all public officials** in the socio-environmental impacts of decarbonization policies as well as mining issues;

- Invest in **multi-disciplinary courses in mining engineering** to train new generations of mining engineers in the North and the South, a new generation of experts who are not exclusively focused on technical and economic aspects;

- Pursue **major regional and national debates** around the reopening of mines in Northern countries, along the lines of Ecuador’s referendum on mining in the Chocó Andino region.
REFERENCES


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