10 things you should know about critical raw materials

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Why are we talking about critical raw materials?

The periodic table is in fashion. There is growing talk about the importance of lithium, platinum and rare-earth elements. Financial institutions, companies, governments of different political colours... almost everyone seems to agree on one thing: if we are to move away from fossil fuels, we need to acquire certain key, or critical, mineral raw materials to produce the necessary technologies. “There won´t be ecological transition without these minerals”, we are told.

These same voices emphasise that Europe currently produces almost none of these minerals, and that they come from regions with less stringent environmental and human rights standards. They insist therefore that “it is time for Europe to do its part”.

“Doing its part” means boosting mining in countries like Spain at a pace that would justify ignoring local communities´ participation rights and other environmental standards.

There is no denying that moving away from fossil fuels is essential and urgent. It is true that the minerals that fuel our consumption in Europe are obtained by exploiting people and territories in the Global South. Despite representing only 6% of the world’s population, the European Union already consumes between 25-30% of the metals produced worldwide[1]. We cannot perpetuate this resource colonialism.

But beyond slogans and false promises, neither the European Union nor the Spanish government intend to put an end to this exploitative system. Raw Material policies for the ecological transition are once again clashing with planetary limits and justice. Meanwhile, the institutional narrative ignores the fact that a growing, mineral-guzzling arms industry exerts an increasing influence over governments.

Moving away from fossil fuels to tackle the climate emergency implies profound changes in our economy and our society. We must drastically reduce current exacerbated production and consumption, limit the movement of goods around the world and completely change the mobility model centred on the use of private cars.

With this in mind, Amigas de la Tierra has prepared this document that tries to answer 10 key questions concerning why critical raw materials are so important, and what they have to do with our economic system, human rights, and existing global domination systems.

What are critical raw materials? 1

The European Union defines critical raw materials as minerals and metals that...

- are at high risk of supply shortages,
- are particularly important for the European economy.

Lithium, cobalt, nickel, tungsten, manganese and rare-earth elements are some of these key metals.

The concept of critical raw materials is not new. Since the first list was published in 2011, it has continued to grow[2]. It has risen from 14 to 34 minerals and metals and may expand even further.

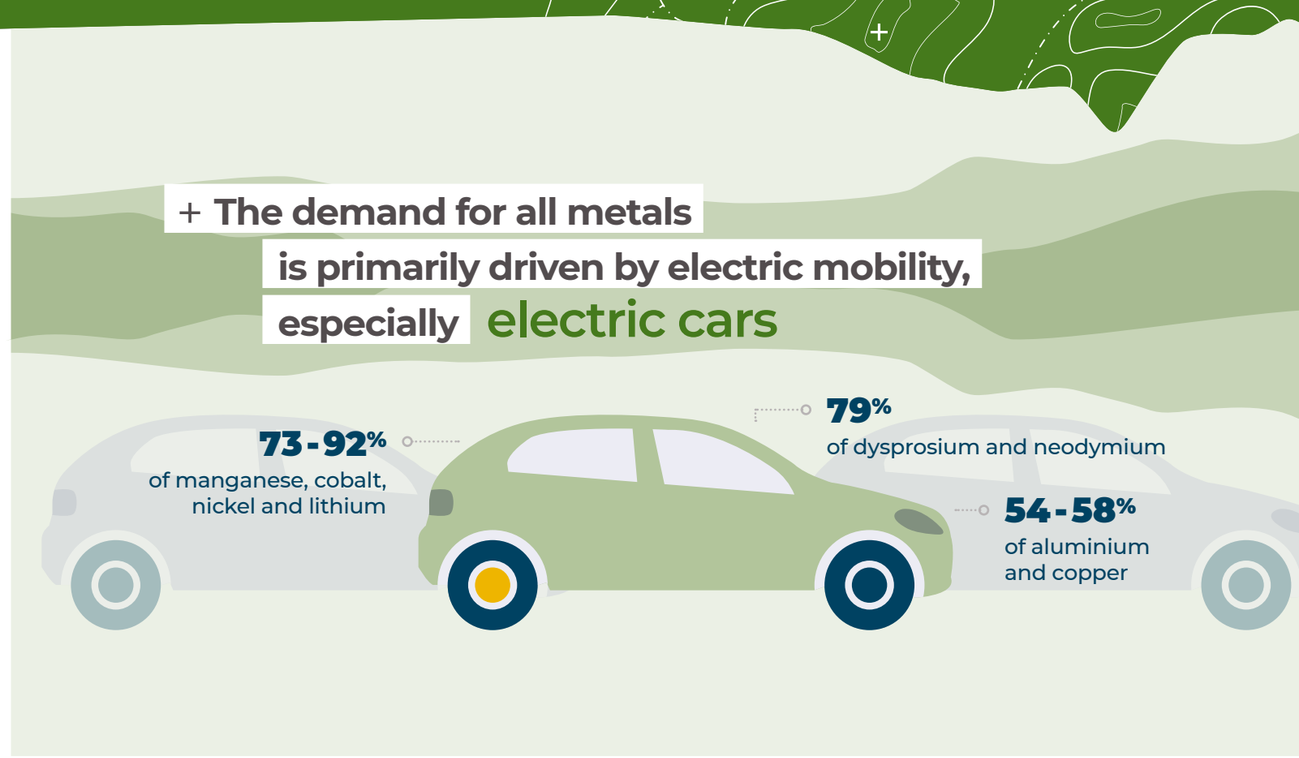
The European Critical Raw Materials Act[3] established a new subcategory called 'strategic raw materials' which currently contains 17 elements for which demand is expected to grow in the coming years. Europe considers "strategic" the minerals needed for the energy and digital transition and for the arms and aerospace industries.

The aim of the law is to guarantee the supply of these minerals. This will be done by accelerating extraction both inside and outside Europe, lowering environmental and participation requirements and through new free trade agreements.

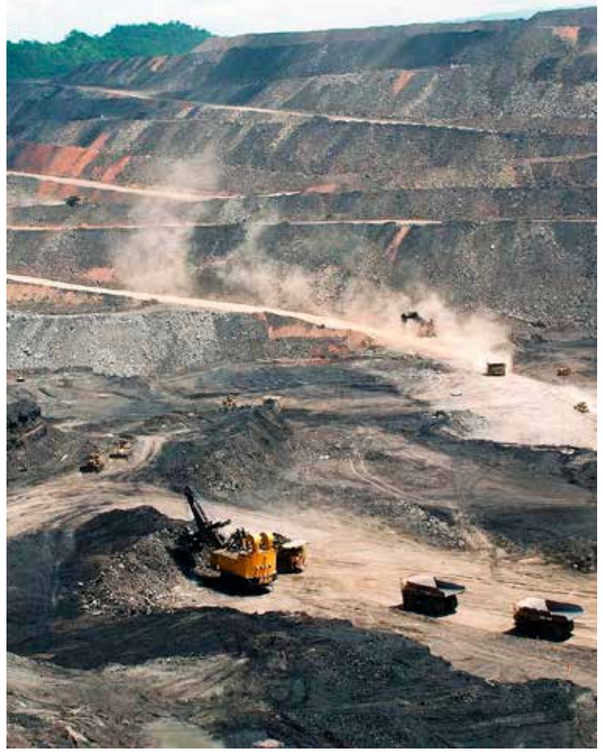
Which sectors and technologies need them? 2

Emphasis is placed on the importance of these minerals for the energy transition, electrification, and the decarbonisation of the economy. However, the relevance of a mineral for technologies such as arms manufacturing has carried a lot of weight in the definition of "strategic". For example, an F.35 fighter plane contains 415 kg of yttrium, terbium and other rare-earth elements, as well as other critical minerals such as titanium, gallium, lithium, platinum, cobalt, manganese, nickel and copper.

In fact, the mining and arms industries have lobbied hard and successfully for European law to include titanium as a "strategic mineral". This metal is barely used in the ecological transition but is key to the defence and aerospace industries[4].



Furthermore, not all sectors involved in the "energy transition" need the same amount of resources. Amigas de la Tierra has calculated that electric cars are the main consumers of minerals, accounting for between 54% and 92% of the minerals associated with the energy and digital transition in Spain[5]. Meanwhile, wind power is only responsible for 16% of the demand for rare-earth elements (dysprosium and neodymium). Focusing on electric cars without rethinking mobility is classist, as the majority of the population cannot afford this product and, as the data shows, it is unsustainable.



How much will demand for these minerals increase? 3

Global demand for lithium tripled, cobalt demand increased by 70%, and nickel demand went up by 40% between 2017 and 2022. The “metal rush” is a reality.

The International Energy Agency (IEA) estimates that global demand for minerals used in decarbonisation technologies will increase four- to six-fold by 2040, depending on climate ambition.

European governments are using the narrative that demand will skyrocket and that Europe is dependent on other regions to justify aggressive raw materials policies that promote extractivism both in Europe and abroad.

These calculations ignore the fact that part of this increase in demand is due to the escalating militarisation of Europe. They also overlook two key issues:

- a large number of already-extracted materials and minerals can be reused and recycled;
- we must change our production, consumption and mobility models and adjust them to planetary limits.

However, European raw materials and climate policies seek to change energy sources while maintaining unsustainable and unjust consumption. They cling to the mantra of unlimited growth, without considering the biophysical limits of the planet, nor social and global justice.

Where do they come from? 4

Most of the minerals we consume in Europe come from other parts of the world. Rare-earth elements for digital technologies and electric vehicles are processed in China. Lithium is extracted in Bolivia, Chile and Argentina and is then processed mostly in Australia. South Africa and the Democratic Republic of Congo supply minerals such as platinum (for the production of green hydrogen) and cobalt (for electric cars and smartphone batteries).

The value chains of technologies for the “green” and digital transitions are global. Minerals travel thousands of kilometres from mine to end consumption, for example, in Europe.

There are many environmental and human rights impacts linked to this global value chain. For example, Rwanda is EU's partner in one of multiple strategic partnerships that Europe is adopting to secure access to critical minerals. There is evidence that armed militias from the DRC are smuggling these minerals into Rwanda[6]. By entering into this agreement, the European Union is fuelling the long-standing conflict in DRC and the suffering of the Congolese people.

+ Reserves and annual extraction of each metal...

Global reserves (2022)
The portion of known mineral deposits in the earth's crust that can be mined economically (profitable to capital) today.

Global annual production (2022)
Tonnes of metals contained in the annual extraction of mineral deposits.

Metal	Global annual production (2022)	Global reserves (2022)
Aluminium (Al)	380 Mt	31 Gt
Copper (Cu)	22 Mt	890 Mt
Cobalt (Co)	190 kt	8.300 kt
Lithium (Li)	130 kt	26 Mt
Manganese (Mn)	20 Mt	1.700 Mt
Nickel (Ni)	3,3 Mt	100 Mt
Gold (Au)	3,1 kt	52 kt
Silver (Ag)	26 kt	550 kt
PGM: (Pt) and (Pd)	Pt: 300 t Pd: 210 t	70 Mt
Rare-earth elements (REE)	300 kt	130 Gt

Paladium 7 %
Canada

Rare-earth elements 14 %
EE.UU

Silver 24 %
Mexico

Nickel 16 %
Rare-earth elements 16 %
Brazil

Copper 10 %
Silver 12 %
Lithium 30 %
Peru

Copper 9 %
Silver 18 %
Lithium 36 %

Lithium 10 %
Argentina

Copper 24 %
Lithium 30 %
Chile

Copper 21 %
Lithium 36 %

Nickel 7 %
Gold 10 %
Platinum 11 %
Palladium 42 %
Cobalt 5 %
Russia

Nickel 7 %
Gold 13 %
Platinum and Palladium 8 %

Manganese 16 %
Silver 14 %
Rare-earth elements 70 %
Aluminium 24 %
Lithium 15 %
Gold 11 %
China

Manganese 16 %
Silver 13 %
Rare-earth elements 34 %

Aluminium 23 %
Guinea

Aluminium 24 %

Aluminium 19 %
Vietnam

Rare-earth elements 17 %

Nickel 10 %
Philippines

Manganese 23 %
Gabon

Cobalt 68 %
Copper 10 %
D.R. Congo

Cobalt 48 %
Silver 18 %

Platinum 8 %
Platinum and Palladium 2 %
Zimbabwe

Manganese 36 %
Platinum 74 %
Palladium 38 %

Manganese 38 %
Platinum and Palladium 90 %
Gold 10 %
South Africa

Cobalt 5 %
Nickel 48 %

Cobalt 7 %
Nickel 21 %
Indonesia

Aluminium 26 %
Lithium 47 %
Manganese 17 %
Gold 10 %
Rare-earth elements 6 %

Aluminium 16 %
Lithium 24 %
Manganese 16 %
Gold 16 %
Copper 11 %
Cobalt 18 %
Nickel 21 %
Silver 17 %
Australia

+ Source
Developed in house, based on data from the United States Geological Survey USGS, https://www.usgs.gov

What is Europe doing? 5

Energy and digital transition policies intensify extractivist colonialism by creating "sacrifice zones" inside and outside Europe. The Critical Raw Materials Act (CRMA) has been touted as necessary to reduce EU´s dependence on China. Accordingly, it aims to increase the extraction of minerals within Europe to cover 10% of Europe´s annual consumption.

But the law also secures minerals supply from outside Europe through agreements with countries such as Argentina, Brazil, Rwanda and many others. Additionally, it establishes various financing mechanisms to boost the business of European multinationals[7].

To guarantee this supply of minerals, the CRMA promotes so-called "strategic projects" aimed at extracting, processing or recycling these minerals. These projects, including mining projects, will be fast-tracked and can get priority over the protection of biodiversity, water and other natural resources. The rights of local communities affected by these projects, both inside and outside Europe, are not protected, making it even more difficult to defend territories.

Although Brussels also aims to increase metal recycling to cover 25% of annual consumption, no specific or binding measures have been put in place to ensure compliance.

What is the Spanish government doing? 6

Spain provides Europe with almost all its consumption of strontium, a metal used in the electrical and electronics industries. It is also a major producer of copper. The upturn in metal prices and European policies have increased interest in mining. In 2018 alone, more than 2,000 mining project applications were submitted across the country[8].

Most of the metal mining permits are held in the regions of Andalucía, Castilla y León, Galicia, Asturias and Extremadura and cover minerals such as aluminium, cobalt, copper, graphite, tin, lithium, manganese, nickel, gold, silver, rare earth elements, uranium, vanadium and tungsten. The projects are mainly led by multinational corporations and many are speculative in nature.

The Spanish Government was key to the rapid adoption of the Critical Raw Materials Regulation, and the selection of the first "strategic projects" in Spain is already underway. Some regions and municipalities are already accelerating mining[9].

This scenario is marked by an outdated national mining code that dates back to the dictatorship period, and a "Roadmap for the mineral raw materials" that prioritises mining over saving and recycling.

What are the social and environmental impacts of mining? 7

Mining is one of the most damaging activities for the environment and human rights. It destroys the soil, pollutes the air and exacerbates the climate emergency. It consumes and pollutes large quantities of water in a context of increasing water scarcity[10].

This pollution undermines people's rights to water and food, destroys their livelihoods and makes them sick. Companies and public authorities often violate participation rights of communities. Processes such as "social engineering"[11] that force acceptance of projects undermine democracy. People opposing these projects sometimes suffer criminalisation and may see their lives or personal safety at risk[12].

These impacts exacerbate existing patterns of gender inequality and in many cases increase gender-based violence. Worldwide, over 80% of lithium projects and more than half of nickel, copper and zinc projects are located in the territories of indigenous peoples, so they are also disproportionately affected. Conflicts over mining are however widespread. In Spain, more than 700 cases of non-compliance with the law due to mining projects have been reported[13].

The structure of this sector explains many of these impacts and their severity. They are predominantly megaprojects[14] led by transnational companies, which appropriate the territory and natural assets to accumulate capital. This is encouraged by a legal framework that ensures impunity for corporate abuses.

Are there alternatives to mining? 8

The "raw materials rush" finds us immersed in an out-of-control production model, with an unsustainable economic system, and unprecedented levels of social inequality and environmental degradation.

The energy transition proposed by the European Union is based on a change in energy sources. It does not challenge the dogma of unlimited growth and inequality in global production and consumption chains. This approach means that our current dependence on fossil fuels will give way to a new dependence on minerals, perpetuating this model.

The alternative involves applying the classic "4 Rs": rethink, reduce, reuse and recycle. Rethink what kind of societies we want, prioritising sectors that guarantee social well-being and restricting those that harm people and the planet, such as the arms industry; reduce energy and mineral consumption; reuse and make the most of technologies; and, once they can no longer be used, recover and recycle as many minerals as possible.

Implementing a feminist economy that puts an end to the racist, militaristic and patriarchal domination system is the only response to the climate and social emergency, and the only way to move towards sustainable and fair societies for all.

What role can recycling play? 9

There is very little or no recovery of metals in Spain from waste electrical and electronic equipment. We are squandering priceless resources. A smartphone circuit board contains 34 critical or strategic minerals[15]. The vast majority of these minerals end up in landfills or incinerators, polluting the environment and harming the local population. Meanwhile, new mines are being planned to extract further resources from the ground, an inefficient and extremely damaging approach.

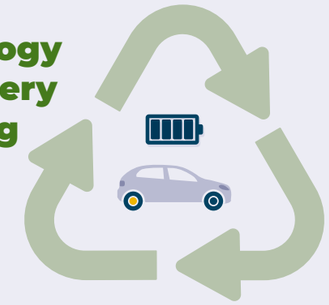
Plans to implement the energy and digital transition must prioritise minerals recycling ("urban mining") over extraction. Recycling has a lower environmental impact than raw material extraction[16] and is a potential source of employment.

In a scenario of energy and digital transition where recycling rates improve, recycled materials could meet an average of 57% of the minerals demand by 2050[17]. If recycling is combined with measures such as extending the lifespan of technologies and a change in the mobility model, recycled metals could cover up to 67% of the minerals demand for the energy and digital transition, drastically reducing the need for mining.

+ For an energy transition

that is truly sustainable and fair we need...

Technology and **battery recycling**



+ Extended life for **technology** and **batteries**

Smaller batteries

+ Second life for **batteries**

+ Reduced private vehicle fleet from **25 million** to **9 million**

Increase **buses** from **65,000** to **250,000**

+ Results

Recycled minerals could cover **67%** of the **material demand** for the **energy transition**

We would reduce the need for **mineral extraction** by **50%**

10

What role can saving measures play?

Increase recycling is essential, but on its own it is insufficient to overcome our dependence on critical minerals and their impacts. If we increase recycling but demand continues to grow unabated, we will continue to require large quantities of new minerals. Reducing our demand is imperative.

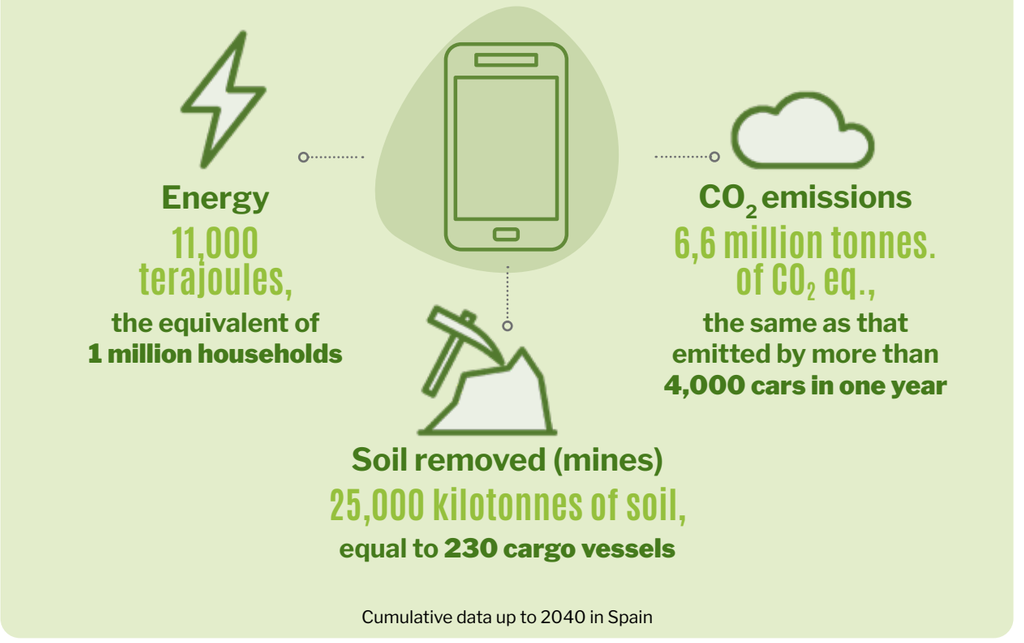
Given that electric vehicles are the main consumer of minerals, transforming mobility will have a major impact. If we reduce the number of vehicles on the road and opt for public transport, we could reduce primary extraction by up to 35%.

There is also an urgent need to combat the planned obsolescence of devices such as mobile phones and laptops. For example, extending mobile phones´ lifetime by just one year could save 29 tonnes of lithium by 2040. This is equivalent to the lithium contained in more than 4,000 electric car batteries[18].

The most effective solution involves combining the recycling of all technologies (renewable energy and electric transport) with saving measures such as extending the lifetime of technologies and cutting down private transport. By combining all these measures, we could halve the need for raw material extraction, in other words, of mining[19].

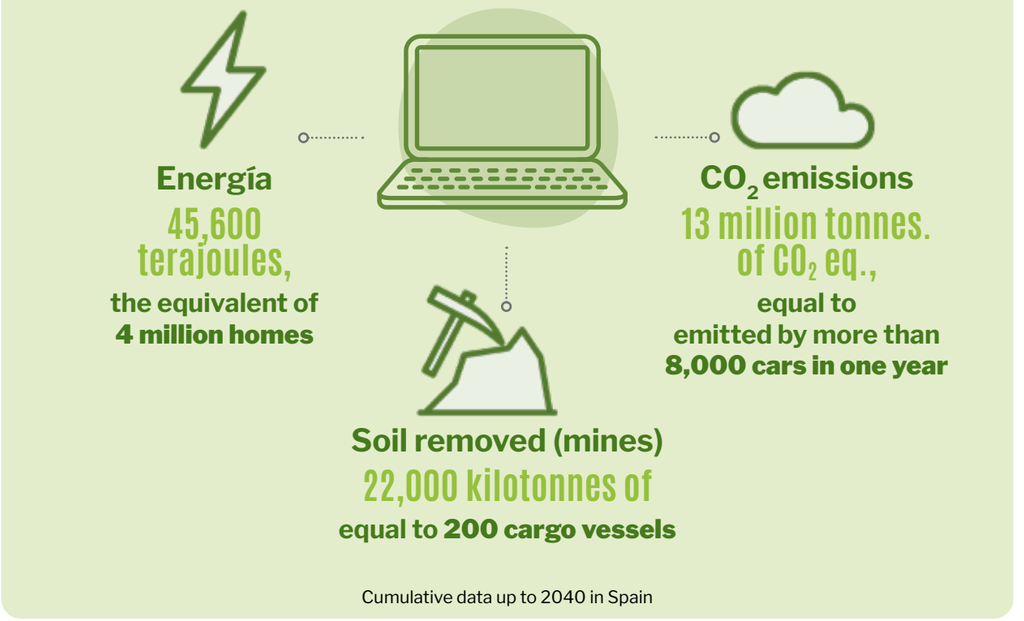
If we also implement the necessary system change in favour of ecofeminist and post-growth policies, the need to extract minerals and other natural resources will be much lower.

Extending the lifespan of mobile phones to 6 years will save...



Cumulative data up to 2040 in Spain

Extending the lifespan of laptops to 9 years will save...



Cumulative data up to 2040 in Spain

Notes

1. Calculated from the EU 2020 Raw Materials Scoreboard.

2. European Raw Materials Initiative:
https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2008:0699:FIN:en:PDF

3. Regulation (EU) 2024/1252 of the European Parliament and of the Council of 11 April, 2024, establishing a framework to ensure a secure and sustainable supply of critical raw materials and amending Regulations (EU) No 168/2013, (EU) 2018/858, (EU) 2018/1724 and (EU) 2019/1020.

4. Amigas de la Tierra Europa, "El lobby de la industria minera: cómo la industria condiciona la Ley de Materias Primas Críticas de la UE", 2024.

5. Amigas de la Tierra, "Minerales para la Transición Energética y Digital en España: demanda, reciclaje y medidas de ahorro", 2023.

6. Nobel Peace Prize winner Denis Mukwege has denounced the agreement as a violation of Europe's own regulations: "Conflict minerals: by allying with Rwanda, the EU reaches the paroxysm of geostrategic cynicism" (Mukwege), 22 February, 2024:
https://afriquactu.net/2024/02/22/minerais-de-sang-en-salliant-avec-le-rwanda-lue-at-teint-le-paroxysme-du-cynisme-geostrategique-mukwege/

See also Bossissi Nkuba, Liliane Nabintu Kabagale, "Between M23 and electric vehicles", 14 April, 2024:
https://africasacountry.com/2024/04/between-m23-and-electric-vehicles

7. Juan Hernández Zubizarreta and Pedro Ramiro, "La Unión Europea y el capitalismo verde militar: materias primas y acuerdos comerciales para el extractivismo neocolonial", 2024 (Ecologistas en Acción y Observatorio de Multinacionales en América Latina),

8. Amigas de la Tierra, Observatorio de Multinacionales en América Latina, "El boom minero: patrones e impactos de la expansión de la industria extractiva en España", 2022.

9. Although this movement is often accompanied by the term "sustainable mining" to greenwash this sector. For example, the Regional Government of Andalusia's approval of the Strategy for Sustainable Mining:
https://www.juntadeandalucia.es/organismos/industriaenergiaymi- nas/servicios/actualidad/noticias/detalle/435196.html

10. Amigas de la Tierra, "Los límites de la minería. Actividades extractivas y espacios protegidos en el Estado español", Joám Evans Pim, 2023.

11. This category includes the set of techniques and strategies that are applied, usually in combination with each other and with other forms of corporate counterinsurgency, on a given population to influence their perspectives and behaviour with the purpose of producing specific results. See MINOB, "Minería y derechos sociales en la península ibérica",
https://minob.org/espanol/informes.html

12. In the last decade alone, the Business and Human Rights Resource Centre has documented 550 claims of human rights violations directly related to "green transition" mineral extraction around the world. Transnational Institute, "The Raw Materials Rush: How the European Union is using trade agreements to secure supply of critical raw materials for its green transition", 2024.

13. Iberian Mining Observatory (MINOB): https://minob.org

14. Amigas de la Tierra, Observatorio de Multinacionales en América Latina, footnote 6. See also: Gonzalo Fernández, Erika González, Juan Hernández and Pedro Ramiro (OMAL), "Megaproyectos: claves de análisis y resistencia en el capitalismo verde y digital", 2022.

15. Amigas de la Tierra, "Alargascencia: beneficios ambientales de extender la vida útil de teléfonos móviles y portátiles en España", 2024
https://www.tierra.org/wp-content/uploads/2024/11/Informe-Alargascencia.pdf

16. Ecologistas en Acción, "Reciclaje de metales. La alternativa a la minería", 2022.

17. Amigas de la Tierra, see note 5.

18. Amigas de la Tierra, see note 5.

19. Amigas de la Tierra, see note 15.

Amigas de la Tierra

"We are a non-profit environmental organisation whose mission is to promote local and global change in favour of a society that respects the environment and is based on fairness and solidarity. We are a group of people who defend social and environmental justice; we firmly believe that politics should be centred on people and the Earth. We therefore denounce and put pressure on companies and governments, while at the same time proposing various solutions to bring about a fairer world"

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