



# **Sacrifice Zones for Sustainability?**

## **Green Extractivism and the Struggle for a Just Transition**

**The EEB is the largest network of environmental citizens' organisations in Europe. It currently consists of over 180 member organisations in 40 countries, including a growing number of networks, and representing some 30 million individual members and supporters.**

The EEB is an International non-profit association /  
Association internationale sans but lucratif (AISBL).

EC register for interest representatives:

Identification number 06798511314-27

BCE identification number: 0415.814.848

RPM Tribunal de l'entreprise francophone de Bruxelles

### **Published October 2023**

Lead Author: Diego Marin (EEB)

Co-authors: Alexander Dunlap (Boston University), Robin Roels (EEB)

Authors for case studies:

- Sweden: Arne Muller (independent journalist), Yblin Roman (CATAPA)
- Bolivia: Silke Ronsse (CATAPA), Alberto Vázquez Ruiz (CATAPA)
- Finland: Jari Natunen (Finnish Society for Nature Conservation), Yblin Roman (CATAPA)
- Portugal: Alexander Dunlap (Boston University), Mariana Riquito (University of Amsterdam)

**Contributing authors from the EEB:** Stephane Arditi, Jean-Pierre Schweitzer, Katharina Wiese, Margarida Martins, Heeta Havisto, Patrizia Heidegger, and Patrick ten Brink.

**Editing and layout:** Ruby Silk (EEB)

**Cover image:** Street art by Sofia Camacho ([@\\_sofiacamacho\\_](#)) and Joao Mauricio ([@violant\\_](#))



This report is supported by the LIFE Programme of the European Union and Open Society Foundations.

*Its contents are the sole responsibility of the authors and do not necessarily reflect the views of the donor.*

# **OPEN SOCIETY FOUNDATIONS**

# Contents

Executive Summary .....	4
Introduction .....	8
Greenwashing Extraction: Unmasking the EU's Critical Raw Materials Regulation.....	12
Lost Lands, Lost Identity: Mega-Mining and the Sámi Indigenous Heritage.....	21
Hidden “European” Indium: Unveiling Green Extractivism in Bolivia.....	35
Waste Landscapes in the Green Transition: Exploring Finland's Battery Mineral Boom.....	44
Social engineering for lithium extraction? .....	56
Conclusion .....	68
Policy Recommendations:.....	71
Annex 1: .....	76



# Executive Summary

In the present day, the magnitude of metallic extraction poses substantial ecological hazards and compounds the challenges associated with climate change. As an example, in the last 10 years, global copper extraction has surpassed all previous levels in human history, and the trend shows no sign of slowing down. To have a chance at limiting global warming to the 1.5°C of the Paris Agreement and to avoid ecological collapse, there is no doubt we need to move away from fossil fuels and that this transition will require a certain level of raw materials. The question is, what are we willing to sacrifice for these materials? Right now, extractivism looks set to continue destroying communities and ecosystems justified by "the green transition".

Using 'corporate science', EU policy echoes industry marketing, further fashioning the mining industry as responsible, sustainable, and green, and equating sustainability with mining has been an approach well highlighted in the EU's critical raw materials act (CRMA). This Act aims to ensure the EU's long-term supply of raw materials that are deemed critical for five strategic sectors for the EU economy between now and 2030: low-carbon technologies, electric mobility (e-mobility), industry, information & communications technology (ICT), and aerospace and defence. A primary target of the CRMA is to reach the 10% domestic sourcing of its critical raw material needs by 2030. Considering that the EU only extracts 3% of global metal production, reaching this target will mean many more mining projects within EU's borders. Considering as well that the EU already consumes 25-30% of metals produced globally while only making up 6% of the world's population, the plans to source more materials from global south countries, fuelled by market demand projections will only exacerbate neocolonial material flows.

This report presents a series of case studies examining the upstream segment of critical raw materials supply chains. The primary objective is to investigate the impact of the EU's promotion of "green extractivism" through policies centred on "clean energy" and "economic growth." The study seeks to understand how such promotion impacts livelihoods, communities (including indigenous communities), ecosystems, and narratives associated with the energy transition. The report sheds light on the nature of green extractivism, with a particular focus on European countries, where research has been relatively limited compared to producing countries in the global south. Three cases are analysed in Europe, specifically Sweden, Finland and Portugal, as these countries have been extensively targeted for material extraction. For the global south, Bolivia is chosen as a case study due to its projected significant role in material sourcing in the upcoming years. All these case studies involve projects related to materials deemed as strategic for energy and digital production, which extends to the other ICT and construction sectors discussed above.

In Sweden, the Swedish geological survey forecasted the possibility of increasing the number of mines to 30 in 2020 and 50 in 2030. Yet, due to several mine bankruptcies owing to falling prices, and resistance against some mining projects (delaying or stopping the projects completely), the 2020 forecast did not materialise. There are currently 12 operating mines, with the majority in Sami indigenous territory. Between 10 and 20 advanced mining projects are directly linked to lower-carbon energy technologies. Most of them located in the northern part of Sweden, also in Sami territory. The

case study analysis in Sweden discusses the impact of mega-mining on the Sámi indigenous people in the country. The Sámi people have a unique culture and traditional way of life with many Sami still engaging in the practice of reindeer herding. The rise of mining activities in the Sapmi region has threatened their way of life by disrupting their access to pastures and fragmenting their grazing areas. The permitting process for mining projects is also influenced by political and economic factors, which often overlook the intrinsic value of Sámi culture and rights.

In Bolivia, the case study is part of a fact-finding mission by Catapa through the European Union project 'Make ICT Fair' and focuses on the supply chain of indium, a metal that is essential for various technologies such as smartphones, flatscreens, touchscreens, LED lights, photovoltaic panels, and high-efficiency glass. The study begins by examining mining cooperatives in the Bolivian highlands that extract silver-lead-zinc polymetallic ore, with severe impacts on the health of the miners. The case study traces the supply chain beyond Bolivia to the European industry. The study highlights that Bolivia is estimated to be the 5th largest extractor of indium globally and that Bolivian silver-lead-zinc ores contain valuable concentrations of indium. Yet official Bolivian export data registers of indium is zero. The minerals are sold to local traders who further supply some of the largest commodity traders in the world. The indium supply chain is subject to treatment charges set by a small international oligopoly of zinc refiners and commodity traders. Despite having a metallurgical plant for refining zinc concentrates, no smelting of zinc ore takes place in Bolivia itself. Effectively, Bolivia bears the burden of extracting the ore containing indium bearing the social and ecological harm of its extraction but the beneficiation and the value-added leaves the country.

Finland is facing a dilemma as it seeks to meet the growing demand for nickel, a component of lithium-ion batteries. The country is one of the EU's only nickel producing countries and wants to play a role in the expected 1400% increase in battery consumption by 2030 in the EU, driven by the rapid expansion of battery applications. Finland promotes itself as a responsible mining destination, but nickel extraction is a complex and polluting process that requires a lot of energy and creates a lot of waste. Nickel and copper have the highest environmental impacts per kilogram among raw materials and mining waste poses a threat to Finland's waterways. The country's bedrocks have low mineral concentrations, which complicates waste management. Mines are already responsible for over 70% of all waste and more than 90% of hazardous waste in Finland. The country's waterways are shallow and sensitive to pollution, which could have serious consequences for the ecosystem and human health. Moreover, Finland's national regulations do not comply with the EU's extractive waste directive, which sets standards for the management of mining waste. The situation is alarming when projected into the future. A Finnish baby born in 2020 would inherit 10 tonnes of mining waste per year for his or her lifetime. By the time this baby turns 30, he or she would have accumulated 300 tonnes of mining waste. Furthermore, battery manufacturers' claims of lower carbon footprints are misleading, as they do not account for the wastewater emissions from mining waste. If they did, the carbon footprints would be up to 20 times higher.

Lastly, in Portugal, the case study analyses the Barroso Mine ("Mina do Barroso"), or Savannah mine, in northern Portugal. The Savannah project poses a severe risk to a "Globally Important Agricultural Heritage System" and is poised to become Western Europe's largest open-pit lithium mine. Despite existent socio-ecological risks, the European Commission and the Portuguese government are exerting increasing political pressure to establish this mine to produce raw materials for lithium-ion batteries. The Barroso agrarian communities are facing significant socio-ecological impacts related to extreme water-use and contamination, eliminating farmlands, decimating local fauna and, overall,

irreparably damage an ecological zone central to climate change stabilization. Socio-ecological impacts have led locals, climate activists, and environmental organisations to oppose this mining project. The article case study investigates the subtle attempts made to gain social acceptance for the Savannah mine, uncovering the 'slow' social engineering strategies used by the company to penetrate rural social ties, exploit psycho-social vulnerabilities, and attempt to undermine the resistance and unity within the region.

All of these case studies arrive at a common worldview. Our economic system blurs the line between societal needs and desires, operating under the assumption that increased material consumption equates to societal benefits, as is highlighted in the Portuguese case. It presumes that everyone aspires to own a private vehicle, with projections from the IEA assuming a doubling of individual car usage by 2050, from around 1.2 billion vehicles to almost 2 billion. It also assumes a universal desire for the latest consumer electronics, driven by the push for widespread digitalisation, and an expectation that the defence industry must expand in parallel with economic growth. This viewpoint fails to consider the nuanced differences between societal essential needs and fabricated societal wants through public relations and advertising industries for example. These assumptions are fuelled by demand projection models that predict an annual economic growth rate of 3%, leading to increased material consumption to meet energy and consumer demand that this 3% assumption entails. With six of the nine planetary boundaries already crossed, these assumptions create a self-fulfilling prophecy of never-ending material extraction. These assumptions also allow for the sacrifice of indigenous lands, rivers, old-growth forests, and agrarian lifestyles, as well as the continuation of hidden neocolonial material flows from the Global South to appear acceptable, all to feed the supposed low-carbon infrastructures and digital technologies. These models essentially generate the belief that it becomes acceptable to destroy the planet to save the planet. A greater contradiction can hardly be found.

Transitioning away from fossil fuels is undeniably crucial, but it poses significant challenges. Without strong societal support for this shift, the project may exacerbate existing ecological challenges they are supposed to address. While lower-carbon energy sources are promoted as an environmentally friendly alternative, it is essential to grasp the intricacies of their processes. Without this understanding, legitimate concerns on the ground and corporate misconduct go unnoticed. It can also lead to complacency from governments in addressing such misconduct and undermine broader climate mitigation efforts. To drive meaningful change, we must comprehend how extractive processes unfold within our societies, especially if they give the illusion of "clean" and "green." Understanding green extractivism is an effective tool to avoid false solutions, to seek remedies, and to question who actually benefits from climate change and energy transition policies? How is sustainability and public funds co-opted for corporate benefit? And ultimately, what kind of transition is actually taking place? Through detailed case studies, we can shed light on these crucial questions and make informed decisions to build a more equitable and truly sustainable future.

# General Recommendations

A set of policy recommendations are presented in the conclusion to address the environmental and social challenges associated with increasing raw material demand for the green transition within the CRMA. These include:

1. The EU should reduce its reliance on primary raw materials and mitigate its critical raw materials demand through demand-side solutions, such as phasing out single-use products with critical raw materials, introducing a material passport system, and supporting material efficiency, sufficiency and substitution at the national level. Promoting cycling, walking cities, public transportation, and urban planning designed to reduce energy and re-use materials should remain an urgent policy agenda.
2. The CRMA should not depend on certification schemes, which do not ensure compliance with human rights and environmental regulations and shift state responsibility to corporate self-governance.
3. The CRMA's partnerships for EU supply security lack a global justice approach and should include concrete measures to ensure sustainability standards, civil society participation, and the protection of human rights and the environment in third countries. Partnerships should align with international agreements, implementing robust monitoring and remediation mechanisms, ensuring transparency and defining "value addition."
4. The CRMA's streamlined permitting for Strategic Projects risks bypassing environmental and social safeguards and lacks public buy-in. Streamlined permitting must not compromise environmental protection, public participation, FPIC, and Indigenous rights. Additionally, resources to licensing authorities have to be allocated, international agreements referenced, transparency ensured and a subgroup on sustainability and responsible mining within the European Critical Raw Materials Board established, where civil society can take a central role.
5. Lastly, the CRMA should prioritise a circular economy approach. This includes implementing an ambitious recycling strategy, enhancing coherence with the waste hierarchy, increasing EU recycling capacity targets, improving collection and separation of CRM-containing components, proposing recycled content targets for all CRM-containing products, incorporating measures for public procurement, and ensuring that the recovery of mining waste follows comprehensive regulations and includes plans for remediation of historical pollution.

For more detailed policy recommendations, refer to the policy recommendations section at the end of the report.

# Introduction

The unprecedented magnitude of metallic extraction poses substantial ecological hazards and compounds the challenges associated with climate change. In the last decade alone, global copper extraction has surpassed all previous levels in human history. Similarly, the extraction of nickel has already reached a scale 120% times greater than its cumulative extraction prior to 2000, while cobalt extraction has already surpassed historical levels by 150%, and lithium extraction has already soared to a remarkable 193%.<sup>1</sup> As international attention shifts to renewable energy sources such as wind and solar, increasing calls for significant expansion in mining operations to meet growing global material demand dominate energy policies.

The International Energy Agency (IEA) predicts that a rapid transition to low-carbon technologies will result in a substantial surge in demand for transitional minerals by 2050. At the global level, the IEA 2021 Clean Energy Minerals report predicts that total mineral demand<sup>2</sup> will likely increase by 200% and 400% between 2020 and 2040.<sup>3</sup> Lithium demand is expected to soar by anywhere between 1300% to 4200%, while nickel and cobalt demand will likely increase by approximately 600% to 2000%. There will also be significant but comparatively smaller rises in demand for manganese and rare earth elements (REEs), ranging from 300% to 800%. In contrast, copper demand is projected to grow by 200% to 300%.<sup>4</sup> To meet this demand, Benchmark Mineral Intelligence estimates that at least 384 new mines will need to be opened worldwide for graphite, lithium, nickel and cobalt in the next decade to cater to the mounting requirements of electric vehicles and battery storage systems<sup>5</sup>. While low-carbon technologies such as solar, wind and battery storage for decarbonisation contribute to this exponential demand for minerals and metals, other economic sectors including ICT, defence, space, and construction, contribute significantly to demand projections (see figure 1). For example, each F-35 jet has approximately 415 kg of yttrium, terbium and other rare-earth elements, mainly for advanced targeting systems, microwave emitters, lens coatings and other optical devices.<sup>6</sup>

---

<sup>1</sup> <https://www.youtube.com/watch?v=yDOrlhrMQvY&t=426s>

<sup>2</sup> Including chromium, copper, lithium, nickel, cobalt, manganese, graphite, molybdenum, platinum group metals, zinc and rare earth elements.

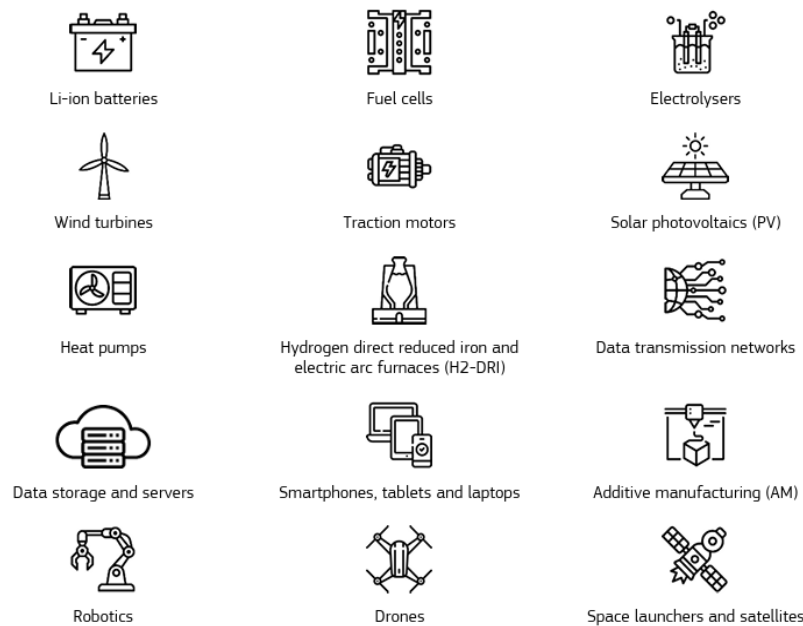
<sup>3</sup> <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>

<sup>4</sup> International Energy Agency (IEA), 'The Role of Critical Minerals in Clean Energy Transitions', Paris: IEA, May 2021, 47-48. Available at <https://www.iea.org/reports/the-role-of-critical-minerals-in-clean-energy-transitions>

<sup>5</sup> [More than 300 new mines required to meet battery demand by 2035 | Benchmark Source \(benchmarkminerals.com\)](#)

<sup>6</sup> [Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU - Publications Office of the EU \(europa.eu\)](#)





**Figure 1: Schematic representation of the fifteen technologies explored in the 2023 JRC CRM foresight study. Source: (EC, 2023)**

The EU's consumption of minerals is already at unsustainable levels. While the EU makes up only 6% of the world's population, it consumes 25-30% of metals produced globally.<sup>7</sup> In the case of cobalt, by 2030 the EU's cobalt demand for batteries will represent almost 60% of the current world supply.<sup>8</sup> The location of industrial mines for key metals poses serious risks to people and nature. About 86% of industrial mines for key metals worldwide are located in areas of high or intermediate ecosystem diversity and about a third are either inside or within 10 km of a protected area.<sup>9</sup> In addition, 54% of projects extracting clean energy minerals overlap with Indigenous lands and other lands-connected peoples.<sup>10</sup> Yet, in Europe and worldwide, the scramble for commodities is unfolding with calls to push for the fast-tracking of mining activities.<sup>11</sup> Mining proponents argue that without mining, there is no energy transition,<sup>12</sup> disregarding the possibility of a less materials-intensive transition. A common argument equates mining extraction with modernity and progress, arguing that mining has brought all the materials we use in modern societies, from those used in vehicles or smartphones and tablets, to those used in modern infrastructure.<sup>13</sup>

During the early 2000s commodity super-cycle, in which many commodity prices increased, the mining industry championed resource-driven development in the global south, celebrating its role in

<sup>7</sup> Calculated from EU Raw Materials Scoreboard 2020.

<sup>8</sup> Carrara, S., Bobba, S., Blagoeva, D., Alves Dias, P., Cavalli, A., Georgitzikis, K., Grohol, M., Itul, A., Kuzov, T., Latunussa, C., Lyons, L., Malano, G., Maury, T., Prior Arce, Á., Somers, J., Telsnig, T., Veeh, C., Wittmer, D., Black, C., Pennington, D., Christou, M., Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU – A foresight study, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/386650, JRC132889.

<sup>9</sup> P. Le Billon, Crisis conservation and green extraction: biodiversity offsets as spaces of double exception, *J. Polit. Ecol.* 28 (1) (2021).

<sup>10</sup> Owen, J.R., Kemp, D., Lechner, A.M. et al. Energy transition minerals and their intersection with land-connected peoples. *Nat Sustain* 6, 203–211 (2023). <https://doi.org/10.1038/s41893-022-00994-6>

<sup>11</sup> [Critical Raw Materials: EU ministers want to move fast but dilemmas abound – EURACTIV.com](https://euractiv.com/en/critical-raw-materials/eu-ministers-want-to-move-fast-but-dilemmas-abound)

<sup>12</sup> [Documentary “Responsible Mining in Europe”: what the experts say | Tarantula \(h2020-tarantula.eu\)](https://www.tarantula.eu/en/documentary/responsible-mining-in-europe-what-the-experts-say)

<sup>13</sup> [The Indispensable Industry: Mining's Role in the Energy Transition and the Americas \(csis.org\)](https://www.csis.org/analysis/the-indispensable-industry-mining-s-role-in-the-energy-transition-and-the-americas)

economic growth. It depicted mineral extraction as lucrative, generating tax revenue, driving infrastructure, and fostering technological advancements and societal progress. This narrative positioned mining as a key player in development strategies, promising tangible benefits for local communities within largely impoverished national economies. However, resource-driven development has locked many producing countries into a resource trap with few benefits to local communities and environmental damage that will last for generations.<sup>14</sup><sup>15</sup> In recent years, with mounting pressure to address climate change and decarbonise economies, a noticeable shift has occurred in the industry's argument. The mining sector has surreptitiously repositioned itself as a vital enabler of the energy transition. It now intends to play a critical role in providing raw materials deemed strategic—such as lithium, cobalt, and rare earth elements—for low-carbon technologies.

While ancient humans and early civilisations mined resources for their use-value, such as in the crafting of tools, weapons, and construction materials to meet immediate needs, our modern societies largely prioritise the exchange value of metals, where the extraction, production, and trade of metals are entirely market-driven, fuelled by the pursuit of economic growth and profit, with ecological impacts understood from the perspective of markets and, consequently, deemed as externalities.<sup>16</sup> This process is driven by an ideology known as *extractivism*, argued by Eduardo Gudynas as the “*appropriation of natural resources in large volumes and/or high intensity, where half or more are exported as raw materials, without industrial processing or with limited processing.*”<sup>17</sup> The term originated in the Latin American context, specifically concerning natural resources and Indigenous Peoples' opposition to mining ventures. More tangibly, extractivism involves the displacement of local peoples, the division of communities, the erasure of Indigenous worldviews, the destruction of nature and the generation of health-related effects.<sup>18</sup> The environment also suffers, with large-scale degradation and monopolisation by powerful industries being key aspects of extractivism.<sup>19</sup>

Though the EU promotes a “no one left behind” approach for its green transition, the reality falls short of the rhetoric. Shattered livelihoods, disrupted communities – many of them Indigenous – and altered ecosystems are hidden behind the discourse of “clean energy” and “economic growth”. At best, the ecologies, and human lives affected by the energy transition go unnoticed amidst the focus on mineral projection demand numbers and political initiatives such as the EU's Critical Raw Materials Regulation. At worst, they are wilfully disregarded and legitimate societal concerns are labelled as “Nimbyism”.<sup>20</sup> The EU's Critical Raw Materials Regulation, which aims to secure access to raw materials by attracting investors and getting the public buy-in, is based largely on the assumption that extractive and energy-intensive development can be compatible with environmental protection.

---

<sup>14</sup> Conde, M. 2017. Resistance to mining. A review. *Ecological Economics*, 132, 80–90.

<sup>15</sup> Hicel, J., C. Dorninger, H. Wieland, and I. Suwandi. 2022. Imperialist appropriation in the world economy: Drain from the global South through unequal exchange, 1990–2015. *Global Environmental Change*, 73, 1–13.

<sup>16</sup> Bardi, U. (2014). *Extracted*. White River Junction, VT: Chelsea Green Publishing.

<sup>17</sup> E. Gudynas, *Extractivisms: tendencies and consequences*, in: Ronaldo Munck, Raul Delgado Wise (Eds.), *Reframing Latin American Development*, Routledge, London and New York, 2018, pp. 61–76.

<sup>18</sup> Marya, R. and R. Patel. 2021. *Inflamed: Deep Medicine and the Anatomy of Injustice*. New York: Picador.

<sup>19</sup> It should be noted that extractivism does not only involve mining, but rather involves the large-scale and unsustainable extraction of natural resources, which can expand to other economic activities such as logging, industrial agriculture, fishing, and oil drilling.

<sup>20</sup> [Full documentary - Responsible Mining in Europe: A new paradigm to counter climate change on Vimeo](#)

Using 'corporate science',<sup>21</sup> EU policy echoes industry marketing, further fashioning the mining industry as responsible, sustainable, and green. This phenomenon is known as "green extractivism."

This report presents a series of case studies examining the upstream segment of critical raw materials supply chains. The primary objective is to investigate the impact of the EU's promotion of "green extractivism" through policies centred on "clean energy" and "economic growth." The study seeks to understand how such promotion impacts livelihoods, communities (including indigenous communities), ecosystems, and narratives associated with the energy transition. The report sheds light on the nature of green extractivism, with a particular focus on European countries, where research has been relatively limited compared to producing countries in the global south. Three cases are analysed in Europe, specifically Portugal, Finland, and Sweden, as these countries have been extensively targeted for material extraction. For the global south, Bolivia is chosen as a case study due to its projected significant role in material sourcing in the upcoming years. All these case studies involve projects related to materials deemed as strategic for the energy and digital transitions,<sup>22</sup> which extends to the other ICT and construction sectors discussed above.

Transitioning away from fossil fuels is undeniably crucial, but it poses significant challenges. Without strong societal support for this shift, the project may be doomed even before it begins. While clean energy is promoted as an environmentally friendly alternative, it's essential to grasp the intricacies of its processes. Without this understanding, legitimate concerns on the ground and corporate misconduct go unnoticed. It can also lead to complacency from governments in addressing such misconduct and undermine broader climate action efforts. To drive meaningful change, we must comprehend how extractive processes unfold within our societies, especially if they give the illusion of "clean" and "green." Understanding green extractivism is an effective tool to avoid false solutions, to seek remedies, and to question what benefit the energy transition serves? How is sustainability co-opted for corporate benefit? And ultimately, what are we transitioning to? Through detailed case studies, we can shed light on these crucial questions and make informed decisions to build a more equitable and sustainable future.

---

<sup>21</sup> For details of 'corporate science,' or the intentional omission and manipulation of scientific research to suit the objectives and claims of extractive companies, see Kirsch, S. 2014. *Mining capitalism: The relationship between corporations and their critics*. Also see, Berkeley: University of California Press & Dunlap, A. 2023. *The Green Economy as Counterinsurgency, or the Ontological Foundations for Permanent Ecological Catastrophe*. *Environmental Policy and Science*, 39–50.

<sup>22</sup> At the time of writing this report, indium was still considered a critical raw material as part of the EU's 2020 critical raw materials list. As of 2023, indium is no longer a critical raw material, however, it is still important for the manufacturing of solar panels.

# Greenwashing Extraction: Unmasking the EU's Critical Raw Materials Regulation

In March 2023, the European Commission announced its Critical Raw Materials Regulation (CRMR), which aims to ensure the EU's long-term supply of raw materials that are deemed critical for five strategic sectors for the EU economy between now and 2030:<sup>23</sup> low-carbon technologies, electric mobility (e-mobility), industry, information & communications technology (ICT), and aerospace and defence.<sup>24</sup> The Commission argues that “*without joint and timely action, European industries and EU efforts to meet its climate and digital objectives are at risk.*”<sup>25</sup> The regulation comes as a response to the global scramble for raw materials that the world's largest economies are undertaking. It seeks to move away from China as a sourcing country to reduce trade risks, establish predictable extraction and production timelines, create new partnerships with third countries, and maintain a level playing field across the EU single market. European industries argue that shocks due to the pandemic and geopolitical conflicts have increased their operating costs and reduced the EU's strategic autonomy. Additionally, the mining industry in Europe has even gone as far as stating that the biggest obstacles to meeting the EU's demand for critical raw materials are the EU's environmental legislation and the lack of coherent permitting procedures.<sup>26</sup>

In addition to recycling targets of 15% and processing targets of 40%, the CRMR proposal by the Commission includes a target to increase domestic mining production in the EU to 10%. With the EU currently extracting only around 3% of global mining output,<sup>27</sup> this increase would mean a substantial rise in domestic mining within the next seven years. Within the European Union, the timeframe required for permitting, starting from the moment of discovery until production, ranges from approximately 10 to 15 years.<sup>28</sup> The CRMR aims to address the delays caused by project lead times and environmental safeguards that supposedly impede the implementation of projects within protected areas under the EU's Natura 2000 network, a network of terrestrial and marine protected areas mandated under EU law. The Commission, moreover, proposes the introduction of a Strategic

---

<sup>23</sup> [Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU - Publications Office of the EU \(europa.eu\)](#)

<sup>24</sup> [Strategic-Raw-Materials-for-Defence-HCSS-2023-2.pdf](#)

<sup>25</sup> [Critical Raw Materials Act \(europa.eu\)](#)

<sup>26</sup> [Europe's green dilemma: Mining key minerals without destroying nature – POLITICO](#)

<sup>27</sup> [Critical raw materials \(sgu.se\)](#)

<sup>28</sup> [2022\\_EFG\\_List\\_Top10\\_Mining\\_Opportunities.pdf \(eurogeologists.eu\)](#)

Projects framework that aims to attract investments in critical raw materials projects in Europe by expediting permitting processes through fast-tracking and “overriding public interest”, as well as by offering financial assistance to mining companies subject to a “sustainability criteria.”

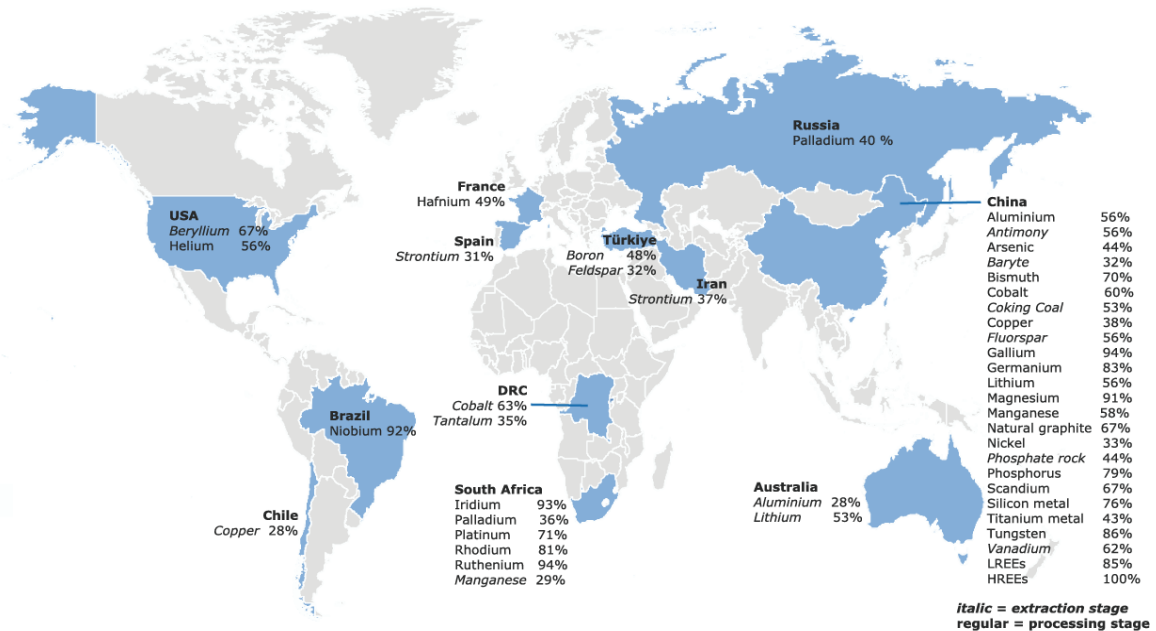


Figure 2: “Countries accounting for the largest share of EU sourcing of CRMs.” Source: (EC, 2023)

However, concerns loom over opening mines in protected areas, and how this will negatively impact biodiversity and conflict with Europe’s climate change mitigation goals. Depending on the type of mining, geological complexity and technology used, mining in protected areas will likely cause the destruction of habitats, endangering species, polluting environments, and disrupting ecosystems to different degrees. These impacts persist through air, water, and living organisms, accumulating gradually over time, and spanning long distances. Recent medical studies suggest that impacts can even result in long-term genetic effects on both humans and nonhumans.<sup>29</sup> Protected areas host unique and vulnerable species, and mining can lead to their displacement, population declines, and even extinction. The use of toxic chemicals in mining can contaminate water bodies and soil, posing risks to aquatic life and human health. Furthermore, opening mines in protected areas can fragment wildlife corridors, hindering species movement and genetic diversity.

In its recent assessment, the European Environmental Agency (EEA) cautions that Europe’s natural environment is experiencing an ongoing severe decline. The EEA findings indicate that a majority of protected habitats and species have poor or bad conservation status. Alarming statistics reveal that as much as 81% of habitats at the EU level are in a deteriorated condition, with peatlands, grasslands, and dune habitats showing the greatest decline.<sup>30</sup> While the primary causes of these negative impacts are intensive agriculture, urban sprawl, and unsustainable forestry practices, the proposed increase

<sup>29</sup> Marya, R. and R. Patel. 2021. *Inflamed: Deep Medicine and the Anatomy of Injustice*. New York: Picador.

<sup>30</sup> [Latest evaluation shows Europe’s nature in serious, continuing decline — European Environment Agency \(europa.eu\)](https://www.eea.europa.eu/en/latest-evaluation-shows-europes-nature-in-serious-continuing-decline)



in mining activities, as suggested by the CRMR, will only exacerbate the already fragile state of nature in the EU.<sup>31</sup>

## Strategic Projects and the Pressure to Fast-track Mining

The duration of mining projects, from exploration to exploitation phases, is extensive. This is primarily due to the considerable ecological and social consequences associated with mining. As argued by Owen and colleagues,<sup>32</sup> formal state approvals are often used to assess the environmental impact of projects with a fixed footprint. However, this approach may not be suitable for large-scale mining projects, which tend to have dynamic footprints that expand and intensify over time.<sup>33</sup> This can lead to cumulative impacts that are often disregarded or given lower priority by both resource developers and regulators. These impacts can occur gradually or in a "slow motion" manner,<sup>34</sup> and their consequences may not be felt until years or even decades after the initial source of impact. For example, UK scientists calculated the extent of pollution from 22,609 active and 159,735 abandoned metal mines around the world and found that around 23 million people are still affected by the legacy pollution from these mining projects.<sup>35</sup> Consequently, the permits required for such projects involve an extensive amount of paperwork. On average, the process of initiating a new mine in Europe is a time-consuming undertaking, typically spanning 10 to 20 years and demanding substantial capital investment with similar timelines across other jurisdictions. This prolonged procedure poses a concern for the EU, which, in its opinion, hinders the ability to address the increasing demand for minerals and metals. But the EU is not alone. Other jurisdictions such as Canada, Australia, the United States and many countries in Latin America, Asia, or Africa, have similarly lengthy processes, and these jurisdictions are aiming to reduce the time it takes for projects to become operational, emboldened by calls for more mining for the energy transition.

In 2020, Australia's Prime Minister announced plans to "cut green tape" to stimulate investment in mining. State governments followed suit, introducing initiatives to remove barriers to development, particularly for "new economy minerals" mines.<sup>36</sup> In Western Australia, mining companies were allowed to commence construction along infrastructure corridors while access licences were still pending. Owen and colleagues find that this allowed Fortescue Metals Group to fast-track its Eliwana iron ore mine.<sup>37</sup> The researchers also find that to boost economic output during the covid recovery, other jurisdictions such as South Africa and the Philippines are both taking steps to boost their mining

---

<sup>31</sup> <https://www.worldwildlife.org/threats/deforestation-and-forest-degradation>

<sup>32</sup> Owen, J.R., Kemp, D., Harris, J., Lechner, Alex. M., Lèbre, Éléonore. (2022) Fast track to failure? Energy transition minerals and the future of consultation and consent, *Energy Research & Social Science*, vol. 89, p. 102665. <https://doi.org/10.1016/j.erss.2022.102665>

<sup>33</sup> G. Banks, Little by little, inch by inch: Project expansion assessments in the Papua New Guinea mining industry, *Resource Policy* 38 (2013) 688–695, <https://doi.org/10.1016/j.resourpol.2013.03.003>.

<sup>34</sup> R. Nixon, *Slow Violence and the Environmentalism of the Poor*, Harvard University Press, Cambridge, MA and London, England, 2011, <https://doi.org/10.4159/harvard.9780674061194>.

<sup>35</sup> [Impacts of metal mining on river systems: a global assessment | Science](#)

<sup>36</sup> [Water and the Environment Department of Agriculture, Congestion busting assessments protecting our environment and our economy, Ministers, 2020.](#)

<sup>37</sup> Owen, J.R., Kemp, D., Harris, J., Lechner, Alex. M., Lèbre, Éléonore. (2022) Fast track to failure? Energy transition minerals and the future of consultation and consent, *Energy Research & Social Science*, vol. 89, p. 102665. <https://doi.org/10.1016/j.erss.2022.102665>

industries with plans to shorten permitting procedures. South Africa's Department of Mineral Resources and Energy plans to increase mining's GDP contribution by halving the processing time for mining licenses. The Philippines lifted a decade-long ban on new open pit mines in April 2021, when President Duterte signed an executive order to enable the reopening of the country's large-scale mining industry. Political discussion in the US is also brewing over the need to establish a mining permitting reform, with a similar argument that mine permitting takes an excessive amount of time and should be streamlined.<sup>38</sup> However, considerable backlash on the mining reform has also arisen. US based NGO Earthworks argues that according to the Government Accountability Office, one of the main causes of delays in mine permitting is the inadequacy or absence of crucial information in mining companies' plans. Another significant factor is the constrained budgets of the permitting agencies, namely the Forest Service and the Bureau of Land Management, which have faced years of funding reductions.<sup>39</sup>

In Europe, the European mining sector is vocal about the time it takes to initiate projects. For years, mining companies have criticised “red tape” and lengthy permitting procedures as a major obstacle hindering mining projects in the EU. In a white paper sent to Commissioner Thierry Breton and Vice President of the European Commission, Maroš Šefčovič, the European mining industry stated that the “*European metals companies...report delays and complexities for receiving their environmental operating permits*” and that there was a need to “*improve predictability and reduce delays for companies applying for environmental permits.*”<sup>40</sup> Improving predictability and reducing complexity and delays is one thing, but the problem extends not only to the length of the permitting process but also to the extent that environmental regulations apply and act as safeguards for environmental and social protection. In many European jurisdictions, and particularly within smaller Member States, permitting agencies lack the proper capacity to process project permits, which became clear during the REPowerEU<sup>41</sup> political negotiations.<sup>42</sup>

Through advocacy with Member States' representatives and Members of the European Parliament, the EEB also found that the lack of staff capacity and underfunding in Member States is a serious challenge for the effective administration of environmental permits for mining projects. The technical expertise required for effective oversight of environmental permits is in short supply. As mining projects are expected to increase in Europe, Member States will need to address this challenge to ensure that environmental protection is safeguarded. Additionally, recent research finds that the mining industry heavily lobbied<sup>43</sup> the European Commission during the drafting of the CRMR to include specific language (at times word for word) on not only fast-tracking mining permits but directly requiring mining projects to be considered of “overriding public interest” meaning they could trump environmental regulation such as on waste, water, and chemicals.<sup>44</sup>

---

<sup>38</sup> [Permitting Reform is the Key to a Secure Energy Future - National Mining Association \(nma.org\)](#)

<sup>39</sup> [What You Really Need to Know About Mine "Permitting" Reform - Earthworks](#)

<sup>40</sup> [eurometaux-declaration-paper-towards-a-resilient-metals-supply-for-the-green-and-digital-transitions-02092020.pdf](#)

<sup>41</sup> REPowerEU was launched by the European Commission in May 2022. The political initiative aims to reduce the EU's dependence on Russian fossil fuels by accelerating the deployment of renewable energy and energy efficiency measures.

<sup>42</sup> [Top-10-problems-for-renewable-energy-in-Europe.pdf \(eeb.org\)](#)

<sup>43</sup> [Mining-the-depths-of-influence.pdf \(friendsoftheearth.eu\)](#)

<sup>44</sup> [Ibid.](#)

## The demand-side gap

The calls to exponentially increase mineral extraction rely on numbers based on demand-projection models provided by different research or institutional bodies. Many materials are demanded by different industries (see figure 1), with these raw materials, which particularly support the increasing energy demands of European cities. Solid models serve as valuable tools for comprehending complex systems and guiding policy decisions, and they can facilitate well-informed political choices, while flawed or incomplete models can lead to self-fulfilling prophecies, exerting a substantial influence on erroneous political decision-making.<sup>45</sup> All models have biases and assumptions, and this is well reflected on projections of future raw material demand. For example, current demand projection models, such as those employed by organisations like the IEA or the Joint Research Centre (JRC), are limited. These models rely on the assumption of constant 3% economic growth, which would mean a doubling of the economy in 23 years along with the materials and energy needed to sustain it. The JRC's projections, which are in line with the EU's climate and energy goals for 2030 and 2050, predict an increase in total electricity demand within the EU. Despite the assumption of significant energy efficiency improvements, the demand is expected to rise from 2900 TWh in 2018 to 3100 TWh by 2030, and further to 6900 TWh by 2050. This surge is primarily attributed to the growing electricity requirements for electric mobility, heat pumps, and the production of hydrogen and e-fuels.<sup>46</sup>

The JRC 2023 Foresight study does offer two scenarios, a High Deployment Scenario (HDS) and a Low Deployment Scenario (LDS). The HDS scenario, takes into account a rapid deployment of technology and a combination of market shares and material intensities that result in a significant increase in materials demand. In contrast, the LDS scenario assumes a slower technology adoption rate and considers various combinations of market shares and material intensities, leading to a moderate increase or even a decrease in materials demand.<sup>47</sup> For instance, the LDS demand for rare earths in wind turbines in 2050 falls below the estimated demand for 2030 and even drops below that of 2020. When it comes to consumer electronics, the LDS foresees a significant decline in annual sales for smartphones, tablets, and laptops, which indirectly means a reduced rate at which consumers upgrade their devices. However, the LDS does not take into account behavioural change.

A KU Leuven study, funded by Eurometaux (the European Association of Metals), titled "Metals for Clean Energy: Pathways to Solving European Raw Materials Challenge"<sup>48</sup>, outlines various pillars for the EU to attain a "Clean energy system with a higher level of strategic autonomy and the right level of sustainability" by 2050. The report has become highly influential within the drafting of the CRMA. The report consists of pillars prioritizing the fulfilment of the EU's mining potential, to maximising recycling efforts, and lastly driving technological advancements and behavioural change. The precise

---

<sup>45</sup> Dunlap, Alexander. 2023. "The Green Economy as Counterinsurgency, or the Ontological Foundations for Permanent Ecological Catastrophe." *Environmental Policy and Science*, 39–50.

<sup>46</sup> Impact Assessment accompanying the Communication "Stepping up Europe's 2030 climate ambition Investing in a climate-neutral future for the benefit of our people", SWD(2020) 176 final.

<sup>47</sup> Carrara, S., Bobba, S., Blagoeva, D., Alves Dias, P., Cavalli, A., Georgitzikis, K., Grohol, M., Itul, A., Kuzov, T., Latunussa, C., Lyons, L., Malano, G., Maury, T., Prior Arce, Á., Somers, J., Telsnig, T., Veeh, C., Wittmer, D., Black, C., Pennington, D., Christou, M., Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU – A foresight study, Publications Office of the European Union, Luxembourg, 2023, doi:10.2760/386650, JRC132889.

<sup>48</sup> [KU Leuven, Metals for Clean Energy: Pathways to solving Europe's raw materials challenge, commissioned by Eurometaux, April 2022.](#)

definition of the "right level of sustainability" is of paramount importance because the absence of a clear goal could render policy recommendations misguided, ill-advised and forfeiting other policy possibilities. While the study acknowledges the potential influence of reducing the EU's raw material demand such as long-term technological advancements stemming from innovation, substitution, and behavioural change like transitioning toward a shared economy, the study regrettably does not incorporate these factors into its modelling. The study suggests that the adoption of a shared economy could yield substantial benefits, especially within the transportation sector which is responsible for 60% of the assessed metals demand. The study, again, refrains from quantifying this potential impact. This omission poses a challenge to the model's underlying assumptions, particularly those pertaining to the exponential growth in private vehicle usage, a factor shared with the IEA model, which the KU Leuven study incorporates into its analysis.<sup>49</sup>

Since raw material demand is connected to the electricity demand projections, any reduction of final energy demand would have an impact on material sourcing. Other scenarios like the Paris Agreement Compatible (PAC) scenario and the Collaborative Low Energy Vision for the European Region (Clever) scenario have calculated energy efficiency but also behavioural change based on quality of life instead of quantity of services and puts an emphasis on demand-side measures such as promoting natural thermal comfort and light, avoiding oversized cars or household equipment, etc. By taking sufficiency at the core, the Clever scenario achieves a 55% final energy consumption reduction, while also reaching 100% low-carbon sources and already achieving net neutrality by 2045.<sup>50</sup> Halving final energy consumption would inevitably reduce the need to build more mines. In a report, titled "Greenlight or Gaslight" which examines Australia's critical minerals policy suggests that the country is at risk of over-mining causing social and environmental harm and that Australia needs to tackle the "elephant in the room": demand-side projections.<sup>51</sup> Other reports conclude that having smaller batteries, driving less private car kilometres and going for innovative chemistries (such as sodium-ion) could reduce raw material demand of nickel, lithium, manganese and cobalt by around half.<sup>52</sup> Another report looking specifically into lithium and the car-dependant US, suggests that the country could reduce lithium demand by up to 90 percent through heavy investments in public transportation, maximizing recycling of batteries and smaller vehicles.<sup>53</sup>

The EU's current energy and material consumption is at critically unsustainable rates. This premise is fundamentally at odds with living within planetary boundaries. Moreover, attempts to sustain this consumption risks the setting of over-ambitious mining targets, with all the social and environmental harms that this mining would lead to both within Europe and abroad. The underlying flaw lies in the uncritical embrace of continuous growth as both desirable and feasible, ignoring the ecological and social limits that make such growth unsustainable. Exploring and taking seriously sufficiency and post-growth scenarios and policy initiatives remains fundamentally urgent to mitigate socio-ecological catastrophe.

---

<sup>49</sup> For more details on the shortcomings of the KU Leuven study, see details in Box C: [Mining-the-depths-of-influence.pdf \(friendsoftheearth.eu\)](#)

<sup>50</sup> [clever\\_final\\_report-exec\\_summary.pdf \(clever-energy-scenario.eu\)](#)

<sup>51</sup> [Latest News - Jubilee Australia](#)

<sup>52</sup> Transport & Environment. (2023). Clean and lean: Battery metals demand from electrifying passenger transport

<sup>53</sup> Thea Riofrancos, Alissa Kendall, Kristi K. Dayemo, Matthew Haugen, Kira McDonald, Batul Hassan, Margaret Slattery, and Xan Lillehei, "Achieving Zero Emissions with More Mobility and Less Mining," 2023, Climate and Community Project.

## What do we mean by green extractivism?

In recent years, there has been a growing trend of using "green" rhetoric to justify the continued extraction and exploitation of natural resources. This approach understood as "green extractivism" highlights the profit-oriented negative environmental and social impacts emerging from mining operations justified with "green" or "sustainability" claims. Dunlap and Brock define green extractivism, or "green mining," as organising "*the reconciliation of industrial destruction with social and ecological 'sustainability' in the format of the green economy.*"<sup>54</sup>

The notion of green extractivism is closely related to "green grabbing", defined by Fairhead and colleagues as "*the appropriation of land and resources for environmental ends.*"<sup>55</sup> In this context, appropriation signifies the shift in ownership, usage rights, and control of resources or land that were previously under public or private ownership, or land and resources that were not subject to ownership at all. This transfer is imposed on disadvantaged people, including marginalised and Indigenous communities, by individuals or entities in positions of power and influence, such as the state or multinational corporations. Green grabbing, in this sense, is largely associated with conservation initiatives such as fortress conservation,<sup>56</sup> or market-based conservation, i.e., carbon credits, or monoculture agriculture and forestry – thus green extractivism is not exclusive to mining but also expands to the sectors aforementioned and may include low-carbon project installation such as wind, solar and hydrological energy generation if they damage ecosystems, exclude and displace communities.

Green extractivism, therefore, represents a larger systemic structure of extractivism that is often initiated through green grabbing. For example, green grabbing can intersect with the mining sector through green economic instruments, such as "biodiversity offsets," and conservation groups collaborating with mining companies.<sup>57</sup> Biodiversity offsetting, a controversial practice that allows companies to offset the environmental impacts of their activities by investing in conservation projects elsewhere, may sound like a positive move for mining activities. However, in some cases, like in Southern Madagascar, and elsewhere<sup>58</sup>, research finds QIT Madagascar Minerals (QMM) has greenwashed biodiversity offsetting, which had resulted in a 'double land grab' to accommodate both mining activities and compensatory biodiversity offsetting, which was used to legitimize the project. This resulted in severe insecurity for the local populations, which entails military and police forces enacting violence to extract resources and displace the local communities.<sup>59</sup> Biodiversity offsetting is also pushed by some politicians and the industry as a means for compensation by the CRMA for projects particularly within nature protected areas.

---

<sup>54</sup> [\(PDF\) When the Wolf Guards the Sheep: The Industrial Machine through Green Extractivism in Germany and Mexico \(researchgate.net\)](#)

<sup>55</sup> Fairhead J, Leach M and Scoones I (2012) Green grabbing: A new appropriation of nature? *Journal of Peasant Studies* 39(2): 237–261.

<sup>56</sup> [Tanzania's Maasai appeal to west to stop eviction for conservation plans | Global development | The Guardian](#)

<sup>57</sup> P. Le Billon, Crisis conservation and green extraction: biodiversity offsets as spaces of double exception, *J. Polit. Ecol.* 28 (1) (2021).

<sup>58</sup> Le Billon, Philippe. 2021. "Crisis Conservation and Green Extraction: Biodiversity Offsets as Spaces of Double Exception." *Journal of Political Ecology* 28 (1): 864–888.

<sup>59</sup> Huff, A., & Orengo, Y. (2020). Resource warfare, pacification and the spectacle of 'green' development: Logics of violence in engineering extraction in southern Madagascar. *Political geology*. 2020.102195 102195. *Geography*, 81. <https://doi.org/10.1016/j>



A necessary tool by which green extractivism can be formulated within policymaking and society at large is through framing and messaging. Mines, but especially open pit mines, are ecologically destructive, necessitating “drilling and blasting of hard-rock, excavation and transport, a process of removing ore, in order for it to be processed.”<sup>60</sup> Mining is an inherently invasive industrial activity with severe socio-ecological consequences that often encounter a lot of resistance, as we will see below in this report. For mining activities to be scaled up, the mining industry and pro-mining proponents need to create the image that reimagines the mining sector’s role in society.<sup>61</sup> More recently, the concept of responsible mining is gaining traction, acknowledging the socio-economic impacts of the extractive sector and suggesting that mining companies require a fundamental shift. Yet, responsible mining is often discussed in terms of Environmental, Social, and Governance (ESG) performance. Extractive performance becomes the priority instead of understanding the various social, ecological, and climatic impacts that extractive projects are producing. Responsible mining, like ESG itself, lacks a common clear and widely agreed definition. Some companies narrowly focus on climate change impacts, disregarding the social and governance aspects of ESG. Others use ESG to highlight philanthropic activities or obtain a Social License to Operate, without considering the wider societal implications. These limited interpretations undermine the true essence of responsible mining and overlook important environmental and social responsibilities.<sup>62</sup> Based on the 2022 Responsible Mining Index, which assesses 250 mine sites in 53 countries, there have been minor improvements, but even the top-performing companies still fall significantly short of meeting societal expectations in areas like community well-being, working conditions, and environmental responsibility. Moreover, many companies show little progress in effectively translating their corporate commitments and standards into successful business practices.<sup>63</sup>

In other cases, mining is referred to not only as an essential sector to fight against climate change but, as international pressure increases for governments to tackle biodiversity loss, so too does the mining industry seek to remain relevant within this framework and not opposed to biodiversity. Svemin argues that “the mining industry is key to increasing biodiversity,”<sup>64</sup> arguing that the industry will contribute net-positively to biodiversity by 2030, a short time frame. However, the delicate and qualitative dimensions of ecosystems mean it is difficult to truly compensate for the environmental impacts of mining. The targets of their “ecological compensation” strategy relate to any impacts after 2020 (2020-2030), meaning that any ecological damage before this time frame is not considered. Rehabilitation and biodiversity offsetting are two common approaches, but they are often insufficient and have insoluble limits. As Systext argues, a mining site, whether rehabilitated or not, is inevitably altered from its original state and the overall balance on ecosystems and biodiversity is always negative.<sup>65</sup> It remains to be seen whether “mining for nature” can truly provide positive biodiversity impacts, though without third party monitoring, clear legislative guidelines for stiff penalties in case of wrongdoing and adequate government funds to oversee mining activities, “mining for nature” will remain another greenwashing attempt by project promoters. Nonetheless, for every “good” case that

---

<sup>60</sup> C. Chaves, E. Pereira, P. Ferreira, et al., Concerns about lithium extraction: a review and application for Portugal, *Extr.Ind.Soc.* 8 (3) (2021), 100928.

<sup>61</sup> M. Bolger, D. Marin, A. Tofighi-Niaki, et al., ‘Green mining’ Is a Myth: The Case for Cutting EU Resource Consumption, European Environmental Bureau, 2021.

<sup>62</sup> [RE-SOURCING-Briefing-Document-2.pdf](#)

<sup>63</sup> [Key Findings | RMI Report 2022 \(responsibleminingindex.org\)](#)

<sup>64</sup> <https://www.svemin.se/en/project-mining-with-nature/>

<sup>65</sup> [Rapport d'étude | Controverses minières - Volet 2 : Meilleures pratiques et mine "responsable" | SystExt](#)

mining companies may claim, there are many other “bad” cases that illustrate the painful consequences of greenwashing.<sup>66</sup>

## Methodology

The case studies presented below employ a variety of research methodologies that combine literature review, anthropological and ethnographical analysis, and on-the-ground research through data gathering and stakeholder interviews. The research begins with a literature study to provide context and understand the broader economic, social, and environmental impacts of the mining projects. On-the-ground research includes interviews with stakeholders, such as company representatives, government officials, community members, and environmental activists. The collected data is analysed to evaluate the claims made by companies and communities, assessing the project's impact on the ecosystem, community, and local cultures. This methodology yields insights into the complex relationships between mining projects, communities, and the environment, informing policy and decision-making for mitigating negative impacts and maximizing positive outcomes. For more details on the individual case studies, please see Annex 1.

---

<sup>66</sup> Vuola, M. 2022. “The Intersections of Mining and Neoliberal Conservation.” *World Development* 152: 105816. doi:10.1016/j.worlddev.2022.105816.

# Lost Lands, Lost Identity: Mega-Mining and the Sámi Indigenous Heritage

Sweden is often praised for its leadership in the green transition.<sup>67</sup> Sweden promotes itself as a main source for the EU's raw materials, currently providing more than 90% of the European Union's iron ore and demonstrating increasing national interest in opening new mines. Swedish companies and many politicians, both from former and new governments, promote a large-scale mining boom<sup>68</sup> and the Swedish State supports the sector through pro-mining policies, such as low mineral taxation and state investments in mining-related infrastructure.<sup>69</sup>

The Swedish geological survey forecasted the possibility of increasing the number of mines to 30 in 2020 and 50 in 2030. Yet, due to several mine bankruptcies owing to falling prices, and resistance against some mining projects (delaying or stopping the projects completely), the 2020 forecast did not materialise as there are currently 12 operating mines. There are now between ten and twenty advanced mining projects that are directly linked to renewable energy technologies. Most of them are located in the northern part of Sweden. Nine of them are copper projects; among them the 'Boliden's proposed huge Laver mine – analysed below. Close to the village Vittangi in the far north, the Australian company Talga Resources plans to open four graphite mines, and in the mountain region of Tärnaby, there are controversial plans to start three open pit nickel mines. These mines are largely located in the part of Sweden where there is reindeer herding and indigenous people. Additionally, there are plans for at least two iron ore mines and three gold mines, also in the northern part of Sweden. In the South, there are some exploration activities, notably two advanced iron ore projects and a controversial plan to start a REE-mine (Rare Earth Elements) in Norra Kärr, close to lake Vättern – not analysed in this case study.

In its aspiration to become a beacon of green mining, Sweden must first navigate the obstacles of public resistance that accompany the expansion of mining operations within its borders. In recent years, the emergence of mining resistance within social movements led by environmental activists, independent journalists, environmental NGOs, and Sámi Indigenous communities has seen mining expansion in the country increasingly critiqued. This resistance is poised to escalate as mining concessions increase. To create a positive narrative, Svemin, the Swedish Association of Mines, Mineral and Metal Producers started an advocacy campaign called "Den Svenska Gruvan" ["The

---

<sup>67</sup> NextGenerationEU: European Commission endorses Sweden's plan.

[https://ec.europa.eu/commission/presscorner/detail/en/ip\\_22\\_1992](https://ec.europa.eu/commission/presscorner/detail/en/ip_22_1992)

<sup>68</sup> [Sweden Chooses the Northern Swedish City Kiruna For Major EU Meeting.](#)

<sup>69</sup> Ojala, C-G & J.M. Nordin. (2015). Mining Sápmi: Colonial Histories, Sámi Archaeology, and the Exploitation of Natural Resources in Northern Sweden. *Arctic Anthropology*, Vol. 52, No. 2 pp. 6-21.

Swedish Mine”] to capture the minds and hearts of the general public who may be ambivalent about the sector’s environmental and human rights impacts. An urban and social media initiative spanning Stockholm, Gothenburg, and Malmö city centres featured a collection of billboards portraying a diverse – thus widely relatable – range of individuals participating in everyday Swedish life activities. Accompanying this campaign is a website offering comprehensive details about the economic, social, and welfare advantages, along with a FAQ section addressing inquiries about green mining.<sup>70</sup>

Looming questions remain concerning the impact of mining on Sweden's indigenous population: the Sámi. What will be the true cost of the green transition? A clash of two competing narratives emerges. The first highlights the need for mining to provide the resources to fight climate change, drive development and decarbonisation, and create jobs and tax revenues. The other casts light on the sector’s role in the vanishing of the Sámi culture, the meaning of justice within the green transition, and on the need for alternative approaches to the climate transition with a lower use of finite resources.

## Sámi indigenous population and mining

The Sami, also known as the Sámi or Saami, are an Indigenous Peoples who live in the Arctic regions of Norway, Sweden, Finland, and Russia's Kola Peninsula. Their way of life is deeply rooted in reindeer herding, fishing, and hunting. They are also the last remaining Indigenous Peoples in Europe with their own distinct language family and with a diverse and unique culture. Throughout the years their historical interactions with nation-states established on their ancestral lands have been replete with challenges. Historically, they have faced forced assimilation, discrimination, and racism at the hands of Nordic governments. Land loss to farmers and industries, oppression through racial biology, and suppression of their religion, culture, and language have scarred their history with abuses and violations; a painful legacy that continues into the present.<sup>71</sup> Reindeer herding continues to be an important activity in the area and is a fundamental practice for the survival of the Sámi culture. Herding occurs in the Northern part of Sweden in an area roughly equal to 55% of the country's surface.<sup>72</sup> Though the practice of reindeer herding is a right guaranteed by Swedish law to the Sámi people, the green transition pushes the Sámi to face the accumulated pressure from mining, logging, wind turbines and climate change. In the context of mining projects, 75% of active mines in Sweden lie within the Sami territory, known as Sapmi.

*“They talk about the green transition. But the reindeer, and we [the Sámi], are paying the price”,*  
- President of the Sirges Sámi community

---

<sup>70</sup> Löfgren, I. (2023). What would a Swedish mine be without a party? On metals, minerals, and love during the “green” transition: Climate propaganda in The Swedish Mine advertising campaign. *Nordic Journal of Media Studies*, 5(1), 194–218. <https://doi.org/10.2478/njms-2023-0011>

<sup>71</sup> Hagbom, A. 2015. *The importance of Resistance, a study of the Saami Resistance Movement Against the Swedish Mining Industry*. Bachelor’s degree dissertation, Lund University.

<sup>72</sup> Swedish website. Sámi in Sweden. Consulted on May 6, 2022. <https://sweden.se/life/people/Sámi-in-sweden>



Figure 3. A map showing Sapmi and the various Sami language groups, stretching from the north of Sweden, Norway, Finland and on the Kola peninsula in Russia. Source: [EU Minority](#).

Sámi people face legal hurdles to defend their cultural survival. Sweden has not ratified the Indigenous and Tribal Peoples Convention (1989), better known as ILO 169, which gives Indigenous Peoples the right to participate effectively in decisions that affect them directly, the right to maintain and strengthen their cultures, lifestyles, and institutions, as well as the right to Free Prior and Informed Consent (FPIC).<sup>74</sup> Sweden's neighbour Norway ratified the convention already in 1990,<sup>75</sup> and Denmark in 1996. The latest country to ratify in 2021 was Germany, which has no indigenous peoples. Though in 2007, Sweden voted in favour of the UN Declaration on the Rights of Indigenous Peoples (UNDRIP), UNDRIP is not legally binding like the ILO 169 convention. The Swedish government has faced increased pressure from international expert bodies raising concerns over the government's failure to respect Indigenous Peoples' international standards and rights in domestic legislation, notably within its Minerals Act and the Environmental Code.<sup>76</sup> While these laws mandate consultations with reindeer herders and other stakeholders, they currently do not include any explicit recognition of the Sámi people as rightful holders of their land and associated rights.

<sup>73</sup> McVeigh K. and K. Thymann. 2022. 'We borrow our lands from our children': Sámi say they are paying for Sweden going green. The Guardian.org. 10 August 2022. <https://www.theguardian.com/global-development/2022/aug/10/indigenous-Sámi-reindeer-herders-sweden-green-transition>

<sup>74</sup> Gaia Amazonas website. What is ILO Convention 169 and why it is important? Consulted on June 29, 2022. [bit.ly/3ZfmXlu](https://bit.ly/3ZfmXlu)

<sup>75</sup> Semb, A.J. 2012. Why (not) Commit? – Norway, Sweden, and Finland and the ILO Convention 169. *Nordic Journal of Human Rights*. p 122–147.

<sup>76</sup> Hagbom, A. 2015. The importance of Resistance, a study of the Saami Resistance Movement Against the Swedish Mining Industry. Bachelor's degree dissertation, Lund University.



The mining boom in the Sámi areas has also led to serious criticism from Sámi politicians and parliamentarians. During the site visits conducted under this study, among many people interviewed, the mining activities were seen as an expression of continuing State colonialism and industrial expansionism in the Sámi areas. The Sami parliament in Sweden, is a popularly elected body and an administrative authority under the Swedish government. In response to the threat of ongoing and planned explorations, it adopted a mineral policy in 2014.<sup>77</sup> The policy states that the planning of mineral exploitation in the traditional Sámi areas must be based on the principle of *Free, Prior and Informed Consent* (FPIC) stipulated in the ILO 169 Convention. The FPIC principle would enable the Sámi parliament, the affected Sámi individual right holders, and affected Sámi villages to exercise the right to say no or yes with conditionalities. The Sámi parliament argues that until the ILO 169 Convention and the Nordic Sámi Convention<sup>78</sup> have been ratified and implemented in Sweden (thereby providing a legal framework for the Sámi rights), there should be no further prospecting and exploitation of mineral resources in Sapmi. Despite the name, the Sami parliament only has an advisory and expert role on Sámi issues, and none of its resolutions are binding.<sup>79</sup>

*“The worst thing is that Swedish society says [is that we are anti-development], but it is the other way around because we stand for [true sustainable development] with nature. We depend on nature, and we are part of nature. We see climate change from up close, and we do not think more mines or wind turbines are the answer to this crisis. We cannot destroy nature and blame it on climate change. We need to think of real solutions.*

*Of course, we need some minerals...but we [the Sámi] want to be part of the planning and say this is OK and this is not OK, and we want Swedish society and companies to respect our rights and listen to us [when we mean] No”. — Matti Blind Berg, chairman of Sámiid Riikkasearvi, the Swedish Sámi Association and reindeer herder*

## Mining impacts on Reindeer Herding

In 2022, UN human rights experts urged the Swedish government not to issue a licence for an iron-ore mine in the Gállok region, within Sapmiland, stating that the open-pit mine will generate vast amounts of pollution and toxic waste, and endanger the protected ecosystems including reindeer migration.<sup>80</sup> As mineral exploitation expands, reindeer husbandry comes under immense pressure. Mining has various adverse effects on reindeer herding. Firstly, it disrupts their natural habitats by destroying grazing lands, migration routes, and calving grounds, making it challenging for reindeer herds to access food and water. Secondly, mining can lead to water pollution by releasing chemicals and heavy metals into water sources, which is harmful to both reindeer and the people who rely on

---

<sup>77</sup> Sametinget, 2014. Minerals and mines in Sapmi, the viewpoint of the Swedish Sami Parliament. Available online at: <https://www.sametinget.se/mining>

<sup>78</sup> The Nordic Sámi Convention aims ‘to confirm and strengthen such rights for the Sámi people as to allow the Sámi people to safeguard and develop their language, culture, livelihoods and way of life with the least possible interference by national borders’ ([Article 1 of the convention](#)).

<sup>79</sup> Sametinget, 2014. *Minerals and mines in Sapmi, the viewpoint of the Swedish Sámi Parliament*.

<sup>80</sup> [Sweden: Open pit mine will endanger indigenous lands and the environment – UN experts | OHCHR](#)

clean water. Additionally, mining activities can generate dust and air pollution, which can affect the quality of the air reindeer breathe and settle on the vegetation they rely on for food. Lastly, the noise and disturbances associated with mining can disturb the natural behaviour of reindeer, as they are sensitive to changes in their environment and may avoid noisy areas, further limiting their access to essential grazing areas.

Mining also adds to the historic and current challenges and exploitation of land and water resources in the Sapmi territory. These include damming of rivers for hydroelectric power, large-scale forestry, tourism, ongoing military training and activities and the construction of wind-power parks, roads and other infrastructures. *“The herders’ biggest challenge now is to get enough food for the reindeer, to find connected grazing areas. It is [now] almost impossible to feed them from nature only,”* says one reindeer herder.<sup>81</sup> Many companies propose to solve grazing area losses and disturbances by feeding the reindeer hay and pellets and building fences, but this increases costs, stress, and workload for the herders and the risk of infectious diseases for reindeer. Moreover, such industrial farming contradicts Sámi’s culturally desired practices.<sup>82</sup>

*“When you feed your herd, you need to keep it tighter together, which increases the risk for disease. It’s not that we can’t see the importance of the green deal, but its impact on us is disproportionate, and this is just the beginning. If you continue taking a little piece here and a little piece there, in the end, there is nothing left of our culture.”* — Chairman of the Ostra Kikkejaure Sámi village



Figure 4: Sámi child feeding a reindeer. Photo credit: Nikola Johnny Mirkovic/unsplash.com

<sup>81</sup> McVeigh K. and K. Thymann. 2022. ‘We borrow our lands from our children’: Sámi say they are paying for Sweden going green. The Guardian org. 10 August 2022.

<sup>82</sup> Per Liljas. 2022. The green revolution sweeping Sweden. Available at: <https://wapo.st/3C7s121>

## Mining permitting process and Sámi participation

The mining permitting process in Sweden has 6 phases (exploration, concession, environmental permit, expropriation, building and local zoning plan), as illustrated in Figure 5. Sámi communities lack influence and an official role within the negotiations and juridical process of the establishment of a mining operation. Raitio and colleagues describe the Swedish mining permitting process and conclude that the first 3 phases (exploration, concession, environmental permits) are particularly crucial for Sami rights as these phases offer the best opportunities to influence decisions that affect their use of the land. Subsequent phases (expropriation, issuance of building permits, and establishment of local zoning plans) encompass choices related to compensation and other issues. However, by this juncture within the authorization process, space for influence is heavily diminished as important determinations regarding the acceptability and ranking of distinct land uses have already been established.<sup>83</sup>

There are limits, for example, the exploration permit phase, is outside of Sámi herding communities' control because legislation does not provide a proper framework to influence this stage of the process meaningfully. At the concession permit phase, however, the Mining Inspectorate makes the decision to grant (or not) a mining permit. If the permit is granted, then the process continues with the Environmental permit phase, where the Land and Environmental Court provides the permits needed to operate the actual mine. Both the mining concession and environmental permit stages require the mining company to undertake separate environmental impact assessments (EIA), but the legal requirements of the two EIAs differ. For the concession phase, the mineral deposit and its immediate surroundings are considered, while for the environmental permits, a fully operational mine with adjoining infrastructure is considered.

---

<sup>83</sup> Raitio, K., Allard, C., Lawrence, R., 2020. Mineral extraction in Swedish Sapmi: The regulatory gap between Sami rights and Sweden's mining permitting practices. *Land Use Policy* 99. Available at: <https://doi.org/10.1016/j.landusepol.2020.105001>.

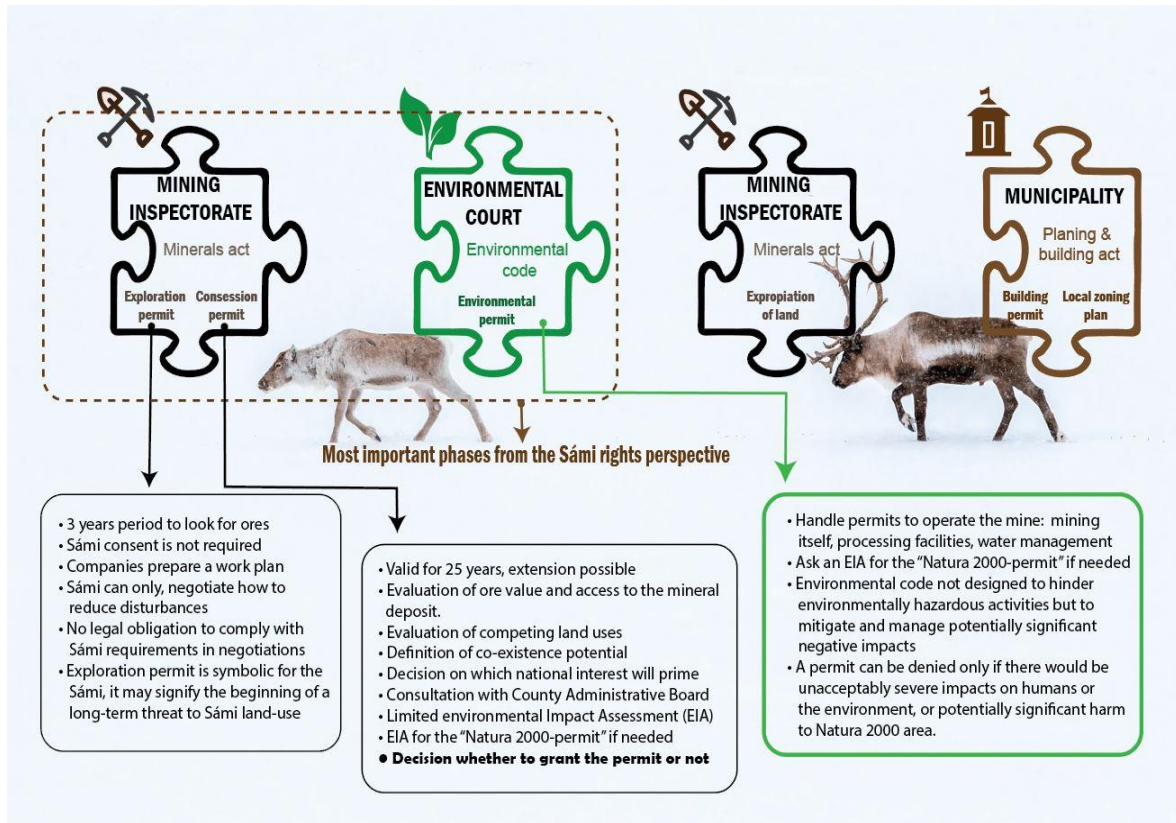


Figure 5: Phases of the permit process for establishing a mine in Sweden. Adapted from Raitio et al., 2020. Background photo, Marcus Löfvenberg/unsplash.com.

This process includes a major flaw in that it is only with the second EIA (for the environmental permit) that the impact of the mining project on the Sámi and the environment is fully assessed. Far too late in the process. Moreover, once a mining permit is granted, it cannot be reassessed even if the impacts on Sámi land use or the environment are worse than anticipated in the concession phase. There are six other major flaws can be identified in the process:

1. There is the mistaken assumption that reindeer herding can co-exist with mining, with only minor efforts from herders.
2. The impact assessment is limited to the environment, not requiring social, cultural or cumulative impact evaluations.
3. When balancing opposing land uses concerning the mining concession, Sámi reindeer herding is treated as an "industry", not a practice or a "Sámi right".<sup>84</sup> Formulating reindeer herding as an industry makes it compete with minerals extraction, where (in GDP terms), mining is more profitable for the state to exploit, notwithstanding the great difference in environmental impacts between the two activities.
4. Mining disturbance zones are often underestimated, potentially having environmental impacts that are larger than officially reported, with impacts potentially extending at least 10 km from the mine and 1.5 km from the roads that are used to connect the mines with the processing plants or other users.<sup>85</sup>

<sup>84</sup> Larsen, R. K., Raitio, K., Stinnerbom, M. and Wik-Karlsson, J. 2017. *Sámi-state collaboration in the governance of cumulative effects assessment: A critical action research approach*. Environmental Impact Assessment Review. 64.

<sup>85</sup> Sonter, L. J., D. Herrera, D.J. Barrett, G.L. Galford, C.J. Moran & B. S. Soares-Filho. 2017. *Mining drives extensive deforestation in the Brazilian Amazon*. nature communications. DOI:10.1038/s41467-017-00557-w



5. There is a lack of involvement of the Sámi as specialists and knowledge carriers. The state and policymakers carry more weight and authority while having less local knowledge.<sup>86, 87</sup> This is in despite of the fact that the Convention on Biological Diversity states Indigenous Peoples traditional knowledge should be included within decision making processes.
6. There is a mismatch between impacts, compensation, and benefit sharing, in which local people tend to lose out.<sup>88,89</sup>

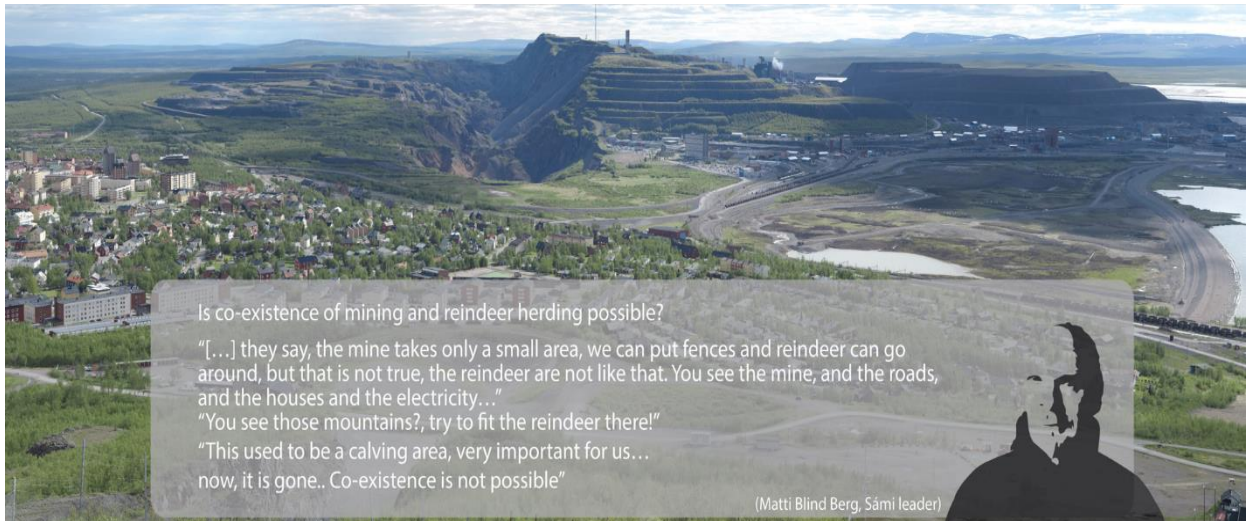


Figure 6: LKAB mine at Kiruna, Sweden. Background photograph by Alexandar Vujadinovic distributed under a CC BY-SA 3.0 licence.

## Current mining projects in the Sapmi

There are currently around 10 to 20 advanced and semi-advanced mining projects in Sweden in the territory used for reindeer herding. About two thirds of these projects are related to the green transition. Some of the projects are described in the following paragraphs to illustrate the conflicts for the Sámi on the ground.

<sup>86</sup> Lawrence R and Larsen RK. (2017) The politics of planning: assessing the impacts of mining on Sámi lands. *Third World Quarterly* 38(5): 1164-1180.

<sup>87</sup> Lawrence, R. and Kløcker Larsen, R. 2019. *Fighting to Be Herd: Impacts of the Proposed Boliden Copper Mine in Laver, Älvsbyn, Sweden for the Semisjaur Njarg Sámi Reindeer Herding Community*. SEI Report, April 2019. Stockholm Environment Institute, Stockholm.

<sup>88</sup> Larsen, R.K. & Boström, M. & District, Muonio & District, Vilhelmina & District, Voernese & Wik-Karlsson, J. 2022. *The impacts of mining on Sámi lands: A knowledge synthesis from three reindeer herding districts*. *The Extractive Industries and Society*. 9. 101051. 10.1016/j.exis.2022.101051.

<sup>89</sup> Larsen, R. K., Raitio, K., Stinnerbom, M. and Wik-Karlsson, J. 2017. *Sámi-state collaboration in the governance of cumulative effects assessment: A critical action research approach*. *Environmental Impact Assessment Review*. 64.



## The Rönnbäcken nickel project

In 2010, Nickel Mountain company, now known as Blue Lake Mining Group, received approval to mine nickel in Rönnbäcken, Västerbotten County, in northern Sweden, a mountainous region south of Tärnaby ski resort. The project is considered as Sweden's, and one of Europe's largest known nickel resources, predicts a production of 23,000 tonnes of low-grade nickel, 660 tonnes of low-grade cobalt and 1.5 million tonnes of iron per year for 20 years from three open pit mines. The mines would occupy an area about the size of central Stockholm (32 km<sup>2</sup>) and, because the nickel ore is low-grade (0.18%), extraction would produce a massive amount of waste. Finding a place for the tailings pond has been challenging for the company and currently the closest options for storing mining waste are hydropower dams or a nearby mountain, which will pose heavy ecological consequences.

*"The mine would be in the central part of the grazing area that we use all year. For example, it will be more difficult to reach the Gardfjället area east of the mine. To reach the calving areas we will have to pass by the mine. It will be difficult to keep the present number of reindeer, which is the basis for the economy of the reindeer herding trade in the Sámi village", says a member of the board of the Vapsten Sámi village.*

The Vapsten sameby<sup>90</sup> (Sami village) uses the area for reindeer herding and opposed the mining plans from the beginning. Environmental groups also oppose the Rönnbäcken mine, which would be located close to the river Umeälven and its estuary in Umeå City, and locals are concerned over impacts on the nearby ecosystems and the populations if the river became polluted.<sup>91</sup> In August 2013, the government granted the mine a permit. The decisive argument was that the mine would provide at least 500 jobs and 115 million crowns (about 10.5 million euros) in local tax revenue. Nevertheless, when national interest areas for minerals and reindeer herding overlap, Chapter 3 of the Swedish Environmental Code stipulates that the activity that best contributes to longer-term sustainable development should have precedence.<sup>92</sup> The government decision mentioned that the project met "Sweden's obligation under international law."<sup>93</sup> However, seven years after the government's decision, the UN committee on racial discrimination investigated the decision and found that it violated the UN rules on the rights of Indigenous Peoples. The UN body recommended that "the State provide an effective remedy to the Vapsten Sámi reindeer herding community (RHC) by effectively revising the mining concessions after an adequate process of Free, Prior and Informed Consent."<sup>94</sup> The Swedish State claims that the Sámi have been consulted and did not accept the UN committee's criticism.<sup>95</sup>

---

<sup>90</sup> A sameby or Sámi village, is a Sami reindeer-herding and economic district.

<sup>91</sup> [Rönnbäcken Nickel Mine, Västerbotten, Sweden | EJAAtlas](#)

<sup>92</sup> Tarras-Wahlberg, H. and J. Southalan, 2021. Mining and indigenous rights in Sweden: what is at stake and the role for legislation. *Mineral Economics* 35:239-252.

<sup>93</sup> "Överklaganden av bergmästarens beslut om bearbetningskoncessionerna Rönnbäcken K nr 1 och Rönnbäcken K nr 2, samt Rönnbäcken K nr 3 i Storumans kommun, Västerbottens län", decision of the Swedish government, 2013-08-22.

<sup>94</sup> "Sylvass FN-kritikmot Sverige: Dra tillbaka tillståndet för nickelgruvan Rönnbäcken", *Dagens Nyheter*, 2020-12-08.

<sup>95</sup> [United Nations Committee on the Elimination of Racial Discrimination \(CERD\), 2020](#). Opinion adopted by the Committee under article 14 of the Convention, concerning communication No. 54/2013 (Regarding Sami rights in Sweden in Rönnbäcken).

Despite arguments over the project's economic benefits, the permit decision is questionable. The previous company, Nickel Mountain Group, went through several financial crises and was involved in financial scandals. The mining permit changed hands numerous times between various companies. The present owner, Blue Lake Mineral, supported by a rapid rise in nickel price, has restarted the work on the project and at the time of writing was planning on applying for an environmental permit.<sup>96</sup> The mining permit is valid until 2037, which means that there is long-term insecurity for both present and coming generations of reindeer herders. Moreover, according to an interviewed Sami leader, the Rönnbäcken mine is not the only industrial project that is planned on the land used by the Vapsten Sámi village. There are plans for the Fäboliden open pit gold mine and many wind farms.

### The Jokkmokk/Kallak iron ore mine

While iron is not an energy transition mineral in most estimations, it is used in various energy-related technologies. Though most of the iron uses go towards steel production, and the automotive and construction sectors, the metal is positioning itself as an important metal also for the energy transition. For example, iron and its alloys are commonly used in the construction of low-carbon energy infrastructure such as wind turbines and solar panels. The Gallok iron mine is a particularly important project within the analysis of green extractivism as the project creates a precedent for the mining industry in Sweden<sup>97</sup> and is being advertised as a mine for the green transition despite iron not being part of the EU's strategic/critical raw materials list.

For more than ten years, the small British company Beowulf Mining and its subsidiary, Jokkmokk Iron, had advanced a plan for an iron ore mine in Norbotten County in Swedish Lapland. The Kallak project, or Gallok in Sámi, is located 40km west of the Jokkmokk municipality, which is an area where Sámi people herd reindeer. The project had become highly controversial, coming to national attention when the mine was blockaded by Sámi people and environmental activists for several months in the summer of 2013.<sup>98</sup> The Jåhkågasska Sámi village is directly affected by the mining plans and the land of the Sámi village is a narrow strip along the Lilla Lule River. It is along this strip that the reindeer are moved between the winter grazing areas in the forests to the summer lands in the mountains. The road where the iron ore will be transported to the railroad in Jokkmokk follows the same stretch. The Sámi villages in the area and the Sámi parliament sharply opposed the planned mine from the beginning. The opposition continued with civil society mobilisation, the Swedish national church, and the Swedish climate movement, with Greta Thunberg joining the resistance.

---

<sup>96</sup> "Elbilen och jakten på metallerna", Arne Müller, 2019.

<sup>97</sup> [Nine years later: Decision on the Kallak mine - Svemin](#)

<sup>98</sup> "Smutsiga miljarder", Arne Müller, 2014.

# Thunberg protests against Sweden iron mine on Sámi land

EURACTIV.com with AFP 7 feb. 2022

Advertis



Greta Thunberg joined local Sámi activists for a manifestation in Gállok. [GretaThunberg / Twitter]

Figure 7: Greta Thunberg among activists protesting the Gallok mine. Source: Euractiv

## EURACTIV Memb

AFEMS - Association of Eur  
APPLIA - Home Appliance E  
BSEF - The International Br  
CEPI - The Confederation c  
Citeo  
CO2 Value Europe  
COGEN Europe  
EBA - European Biogas Ass  
ECI - European Copper Inst  
ENTSO-E - European netw  
EURIMA - European Insulat  
EUROFER - The European S  
Euroheat & Power  
European Aluminium

Norrbottn County's County Administrative Board (CAB) opposed the project, while Bergsstaten, the state authority responsible for mining, wanted to grant the concession. As a result, the government had the final say. Following more than four years, the government ended up granting the mining permit on 22 March 2022, despite strong mobilisation against it. This land is classified as a national interest area for mining and reindeer herding. By its decision, the government places economic interests of mining above the cultural and low-carbon activity of reindeer herding. The government's decision came with conditions that the company must comply with to reduce its impact on reindeer herding. For example, the company should cover all the costs for the Jåhkågasska tjiellde that are caused by the mine (such as additional feeding of the reindeers and transport of reindeers with lorry). Also, fencing, and other measures are needed to reduce the possibility of reindeer being killed on the road. During the construction of the mine, the work must be carried out during periods of the year when reindeer herding is minimally disturbed.<sup>99</sup> Beowulf Mining claims that mining and reindeer husbandry can co-exist at Gállok, while the involved Sámi consider it inherently contradictory.

Beowulf Mining which is planning to start an iron ore mine in Kallak in the Jokkmokk municipality. In its press releases and letters to the government, the company tries to link itself to the plans for hydrogen-based steel production in northern Sweden, known as Hybrit. For example, in a letter to the Swedish minister of industry, Karl-Petter Thorwaldsson, the CEO of the company, Kurt Budge, wrote that the company has "developed a mining project which could play a key part in the sustainable, diversified, and secure supply of high-quality iron ore to 'Norrbottn's fossil-free steel sector for decades to come". However, there is no connection. The new steel mill will use iron ore pellets, while the Kallak mine will produce fines (a fine-grained powder of concentrated iron ore). The

<sup>99</sup> "Information gällande beslutet om bearbetningskoncessionen Kallak K nr 1", website of the Swedish government, 2022-03-22.

iron ore used in the Hybrit project will actually come from Canada and Brazil, where iron mining is heavily impacting the amazon rainforest and indigenous peoples.<sup>100</sup>

On the political level, there is a general consensus between the social-democratic government and the right-wing opposition about a pro-mining agenda. Several governmental investigations are going on in the permitting process for mines. It is likely that there will be new rules and legislation introduced in the coming years that will make it easier to start a mine. On this point, both the social democrats and the opposition parties have made it clear that it should be possible to open mines in areas under environmental protection,<sup>101</sup> echoing the overriding public interest measures of the EU's CRMA.

Before the government made its decision, UN experts on human rights and indigenous rights criticised the lack of consultation with the Sámi people. After the decision, the UN Committee on Racial Discrimination condemned the decision and requested the government to consider withdrawing it.<sup>102</sup> As of writing of this report, the Sami communities have appealed the favourable decision for the mine and have taken the case to the Swedish Supreme Administrative Court.

## The Laver copper mine

Copper is a base metal that is used in many modern technologies, and used in many applications that are associated with the energy transition, including electricity networks, electric vehicles and consumer electronics, but also highly used in the construction sector. The highly malleable and conductive metal was consumed around the world in a measure of 20 million metric tons (Mt) in 2020. In 2023, the EU denominated copper as a strategic raw material, due to its importance in industries it deems critical, including supply concerns and geopolitical factors such as the EU dependence on third countries. The global demand for copper is poised to grow significantly, from around 30 million Mt in 2020 to 45 Mt by 2030, and as high as 70 Mt by 2050. This anticipates a substantial 51% upswing in projected demand, contrasting the historical growth rate of 2.4% spanning 1990 to 2020.<sup>103</sup> The EU already consumes 20% of the world's copper production and its appetite for the metal is also set to rise, with an estimated increase from 4.3 Mt in 2020 to 5 Mt in 2030, and 6 Mt in 2050. Specifically, the EU's energy transition under the business as usual modelled scenarios scheduled for 2030 is projected to necessitate 1.25 Mt of copper.<sup>104</sup>

In 2013 the mining company Boliden discovered a mineral resource containing more than one billion tons of copper, silver and gold at Laver, in the municipality Älvsbyn and located within the reindeer management area Semisjaur-Njarg Sámi community. The metal content for the project was exceedingly minimal – 0.2 % copper, 3 gram/ton silver and 0.1 gram/ton gold. The proposed annual production in the mine would be 36 million tons, and the area needed for the mine, tailing pond, waste rock, and concentrator would be about 49km.<sup>2</sup> Norrbotten's county administrative board (CAB) rejected the company's application for a mining permit in 2015. The reasons for this action were twofold: the first being the effects on reindeer herding and the second being the mine's intrusion in

---

<sup>100</sup> [Iron Will: Global Extractivism and Mining Resistance in Brazil and India: Markus Kroger - University of Michigan Press on BibliOpen.org](#)

<sup>101</sup> "Mineralpolitisk granskning 2022", Svemin.

<sup>102</sup> "Ny skarp kritik från FN – vill att Sverige tar hjälp i urfolksfrågor", Dagens Nyheter, 2022-05-11.

<sup>103</sup> [Systemiq-2022.-Circular-Economy-Critical-Raw-Materials-factsheets\\_final.pdf](#)

<sup>104</sup> [metals-for-clean-energy.pdf \(eurometaux.eu\)](#)



the catchment area of the river Piteälven which is under Natura 2000 site protection. The Semisjaur-Njarg RHC oppose the project because about half of the winter grazing area with lichen would be lost (lichen is the principal food source of the reindeer). When the area is gone, a large-scale feeding of the reindeer would be necessary to compensate for the loss. According to the CAB, the company has not shown how this should be organised and how the reindeer herders should be compensated for the lost grazing area.<sup>105</sup> Furthermore, using the experience of the ongoing Aitik copper mine, one of Europe's largest mines, as a proxy, the Stockholm Environment Institute suggested the impacts of the Laver mine would be very severe.<sup>106</sup> According to the Gällivare Sámi community, the Aitik mine has forced several herders out of reindeer herding due to a shortage of pasture land. The case of Aitik illustrates how the disturbances faced by an indigenous community can surpass earlier expectations due to factors like increased traffic and expanding infrastructure. In this context, both the mine itself and its associated elements, including roadways and power lines, have the potential to expand extensively, encroaching upon progressively larger territories.

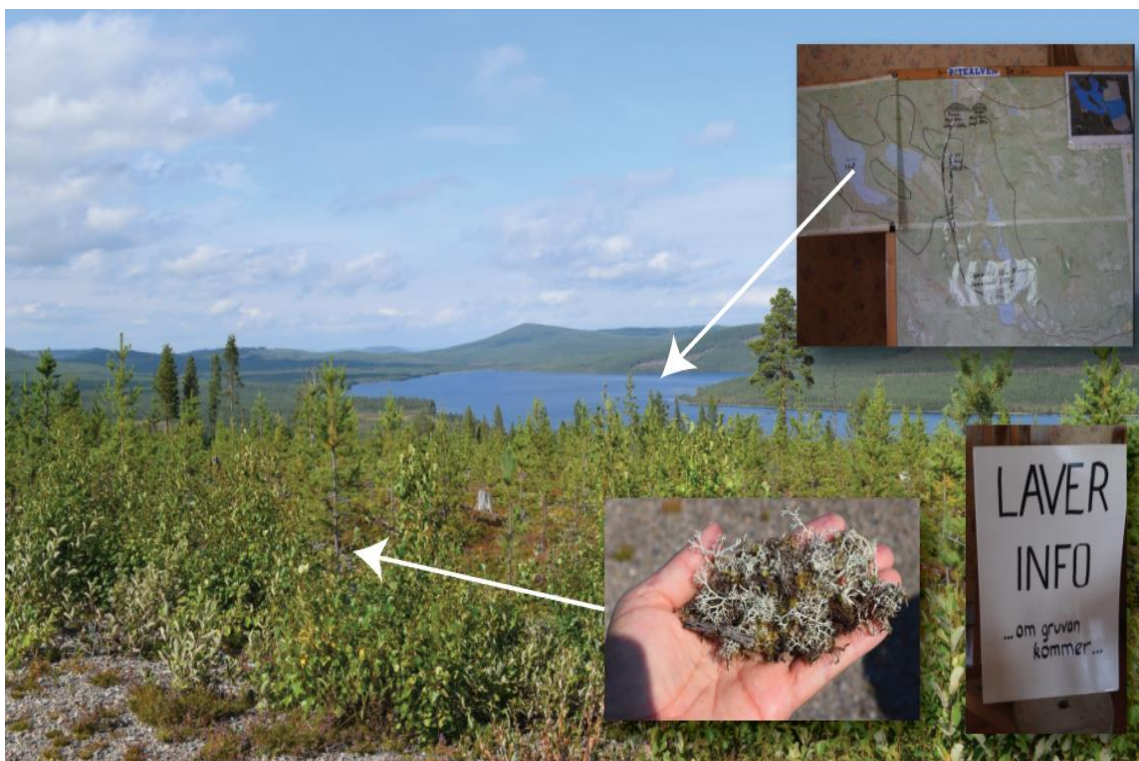


Figure 8: The area to be covered by the Laver mine, Älvsbyn, Sweden. Top right: Expected natural area directly affected by the Laver mining project. Bottom left: Pamphlet of an environmental group in Laver reading “...if the mine comes...”. Bottom centre: A hand showing lichen, the principal food for the reindeer. The laver is a lichen-rich area. Photo credit: Miljögruppen I Pite älvdal (the environmental group in the Pite river valley, Sweden).

<sup>105</sup> "Yttrande avseende bearbetningskoncessionen för Laver K nr 1", 2015-10-09.

<sup>106</sup> Lawrence, R. and Kløcker Larsen, R. (2019). Fighting to Be Herd: Impacts of the Proposed Boliden Copper Mine in Laver, Älvsbyn, Sweden for the Semisjaur Njarg Sami Reindeer Herding Community. SEI Report, April 2019. Stockholm Environment Institute, Stockholm.

Additionally, there is increasing opposition in the non-Sámi community in Älvsbyn. The Miljögruppen I Pite älvdal (the environmental group in the Pite river valley) refers to the old Boliden Laver mine, which exploited copper from 1936 to 1946 and to the dam accident that polluted the water in 1952. Dam failure or chronic leakages are recurrent in the mining industries.<sup>107</sup>

*“Before the dam break, there were fish, after the accident they disappeared for a very long time. The new mine waste dam is a giant, what would happen if it broke? Nobody can guarantee the dam will last for hundreds of years!”*, said a member of the Miljögruppen I Pite älvdal (the environmental group in the Pite river valley, Sweden).

*“My great-grandfather came here in the middle of the eighteen hundreds, since then we live here. The memories of my family, my parents, and grandparents, my own identity is tied to this place. I do not want to move, it would be very sad if I should be forced to,”* said one of the inhabitants in the area.

Both the county administrative board and Bergsstaten, the state authority for mining, demanded that the company first apply for a Natura 2000 permit, where the company must show how the mining project will affect the protected area. The company has refused to do this and appealed the decision to the government. In 2021, the government made the same decision as Bergsstaten. Boliden then appealed to the Supreme administrative court<sup>108</sup> and on 22 June 2022, the court rejected the appeal. There is a possibility that the State will change the rules concerning mining in Natura 2000-areas, since it is perceived as hindering future mining projects. The government initiated an investigation in May 2022 with the goal of moving the question of the impact of a mine on a Natura 2000 protected areas to the environmental permitting phase,<sup>109</sup> with the Swedish Minister of Trade and Industry highlighting Boliden's application for the Laver mine as an example of why the change is needed.<sup>110</sup> However, moving the environmental impact assessment only after a permit has been granted at the concession phase and delaying the Natura 2000 impact evaluation would only increase environmental risks and contribute to the violation of indigenous rights of the Sámi.

---

<sup>107</sup> [Chronology of Major Tailing Dam Failures', 1960-2022](#)

<sup>108</sup> "Boliden tar stoppat projekt till högsta instans", Sveriges television, 2021-01-14.

<sup>109</sup> "Natura 2000-tillstånd i samband med gruvverksamhet – nu utreds frågan, website of the Swedish government, 2022-05-06.

<sup>110</sup> [SVT Nyheter, 6 May, 2022. Regeringen vill se fler gruvor – kan ändra lagstiftning om Natura 2000.](#)



# Hidden “European” Indium: Unveiling Green Extractivism in Bolivia

While indium is classified as a "rare metal" (in comparison copper it is about 520 times more abundant in the earth's crust<sup>111</sup>), indium is far from scarce in the devices we encounter daily or within the realm of low-carbon technologies. Since the 1970s, the global demand for indium has grown due to the use of indium in liquid crystal displays (LCDs) and solar panels, characterised by its electrical conductivity in thin layers. For instance, the screen of the smartphone or computer through which you are likely using to read this report relies on indium-based technology.

About 65% of indium is used in the production of Indium Tin Oxide (ITO)<sup>112</sup> and, to a lesser extent, Indium Germanium Zinc Oxide (IGZO).<sup>113</sup> ITO-coated glass is also known as “conductive glass”. This conductive glass is further assembled in the displays of electronics and then assembled in end-consumer products. Though in 2020, the metal was included in the EU's Critical Raw Materials (CRM) list, in the latest CRM list, the metal is deemed neither strategic nor critical. Despite its new non-critical classification, the metal is still politically regarded as a “green” metal. Due to its properties, this metal is indispensable for producing almost any digital electronic device containing a flat panel display, including the control panel for the management of any low-carbon energy installation. Moreover, indium is necessary to produce the thin-film photovoltaic (PV) flexible panels based on the CIGS/CIS technology (Copper Indium Gallium Selenide solar cells) and in many cutting-edge solar panels that combine different coatings, such as ITO, and glass layers to reach the highest efficiencies. In recent calculations on the EU's raw materials demand for wind and PVs in the transition towards a decarbonised energy system,<sup>114</sup> the forecast is an increase in demand (up to 40 times in 2050 according to the High Demand Scenario). Many rare earth elements (REE) and rare metals, such as indium or germanium, are 100% produced as a by-product resulting from refining other more common materials, such as zinc or copper.<sup>115</sup> Approximately 95% of the refined indium produced in the world

---

<sup>111</sup> Skirrow, R. G., Huston, D. L., Mernagh, T. P., Thorne, J. P., Dulfer, H. and Anthony Senior, B. 2013. Critical commodities for a high-tech world: Australia's potential to supply global demand; Canberra, Geoscience Australia.

<sup>112</sup> Shanks, W.C.P., III, Kimball, B.E., Tolcin, A.C., and Guberman, D.E., 2017, Germanium and indium, chap. I of Schultz, K.J., DeYoung, J.H., Jr., Seal, R.R., II, and Bradley, D.C., eds., Critical mineral resources of the United States—Economic and environmental geology and prospects for future supply: U.S. Geological Survey Professional Paper 1802, p. I1–I27, <https://doi.org/10.3133/pp1802I>.

<sup>113</sup> Ronsse S. (2020) Zinc, lead, silver & indium. Linking the Bolivian minerals to the European industry.

<sup>114</sup> Carrara S., Alves Dias P., Plazzotta B. and Pavel C. (2020) Raw materials demand for wind and solar PV technologies in the transition towards a decarbonised energy system, EUR 30095 EN, Publication Office of the European Union, Luxembourg, 2020.

<sup>115</sup> Gregoir, L. (2022) Metals for Clean Energy: Pathways to solving Europe's raw materials challenge (KU Leuven & Eurometaux).

comes from the processing of zinc ores and today, there are only a few smelters and refining facilities in the world that have the technical know-how and metallurgical capacity to extract them, notable among them are facilities in Belgium and France. The metal quantities these smelting companies recover are minimal, which requires companies to accurately know where their ore supply is coming from to keep their production profitable. In other words, companies establish tracing and monitoring systems for their raw materials supply, however companies largely do not disclose this information.

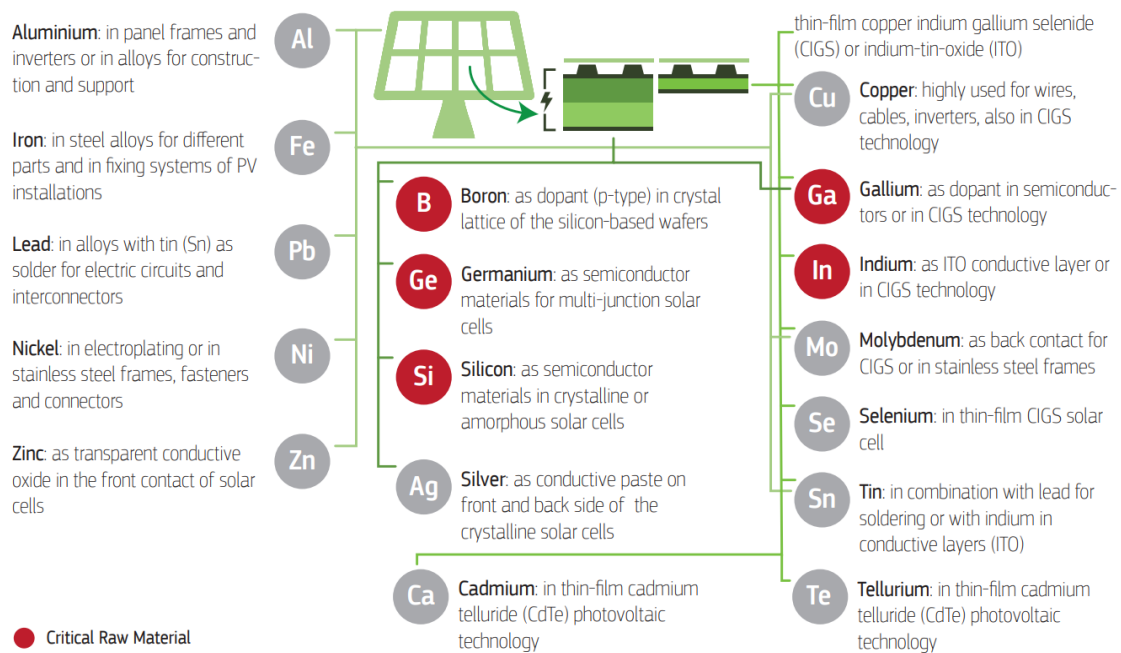


Figure 10: “Raw materials used in solar PV technologies” (European Commission, 2020)<sup>116</sup> Indium plays an important role in the manufacturing of these technologies.

## Responsible European Production?

Unlike many other CRMs, indium is regarded as having an important domestic production in the EU, which in theory minimises dependency on countries with low environmental and social standards. However, the study conducted by a Belgian civil society organisation, CATAPA, demonstrated that insourcing of indium is in fact coming from abroad, from Bolivia and other countries.<sup>117</sup> What is worse, neither the Bolivian state nor the cooperative miners are properly paid for the extraction of the metal, yet the Bolivian state and especially the artisanal miners face the environmental burdens tied to the indium material extraction. Besides the many international regulatory frameworks and voluntary industry schemes initiatives<sup>118</sup> that companies usually refer to, such as the Responsible Minerals

<sup>116</sup> European Commission (2020) Critical materials for strategic technologies and sectors in the EU - a foresight study

<sup>117</sup> Ronse S. (2020) Zinc, lead, silver & indium. Linking the Bolivian minerals to the European industry.

<sup>118</sup> [germanwatch\\_abstract\\_an\\_examination\\_of\\_industry\\_standards\\_in\\_the\\_raw\\_materials\\_sector\\_2022-09.pdf](#)

Assurance Process (RMAP), the situation on the ground is far from guaranteeing the respect of human rights and the local environment.

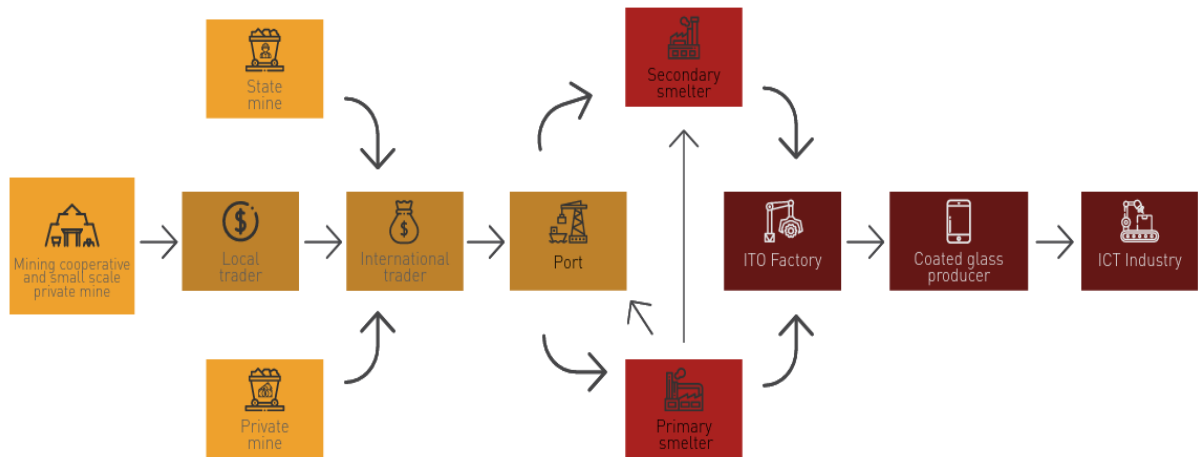


Figure 11: Summary of the supply chain of Bolivian indium bearing ore to the ICT industry. Ronsse S. (2020).

Consumer goods produced by prominent corporations typically comprise numerous intricate components that are manufactured and assembled by a multitude of subcontractors. These subcontractors, in turn, maintain a network of further subcontractors and suppliers, ultimately tracing back to the primary mineral extractors situated in mines. This intricate web of interconnected entities presents substantial challenges in attributing liability to the ultimate brand entity. On the other side of the supply chain, there are not many mines feeding each smelting company group worldwide. Although they already have the data, today, the smelters are not held accountable for what happens in their short supply chain. At the moment, there is not yet a monitoring framework in the EU to govern the raw materials sector.

Due to its by-product nature, there is scarce information about indium's mine production and the indium market is very opaque and supply chains difficult to track. Approximately one-half of the byproduct indium in the world is produced at smelters located in southern China, but the Republic of Korea, Japan, Canada, Belgium, and Peru (in order of output) also produce significant byproduct indium.<sup>119</sup> The EU registers its production within the EU's borders<sup>120</sup>, namely in France (38%) and Belgium (25%). Domestic production would mean that the EU has direct jurisdiction over due diligence measures, such as in the case of France's Duty of Vigilance Law, making French companies liable worldwide, as well as the EU's forthcoming Corporate Sustainability Due Diligence Directive (CSDDD). However, there are neither indium-rich deposits nor indium ores being mined in France or Belgium. Moreover, it is estimated that only 1% of indium is recycled worldwide from end-product

<sup>119</sup> Shanks, W.C.P., III, Kimball, B.E., Tolcin, A.C., and Guberman, D.E., 2017, Germanium and indium, chap. I of Schulz, K.J., DeYoung, J.H., Jr., Seal, R.R., II, and Bradley, D.C., eds., Critical mineral resources of the United States—Economic and environmental geology and prospects for future supply: U.S. Geological Survey Professional Paper 1802, p. 11–127,

<sup>120</sup> [European Commission \(2020\) Study on the EU's list of Critical Raw Materials – Final Report.](#)

waste,<sup>121</sup> and inside the EU, the rate for its recycling is close to 0%.<sup>122</sup> In 2019, a fact-finding mission in the heart of Bolivian highlands discovered how the EU was sourcing this indium.<sup>123</sup>

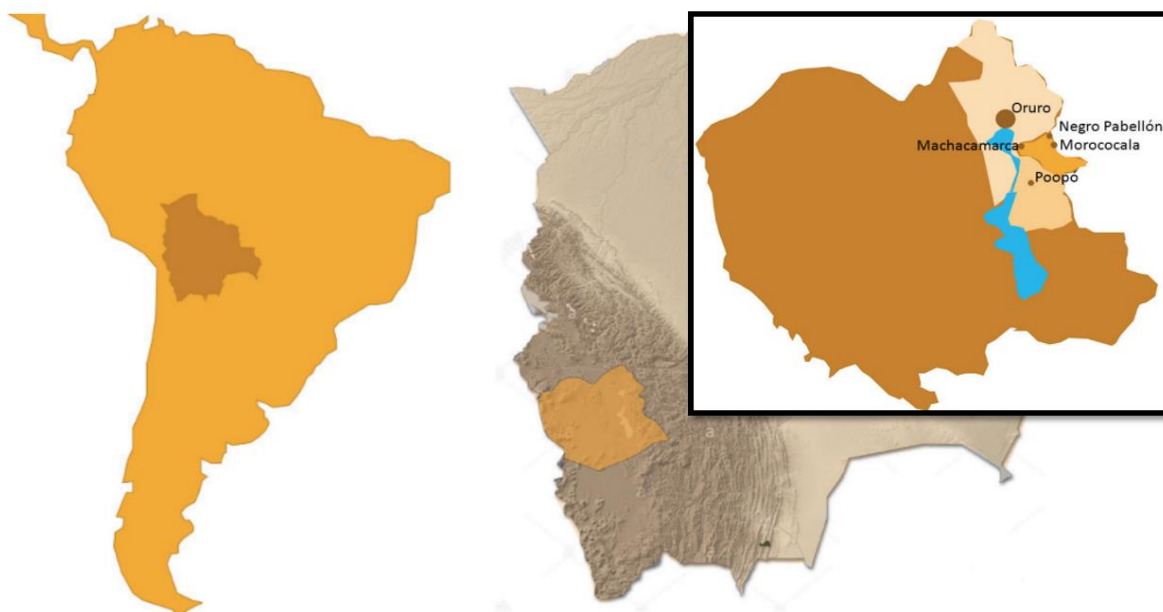


Figure 11: Location of the Oruro Department within Bolivia, South America, next to the locations of the mining cooperatives studied. ©Silke Ronsse (CATAPA).

## Bolivia's Indium and Mining Cooperatives

Mining cooperatives in Bolivia are associations of small-scale miners that collaborate to collectively extract and process minerals. These cooperatives, often operating in the informal sector, pool resources and expertise to overcome financial constraints and access equipment. However, their informal status can lead to challenges related to safety, environmental impact, and labour conditions. Despite these difficulties, mining cooperatives play a significant role in Bolivia's mining industry, providing livelihoods for many in rural areas. In Bolivia, mining cooperatives often operate with a significant degree of autonomy. The Bolivian mining law<sup>124</sup> provides a legal structure for artisanal and small-scale mining (ASM), which creates an income for around 2% of the entire Bolivian population, approximately 200,000 people.<sup>125</sup>

The six studied mining cooperatives operating in the Oruro Department consist of an amount from a minimum of 20 to up to a few hundred miners gathered as a legal socio-economic entity: the mining cooperative. The self-associated miners then divide themselves into small groups of two to six people

---

<sup>121</sup> UNEP (2013) Metal Recycling: Opportunities, Limits, Infrastructure, A Report of the Working Group on the Global Metal Flows to the International Resource Panel. Reuter, M. A.; Hudson, C.; van Schaik, A.; Heiskanen, K.; Meskers, C.; Hagelüken, C.

<sup>122</sup> European Commission (2020), Study on the EU's list of Critical Raw Materials

<sup>123</sup> Ronsse S. (2019) Towards a fairer ICT supply chain Research and fact-finding mission in the context of the project 'Make ICT Fair' in Oruro, Bolivia.

<sup>124</sup> Ministerio de Minería y Metalurgia (2014) Ley N° 353 de minería y metalurgia

<sup>125</sup> Ronsse S. (2020) Zinc, lead, silver & indium. Linking the Bolivian minerals to the European industry.

to work in each underground sub-gallery, where they extract veins rich in valuable metals with pneumatic drills and dynamite sticks. This type of work is primarily done by men. Within the cases studied there was a huge difference in the role of women. Women's limited presence in Bolivian mining cooperatives is influenced by a blend of factors: entrenched gender roles, historical male dominance in mining, perceived physical demands and risks, cultural norms shaping acceptable work, unequal access to resources, and prevailing societal attitudes that deem mining unsuitable for women. In the Altiplano region, women are usually not allowed to work in underground mines because of local cultural beliefs and superstition which view it as bad luck for women to enter a mine. Despite the barriers, some women are working as miners<sup>126</sup> and in Bolivia, the National Network of Women in Mining is an organisation created to bring women miners together and secure their recognition across the country. Yet since there is also no cultural limitation for women working outside the mines, many women rework the mining waste deposited on the surface of underground mines, as well as searching for small quantities of valuable minerals left unseen by the gallery miners. Nevertheless, this activity is significantly less profitable than the extraction in underground galleries.



**Figure 12: Miner separating zinc-silver and lead-silver minerals by gravity before their concentration, at Cooperativa Minera San José Jallpa Socavón (Oruro, Bolivia). © Silke Ronsse (CATAPA)**

The informal and small-scale nature of many mining cooperatives can make it challenging for the government to effectively enforce labour regulations. For example, health and safety regulations go unheeded, leading to significant health impacts for many miners working in Bolivia's underground mines. Miners are exposed to harmful dust, and work under extremely hazardous conditions. Consequently, health problems (respiratory problems are common, especially silicosis) and fatal accidents are frequent.<sup>127</sup> The impact produced on children's health in mining areas and the environmental impacts on surrounding areas and on downstream water bodies should not be underestimated either. Issues of soil and water pollution and concerns in local freshwater

<sup>126</sup> ["Mi nombre es Sinforosa Rodriguez, soy mujer, y también minera" - Solidaridad Latam](#)

<sup>127</sup> Ibid. Ronsse (2019)



management are frequent in the region, and these issues reinforce the migration process from decaying community-farming villages to quickly sprawling cities.<sup>128</sup>

To access the valuable metals, most cooperatives perform a first concentration of the zinc ore to increase their materials value. The concentration process is done by grinding the rock and using gravity or flotation processes where activating chemicals are added, which can be very harmful to the workers and the environment. This process separates the valuable metal-rich “mineral” from the valueless “waste rock”. By concentrating the zinc mineral Sphalerite, the indium concentration increases too. However, the miners are only paid for the minerals they find, extract, and sell. Individually or as a collective within the cooperative, the minerals are then sold to local traders (middlemen) and the analysis of the minerals’ quality is done by the local traders at the moment of the sale (see figure 11), which falls out of the miners’ control.

Due to the combination of depressed zinc prices, elevated treatment charges – which is a fee established by smelters and commodity traders internationally, which miners pay to smelters for refining the concentrate or ore into a refined end product – as well as unethical practices by certain local traders, miners are effectively receiving inadequate payment for their labour. During periods of low prices, the miners’ income might not be high enough to cover their basic needs, so further spending on occupational health and safety measures is not possible, not to mention any investment in environmental protection. Additionally, while many of the mining cooperatives are extracting tin ores and tin, none of the six cooperatives visited knew about the existence of any responsible sourcing framework or any due diligence protocol from the trading and smelting companies using their minerals. At the moment of the site visit, the cooperatives had never had any sort of international inspection, nor had they heard about any monitoring scheme.



**Figure 13: Miners leaching tin from waste rock using buddle pits directly on the soil with no further protection, in Machacamarca (Oruro, Bolivia). © Isabella Szukits (Südwind)**

---

<sup>128</sup> [Ronsse S. \(2017\) Milieumigratie op de Altiplano. Boliviaanse gemeenschappen lopen leeg.](#)



## Hidden sourcing from Bolivia

One of the sources of the French and Belgian indium production was discovered on the ground at the beginning of the supply chain by monitoring a few small mining cooperatives extracting tin ore in the Bolivian highlands.<sup>129</sup> Tin has been targeted for many years by the international regulations on Conflict Minerals<sup>130</sup> related to the so-called “3TG” (Tin-Tantalum-Tungsten-Gold). Many of these cooperative mines – and the bigger private mines operating in the same area – are not only mining tin but also silver-lead-zinc polymetallic ores. Cooperative miners are paid for the sale of tin, zinc-silver and lead-silver concentrates and their wages depend on the market price of those four metals at the selling point. This is decisive for the miners to decide on which ore type they will increase in extraction during certain time periods of price fluctuations.

The extracted minerals are rich in many other metals at lower or higher concentrations, but those concentrations are generally not economically interesting for the buyer. In the cases studied, no company was officially buying the indium content of their minerals, and none of the cooperative miners were getting paid for the indium concentration. When tracing the export of zinc-rich concentrates, it was observed that the majority of these concentrates were shipped to two major zinc – and indium – producers: Korea Zinc (South Korea) and Nyrstar (based in Budel, The Netherlands, and with plants in Balen, Belgium, and Auby, France). Remarkably, at the time of the study, official Bolivian statistics registered zero export of indium.<sup>131</sup> Bolivian mining law (law n° 535 of 2014) requires a 5% royalty to be paid by the companies to the government for the export of indium ore, which must only be paid in case the minerals have a “commercial value”. Considering indium’s economic importance, and Bolivian zinc ores contain some of the world’s highest indium content, some estimations put Bolivia as the 5<sup>th</sup> largest extractor of indium worldwide, despite the country not officially being a global exporter.<sup>132</sup> As a result, the state and people of Bolivia are extracting this material and incurring the social and environmental costs of its extraction, while countries like France and Belgium are reaping the advantages.

---

<sup>129</sup> Ibid. Ronsse (2019)

<sup>130</sup> [European Commission \(2022\) Conflict Minerals Regulation: The regulation explained.](#)

<sup>131</sup> Ministerio de Minería y Metalurgia (2019) Dossier Estadísticas del sector minero metalúrgico 1980-2018.

<sup>132</sup> [USGS Indium statistics and mineral information, 2023.](#)



**Figure 14: Heaps of waste rock (without any environmental measure applied) from different minerals at Cooperativa Minera Morococala (Oruro, Bolivia). © Silke Ronsse (CATAPA)**

Local actors involved in the zinc industry, including artisanal and small-scale (ASM) miners and local traders, lack the authority to influence the international treatment charges. Historically, these charges were intended to cover the operational expenses of the refiners. Since Bolivia does not engage in the smelting of zinc ore, and the Bolivian Ministry of Mines and Metallurgy hold no sway over these charges, these treatment charges are effectively imposed directly on the miners themselves, who represent the most vulnerable actors in the indium value chain. Given that there is no official sale of indium, there is no analysis conducted on indium in Bolivia for commercial or tax-related purposes, leading to miners receiving no compensation for the indium content, despite having actively extracted it as a zinc ore.

In 2011 alone, Bolivian miners would have missed 18 million euros for the value of the indium content exported, and another 6 million euros in royalties for the state.<sup>133</sup> Some of the world's largest commodity traders and zinc smelters are supplied with these zinc ores, particularly rich in indium. The freight is exported at Chilean ports (e.g., Arica and Iquique) after around 500km by truck. Both at the Bolivian-Chilean border and at the port terminal, the minerals' metal content is checked, and there is always a public register following up on the movement of these minerals. In 2019, around nine-tenths of the zinc minerals departing at the Port of Arica, Chile, were sold to only two companies: the Korea Zinc group (South Korea) and Trafigura group (based in Singapore and Switzerland). The latter is the world giant of the international commodity trade, which in 2019 took over Nyrstar (the second-biggest zinc smelter in the globe after Korea Zinc) using a financial operation that the Belgian media labelled as possibly "*the biggest corporate fraud in Belgian history*".<sup>134</sup> Nyrstar is the only zinc smelter present in Belgium, France and The Netherlands, so most of the zinc ore imports registered by

<sup>133</sup> Zapata Rosso A. (2018) El indio en Bolivia: muchos cerros a la izquierda.

<sup>134</sup> [Eeckhout B. \(2022\) 'De grootste bedrijfsfraude uit de Belgische geschiedenis': heeft grondstofgigant Trafigura Nyrstar gered of leeggezogen? \(De Morgen\).](#)

Eurostat must feed its metallurgical complexes. Every year around 150,000 tonnes of Bolivian zinc ore arrive at the Port of Antwerp,<sup>135</sup> Belgium, where Nyrstar has its warehouse at the Antwerp Bulk Terminal (ABT) of SEA-invest. The materials are directly weighed and analysed at arrival to determine their metal concentrations and then prepared for further shipment.



Figure 15: Nyrstar's warehouse at ABT, Port of Antwerp (Belgium). ©Alberto Vázquez Ruiz (CATAPA)

Depending on the concentrations, the low-indium zinc concentrates are further transported by freight train to Balen (Belgium) or Budel (The Netherlands), while the high-indium concentrates are shipped through waterways in smaller cargo vessels to Aubry in France, where Nyrstar built its indium refining plant in 2011. Nyrstar also constructed a plant in 2012 to process indium-rich zinc metals imported from Bolivia and other sources in Antwerp, Belgium. The company's investment hinges on maintaining a consistent supply of these minerals to keep its plant profitable. To ensure this supply, Nyrstar collaborates with Trafigura, a commodity trader, which provides batches of indium-zinc minerals. By receiving the 'bill of lading' from Trafigura, Nyrstar gains insight into the minerals' origin, initial sale by a local trader, and the route it followed before reaching the Antwerp terminal. Although the specific process might be proprietary, this practice ensures Nyrstar's awareness of the mineral's origin and journey. Besides Nyrstar, Umicore also processes and produces indium. Umicore, the world leader in cutting-edge metallurgical technologies, refines rare metals at its Hoboken and Olen plants in Belgium.<sup>136</sup> However, Umicore does not base its production on primary materials such as Nyrstar, but on secondary sourcing. In other words, it does not feed its plants with newly mined ores, but with WEEE (Waste from Electrical and Electronic Equipment) and slag (metallurgical waste) from other smelters. This is sometimes called "urban mining" or waste "reprocessing". In the Hoboken site, a sophisticated metallurgical complex (copper smelter, lead blast furnace, lead refinery, etc.) performs the extraction of small quantities of metals present in the waste materials like indium. The Hoboken complex can further refine the traces of Bolivian silver, lead, and indium still present in the waste streams from the Nyrstar plants, which extract zinc.

---

<sup>135</sup> Ibid. Ronsse S. (2020)

<sup>136</sup> The company also operates in other countries, see: <https://ums.umicore.com/en/local-presence>

# Waste Landscapes in the Green Transition: Exploring Finland's Battery Mineral Boom

Batteries are central to the EU's energy and digital transition.<sup>137</sup> The European Commission has set up enabling initiatives and huge funding to develop the battery value chain, including mining raw materials within the European Union.<sup>138</sup> On a global scale, the rise of the digital economy and low-carbon technologies, especially low-carbon mobility, will lead to a rapid proliferation of battery applications, resulting in a suspected 14-fold surge in battery demand by 2030.<sup>139</sup> The EU is planning to account for 17% of that demand and expects that there will be least 30 million electric vehicles on EU roads by 2030 under its growth-oriented model assumption. Consequently, the European Commission has put forth a regulatory framework aimed at batteries and waste batteries. This framework introduces the requirement for due diligence in sourcing raw materials for battery production. The newly established Batteries Regulation is set to be enforced from August 2023, its implementation commencing in early 2024.<sup>140</sup>

While there are 16 strategic raw materials the EU considers for its 15 strategic technologies, nickel is one of the most important materials as it is used in 14 of the 15 (see figure 1). About 70% of the world's demand for nickel comes from the stainless-steel sector as the metal is key in producing the material, nickel is also one of the principal metals in battery production due to its ability to contribute to higher energy density in batteries, allowing them to store more energy per unit of weight or volume. Nickel-based cathodes also provide good thermal stability and resistance to overcharging, reducing the risk of thermal runaway, and enhancing battery safety. The EU expects battery grade nickel to increase 20 times over by 2040 and supply concerns for the metal arise from Russia's invasion of Ukraine. Russia produces 20% of the world's class 1 nickel supply and is the main EU sourcing country for the metal. Other countries like Indonesia imposed a full ban on the export of nickel ore in January 2020, which the EU claimed unduly and illegally restricted access to raw materials needed for

---

<sup>137</sup> European Parliamentary Research Service (EPRS), 2022. New EU regulatory framework for Batteries, Setting sustainability requirements. Briefing EU legislation in progress.

<sup>138</sup> Umbach, F. 2022. Critical Raw Materials for the energy transition: Europe must start mining again. [energypost.eu](https://energypost.eu).

<sup>139</sup> [New EU rules for more sustainable and ethical batteries | News | European Parliament \(europa.eu\)](https://www.europarl.europa.eu/news/en/2023/07/15/new-eu-rules-for-more-sustainable-and-ethical-batteries)

<sup>140</sup> Regulation (EU) 2023/1542 of the European Parliament and of the Council of 12 July 2023 concerning batteries and waste batteries, amending Directive 2008/98/EC and Regulation (EU) 2019/1020 and repealing Directive 2006/66/EC [2023] OJ L 191/1 ("Batteries Regulation").

stainless steel production, distorting world market prices of the metal.<sup>141</sup> As a result, the EU is continuing to look for sources of nickel production, particularly within its borders. However, nickel remains a topic of contention due to its intricate extraction, processing, and smelting procedures, which are prone to causing pollution and demanding substantial energy inputs. Comparative analyses across raw materials show that nickel, alongside copper, stands out for its significant per-kilogram environmental effects.<sup>142</sup>

In the EU-27, only Finland and Greece are nickel producers. In 2021, Finland produced an estimated 42 thousand tonnes (kt) Ni and Greece 14 kt in 2019. Between 2020 and 2040, the compounded nickel production is expected to rise to around 60 kt, where Finland would provide about 80%.<sup>143</sup> In Finland, nickel is produced from sulphide ore deposits. Production is carried out by two companies, namely the state-owned Terrafame operating in Sotkamo and Boliden operating in Kevitsa located in Sodankylä, northern Finland. Terrafame aims to become a major player in the battery industry, but campaigners living around Terrafame are worried that expanding mining will destroy sensitive ecosystems. A major concern over battery production is not necessarily the open-pit or underground mining, but rather the billion of tons of mining waste behind each battery metal.

*"You simply cannot produce these minerals in an environmentally friendly way,"* said a member of environmental groups in Sotkamo.

144

## The Costs of Extraction: A Closer Look at Mining Waste

The mining industry, renowned as one of the world's most polluting sectors, has an alarming history of generating vast quantities of hazardous and toxic waste. Central to this issue is the colossal volume of waste produced by mining operations, often stockpiled in specialized facilities known as "tailings dams." Some of these dams reach staggering heights of over 150 meters and have the capacity to store millions of cubic meters of waste. Remarkably, these dams constitute some of the largest engineering structures ever constructed by humans, with a few even visible from space. A pressing concern arises from the enduring nature of many tailings dams. These facilities often remain in place indefinitely, outlasting the operational life of the mines they serve. Regrettably, mining companies sometimes prioritize cost-cutting over safety,<sup>145</sup> opting for riskier and less stable construction methods for tailings dams. This perilous approach places downstream communities and delicate ecosystems in harm's way. Recent research has unveiled a troubling trend—increasingly severe and frequent collapses of tailings dams.<sup>146</sup> A stark example occurred in 2019 when a tailings dam failure

---

<sup>141</sup> [EU launches consultation on use of Enforcement Regulation on Indonesian nickel export restrictions \(europa.eu\)](#)

<sup>142</sup> OECD (2018). Global Material Resources Outlook to 2060 – Economic drivers and environmental consequences. OECD Publishing.

<sup>143</sup> Fraser, J., J. Anderson, J. Lazuen, Y. Lu, O. Heathman, N. Brewster, J. Bedder and O. Masson. 2021. Study on future demand and supply security of nickel for electric vehicle batteries, Publications Office of the European Union.

<sup>144</sup> Kingsley, S., 2020. Finland's battery plans spark environmental fears. EdnHUB, AFP.

<sup>145</sup> [GTR-TZH-compendium.pdf \(globaltailingsreview.org\)](#)

<sup>146</sup> [Bowker & Chambers - Risk-Public Liability-Economics of Tailings Storage Facility Failures – 23Jul15.pdf \(csp2.org\)](#)

in Brumadinho, Brazil, resulted in the tragic loss of 272 lives and the release of a staggering 9.7 million cubic meters of waste into the Paraopeba River ecosystem.<sup>147</sup>

On average since the 1980s, the volume of mine waste tailings has doubled for each unit of mineral produced due to decreasing ore rates.<sup>148</sup> This surge in mineral and metal extraction is accompanied by a corresponding increase in mining waste. In Finland, the country's low mineral concentration within its bedrocks leads to a higher volume of waste generation. Currently, mines in the country are already responsible for over 70% of all waste and more than 90% of hazardous waste. This poses a significant challenge for Finland's waterways, which are relatively shallow and highly vulnerable to pollution.<sup>149</sup> Other concerning measures relate to Finland's national regulations not meeting the requirements of the EU's extractive waste directive, which made the Ministry of the Environment launch a two-year project on 7 March 2023.<sup>150</sup>

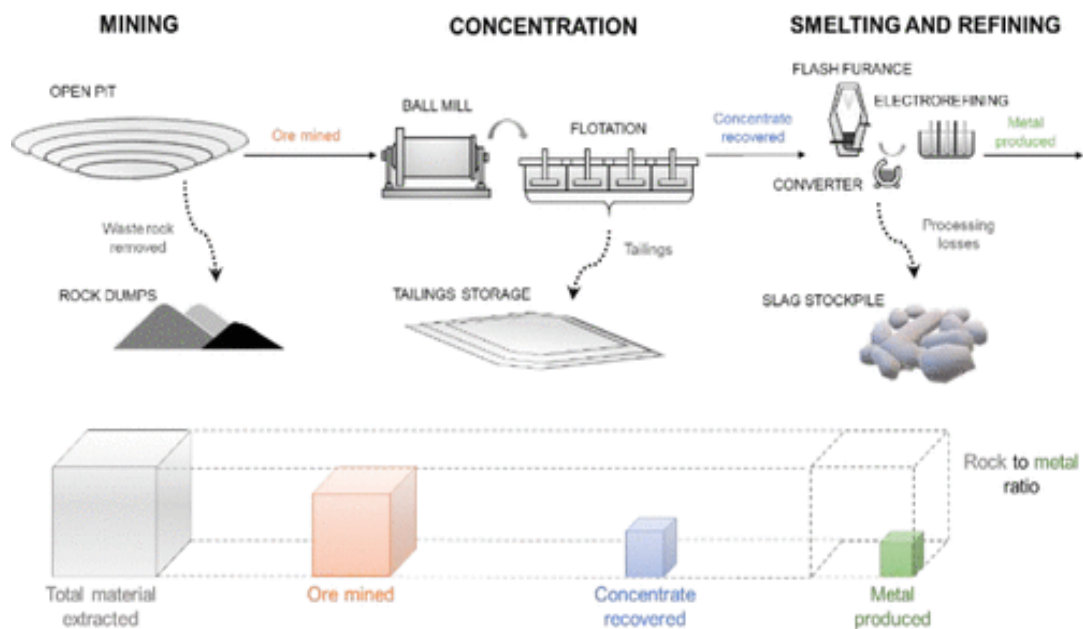


Figure 16: Rock to Metal ration (RTM ratio) and stages of mining, concentration and smelting and refining and their waste production<sup>151</sup>. RTM ratio is not specific to nickel, rather a broad explanation of what occurs in various mineral beneficiation processes.

<sup>147</sup> [Brazil's Vale Vowed 'Never Again.' Then Another Dam Collapsed. - WSJ](#)

<sup>148</sup> [safetyfirst-mainreporten-final.pdf \(miningwatch.ca\)](#)

<sup>149</sup> [The mines that the EU now wants would pollute Finland a great deal - Inari Association \(sll.fi\)](#)

<sup>150</sup> [Mininginfo Finland – Kaivosinfo – English](#)

<sup>151</sup> Nassar, N.T.; Lederer, G.W.; Brainard, J.L.; Padilla, A.J.; Lessard, J.D. Rock-to-Metal Ratio: A Foundational Metric for Understanding Mine Wastes. *Environ. Sci. Technol.* **2021**, *56*, 6710–6721.



# The Terrame Nickel Project in Central Finland

Terrafame is situated in the Sotkamo municipality, nestled in the heart of Finland's central region. Home to approximately 10,000 residents, this municipality occupies a unique position within the watershed of two significant water systems that straddle the Kainuu and Northern Savo regions. To the north, these pristine waters flow into the Oulujoki-river system, while to the south, they meander into the Vuoksi/Saimaa Lake system. The local population enjoys a deep connection with these waterways, utilizing them for travel, leisure, and fishing. This rich aquatic environment is a magnetic draw for summer tourists, with the region boasting around 100,000 summer cottages. The waters discharged from Terrafame find their way through Lake Laakajärvi before joining the Saimaa/Vuoksi waterways. This expansive catchment area is not only a regional treasure but also a cornerstone of Finland's national tourism sector. The region's abundance of lakes provides a source of pure, drinkable water. Among these, Lake Saimaa takes centre stage, renowned for its role as the habitat of the Saimaannorppa, a unique lake seal and an enduring symbol of Finnish nature conservation. Lake Saimaa generously releases its waters, eventually making their way to Russia through the Vuoksi River, further underlining the interconnectedness of these vital water systems.

The Terrafame company mines nickel in Sotkamo and recovers the metal as nickel sulphide in its production plant. The company built a battery chemicals plant to transform the nickel sulphides into nickel sulphates used in the production of lithium-ion batteries. According to Terrafame, it would produce enough nickel sulphate to supply one million electric cars per year, which equates to 37,000 tonnes of nickel annually.<sup>152</sup>

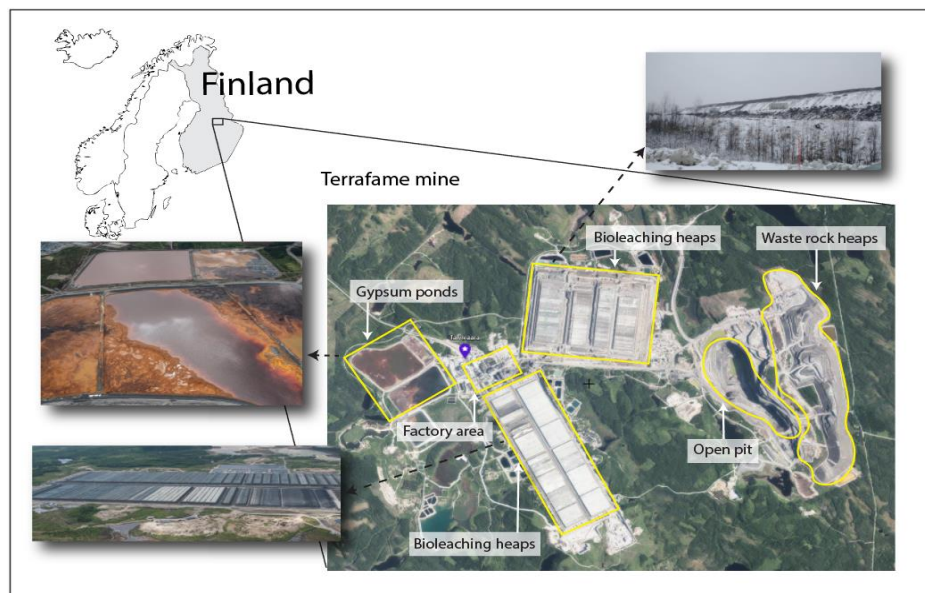


Figure 17. Localisation of Terrafame, Photo: Google Earth. Image detail photos, Anti Lankinen, Wikimedia Commons, creative commons attribution 2.0.

<sup>152</sup> See [2018 permit application page 15 second paragraph "Terrafame hakee lupaa korottaa nikkeliuotanto tasolle 37 000 t/v"](#)

## Box 1

### Background: From Talvivaara to Terrafame

In the 80s, the Outokumpu state-owned company found a potential ore in large quantities, a mineral called black schist, but the grade was poor and had very high sulphur concentrations which meant that at the time the ore was decided not to be mined.<sup>153</sup> However, in 2008, mining started as a private initiative with the operation presented as environmentally friendly and based on a novel heap bioleaching technology.<sup>154</sup> Yet, problems arose as time went by. Local communities were concerned about the deterioration of the lakes nearby, with many complaining about bad odours (like rotten eggs, typical for sulphur release). Mining activity blasts caused “mushroom clouds” of black dust that were especially visible during wintertime thanks to snow conditions. The gypsum pond (mining waste facility, see figure 16) obtained uranium, nickel, and other toxic contents. The pond had a series of leaks from 2008 to 2012, causing great environmental damage. The largest and most significant leak occurred in 2012 when approximately 1.2 million cubic meters of water and sediment, laden with heavy metals, were released, with roughly 240,000 cubic meters spilling beyond the confines of the mining area.<sup>155</sup> According to a report from Finland's State Investigation Authority, the structural integrity of the waste pond may have been compromised by previous incidents. However, the report also highlights that the company failed to conduct thorough and diligent inspections in response to these prior events.<sup>156</sup> Eventually Talvivaara went bankrupt in 2014. The following year, the State of Finland founded Terrafame to save the old Talvivaara operation. By then, the company had many water management problems, which were partially handled by building a pipeline to release wastewater into the nearby lake Nuasjärvi. However, the lake was the heart of the region's tourism industry. After the pipeline construction, the lake lost its ecological integrity, experiencing a reduction in biodiversity and in oxygen levels, and sustained a surge of water stratification, which altered the local food web.<sup>157</sup> Regrettably, commercial fishing is no longer possible and the lake's reputation of cleanliness is destroyed.

---

<sup>153</sup> Statement of professor Matti Saarnisto for the Finnish parliament  
<https://www.riksdagen.fi/El/vaski/JulkaisuMetatieto/Documents/EDK-2016-AK-44700.pdf>

<sup>154</sup> The early phase of Talvivaara. Available at:  
[https://www.nuclear-heritage.net/index.php/Talvivaara\\_mine\\_environmental\\_disaster\\_in\\_Finland](https://www.nuclear-heritage.net/index.php/Talvivaara_mine_environmental_disaster_in_Finland)

<sup>155</sup> [New Uranium Mining Projects - Finland \(wise-uranium.org\)](http://www.wise-uranium.org)

<sup>156</sup> Safety Investigation Authority Report (in Finnish). [Y2012-03\\_Tutkimusraportti.pdf \(turvallisuustutkiminta.fi\)](https://www.tutkimuslaitos.fi/tutkimusraportit/2012-03-tutkimusraportti-talvivaara)

<sup>157</sup> Luoto, T.P., J.J. Leppänen & J. Weckström. 2019. Waste water discharge from a large Ni-Zn open cast mine degrades benthic integrity of Lake Nuasjärvi (Finland). *Environmental Pollution* 255 (2): 113268.



Figure 18. Demonstration in Helsinki in relation to the Talvivaara leakage, Finland, November 14th, 2012. Photo by Heikki Kastemaa. Distributed under the Creative Commons Attribution-Share Alike 3.0. Wikimedia commons.

## Nickel production and the implications of long-term mining waste treatment

The current operating Terrafame mine runs under an established environmental permit, enabling the extraction of 18 million tonnes (Mt) of low-grade black schist deposit. Although the precise volume of waste rock, essential for accessing the ores, remains undisclosed, an estimated quantity of around 32 Mt is approximated,<sup>158</sup> but when combining the mining tailings and waste rock, Terrafame's nickel production culminates in the annual generation of nearly 50 million tonnes of mining waste.<sup>159</sup> Terrafame's waste rock presents a substantial sulphur content of 9.1%,<sup>160</sup> warranting its classification as hazardous.<sup>161</sup> Upon the completion of the metal extraction process, the resulting mine tailings demonstrate a notable richness in sulphides, significantly heightening the potential for acid mine drainage (AMD) which occurs when water and oxygen interact with rocks or waste containing sulphide minerals. This results in the generation of acidic water with elevated metal concentrations, posing risks to water quality ecosystems and drinking water. Notably, the water contained within the waste rock heaps at Terrafame holds a nickel content that surpasses hazardous waste dump

<sup>158</sup> Terrafame's Environmental Impact Assessment.

<sup>159</sup> See permit application 20.12.2018 page 14 last paragraph: "Terrafame hakee lupaa louhia 18 Mt/v malmia, sekä enimmillään 45 Mt/v sivukiveä." <https://ylupa.avi.fi/api/v1/documents/attachment/4704269>

<sup>160</sup> See 2018 permit application page 355: "Malmin keskimääräinen rikkipitoisuus on 9,1 %. Kuusilammen Ja Kolmisopen esiintymissä sivukivilajit ovat mustaliuske, metakarbonaattikivi, kiilleliuske ja kvartsiitti. Sivukivenä oleva mustaliuske eroaa hyödynnettävästä mustaliuskeesta lähinnä alhaisemman nikkeli-, kupari-, sinkki- ja kobolttipitoisuuden perusteella". 2018 mining waste plan Table 17 Table 4-13 page 29, Table 4-21 page 37, 2017 mining waste plan Table 3-2, page 3-1

<sup>161</sup> See 2018 mining waste plan "Mustaliuskeiden osalta luokitusta on muutettu KL2 sivukivialueen ympäristölupapäätöksen myötä (Ympäristölupapäätös Nro 76/2017/1). 4

standards by a factor of 30 (as indicated in Table 1). This transgression is further exacerbated when measured against acceptable benchmarks for waterways, signifying a staggering excess of 240,000 times beyond standard environmental quality levels set for lakes and rivers.

	<b>Terrafame waste rock water (2020)<sup>162</sup></b>	<b>Finnish standards for hazardous waste</b>	<b>Exceed</b>	<b>EU quality standards for Cd and Ni<sup>163</sup></b>	<b>Exceed</b>
			x fold		x fold
	(mg/L)	(mg/L)		(µg/L)	
<b>Cadmium</b>	14	0,5	28	0,1	140.000
<b>Nickel</b>	1200	4,0	300	5	240.000
<b>Zinc</b>	5700	20,0	285	8	712.500

For the mine, the waste rock is stored in heaps. The total area of the waste rock and tailings heaps is more than 10 km<sup>2</sup> (or 1500 football fields). If water spills from the heaps were to occur, they would likely be tens of thousands to millions of cubic metres. With the acid-forming potential of the waste, the waste heaps are a ticking time bomb. An acute wastewater leakage of about 10% or higher could cause immediate and catastrophic impacts in Terrafame's surrounding waterways and eventually reach the Baltic Sea.<sup>164</sup> Many streams in other regions of the world impacted by acid mine drainage have a pH value of 4 or lower – a range more akin to the acidity of lemon juice. These acidic waters create inhospitable ecosystems for plant life, sustaining animal habitats, or nurturing fish populations. The harmful influence of acid mine drainage extends beyond its low pH, as it triggers the dissolution of toxic metals such as arsenic, nickel, cobalt, and cadmium from the surrounding rock formations. These metals, even in small concentrations, pose significant threats to both human health and the survival of wildlife.<sup>165</sup> Even if there is no accident or acute leak, chronic wastewater releases are inevitable. In this case, the amount of Terrafame's waste would be enough to bring the metal concentrations in the Finnish waterways above the environmental quality standards (EQS).

<sup>162</sup> Terrafame wastewater inspection Table 3-1 2020. Waste stone dump KL2 page 53/93

<sup>163</sup> [Eu environmental quality standards.](#)

<sup>164</sup> The annual portion of the wastes for reaching the eqs norms was calculated and time for how long time the effect would last if contamination would be kept on that level, see separate long-term water report: [Natunen, J. Mining waste report, Finn. Assoc. Nat. Conserv. 2022.](#)

<sup>165</sup> [Septoff A. 2005. Acid Mine Drainage. Earthworks factsheet.](#)

## What if Terrafame's waste was distributed to the Finnish population?

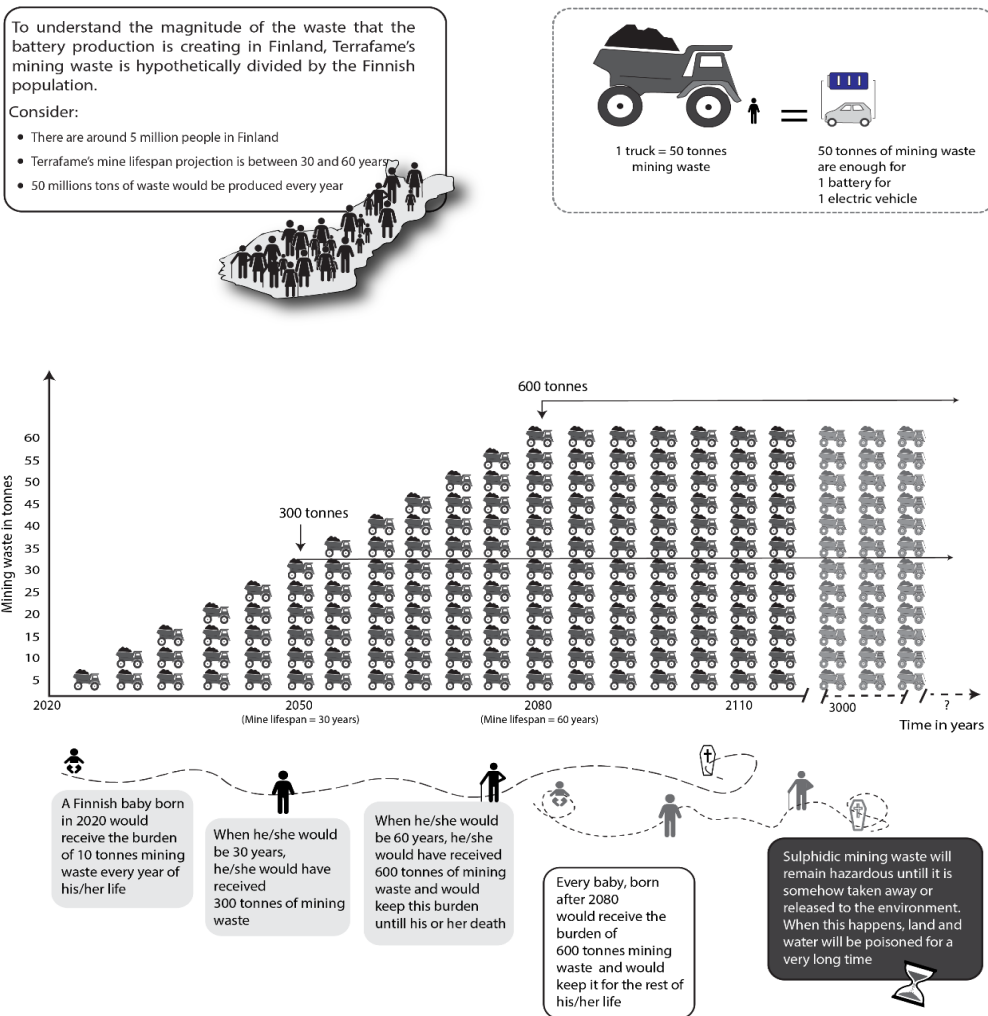


Figure 19. Hypothetical distribution of Terrafame's mining waste by the Finnish population (about 5 million people). For the illustration, no change in the population number is considered.

To manage mining waste, mining companies use encapsulations which involves placing the waste inside impermeable materials, such as geomembrane and geosynthetic clay layers, to create a physical barrier that prevents contact between water and the waste, thereby reducing environmental impacts. This practice is a common practice across the industry to manage waste, however, mining waste encapsulation is not a sustainable solution in the long term as the durability of encapsulation weakens over time.<sup>166</sup> According to Mininginfo Finland, the top and bottom linings of mining waste sites at Terrafame do not meet the international standards for waste sites, even though they are located in high-risk areas near water bodies. Professor Matti Saarnisto, and former research director at the Geologic Survey of Finland (GTK), qualified Talvivaara/Terrafame's mining as unsustainable due

<sup>166</sup> [Selvitys: Jokainen kaivosallas vuotaa aikanaan | Kaleva](#)



to the high-sulphur content in the ore and waste rock.<sup>167</sup> The expert stated there is no long-term experience with the durability of the protective membranes in the case of Talvivaara/Terrafame.<sup>168</sup> A chairman of Terrafame's board, said that the waste heap bottoms are designed to last (only) decades.<sup>169</sup> In November 2016, the supervision authority of Finland (ELY) and concerned citizens demanded that Terrafame examine the entire mine life cycle, the short and long-term impact of the wastewater and the leakage risk. However, as of the writing of this report, this assessment was never done. Terrafame modelled a situation six years after the mine closure and assumed that the discharged water was safe in this period.<sup>170</sup> Nevertheless, the hazard posed by acid-forming mining waste does not decrease nor disappear. When it meets water and air, the wastewater is still reactive and will produce acidic mine drainage even after hundreds of years. In Sweden, a governmental audit reported sulphide mining waste is a long-term problem and represents a risk for the state that could last as much as 1000 years.<sup>171</sup>

Environmental and economic costs linked to mining waste are severe. For example, the Canadian company Belvedere operated two mines in Finland (Särkiniemi and Hitura) for two years, until they went bankrupt. The State of Finland had to assume the waste remediation of these relatively small mines with a total cost of 21 million euros. The current wastewater and groundwater treatments of Terrafame operations would cost tens of millions per year.<sup>172</sup> In addition, the long-term maintenance of the hazardous waste dumps, including replacing the decaying surface and bottom protective structures and removing the trees, would have a big price tag. Terrafame has 1000 hectares, so it would cost 300 million euro for maintaining the covering for some decades. The current mining profits, in most cases, would be a minor fraction of the guarantees needed for long-term waste management. Even if large amounts of the money needed were to be available, a guarantee for hundreds or thousands of years is impossible.

---

<sup>167</sup> Speech at a Talvivaara demonstration in the front of government house on February 6, 2017: Sulphuric acid is the biggest problem of Talvivaara. <http://www.kansanuutiset.fi/artikkeli/3667433-geologian-tutkimuslaitoksen-ex-tutkimusjuht-rikkihappo-talvivaaran-suurin-ymparistoongelma>

<sup>168</sup> [GTK statement in the Talvivaara license 2012.](#)

According to the waste dump plastics manufacturer, the durability can be 200-300 years under the most favourable conditions, referred by Terrafame's Hilla in public EIA hearing

<sup>169</sup> YLE (Finnish Broadcasting company) A-talk show 17.11.2016 "The Miracle of Talvivaara" "Talvivaaran ihme." [A clip from the end the discussion is in youtube.](#)

<sup>170</sup> [Terrafame Ltd's Water Management project, Sotkamo \(ymparisto.fi\)](#)

<sup>171</sup> [Mining waste – Economic risks for the state | The Swedish National Audit Office \(riksrevisionen.se\)](#)

<sup>172</sup> Estimation by J. Natunen. A minor part of the cost would be the price of the limestone reagent at 20 euros/ton for 3000 Mt waste and 27 % (mass) sulphuric acid formed (based on reactions 1 and 2) would cost about 16 billion euros. The amount of limestone needed would be 660 times the annual limestone production in Finland 1,26 Mt (Tukes annual statistics 2021).

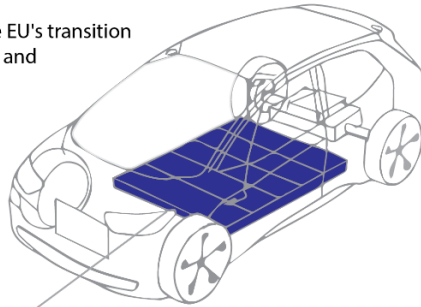


# The environmental impact of your **BATTERY**



**Batteries** are central in the EU's transition to a digital, energy-efficient and climate-neutral economy

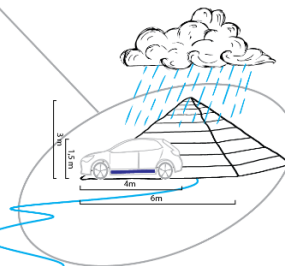
**Batteries** drive a huge increase in the demand of raw materials which in turn drives a huge increase in social and environmental risks associated to mining.



Terrafame in Finland, produces nickel for **1 MILLION batteries each year.**

The plan is to do it for 30 to 60 years: the government promotes the industry, local populations and environmental organisations fear for the future impacts on the ecosystem and oppose.

One battery contains in average **35 kg of Nickel.**



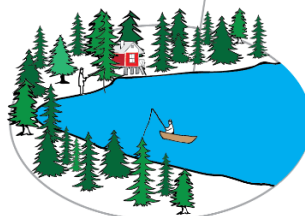
For each battery, **50 tons of waste** is produced. That would be like a pyramid of 6x6x3 m (36m<sup>3</sup>).

**The waste contains about 50 kg of Nickel,** and would form 15 tons of sulfuric acid.

The pollution would advance in the water system towards Lake Kivijärvi and further, lowering the water quality and endangering the ecosystem and health and economy of neighbouring inhabitants on its way.

With the ambition of producing 1 Million batteries per year, in 60 years, **there would be 3.000 Mt of acid drainage forming waste and 3 Mt of Nickel in it.**

The risks associated with the Battery production in Finland are clearly very high.



Lake Ylä-Lumijärvi is connected to Terrafame discharges. It has an area of 6 ha, 1 m average depth and 60.000 m<sup>3</sup> volume.

In a catastrophic leak the lake would become acidic. The Ni level would exceed the environmental quality standard of 5 µg/L by 170 fold.

Fish would be driven away from the lake. The ones remaining would have a very high mercury level. The whole ecosystem would be damaged with the waste from producing just "one" battery.

**"Future generations will have quite a big responsibility for the environmental safety of the area"**

Antti Lankinen, Finnish Association for Nature Conservation in Kainuu district



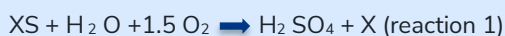
Figure 20. Illustration of the environmental impact of producing nickel for electric vehicles' batteries in Sotkamo, Finland.

## Underestimating carbon footprints per battery

Terrafame also produces nickel and cobalt sulphates for battery producers, with the nickel sulphates meeting the demand of around one million electric cars per year. The company claims that through life-cycle analysis, their carbon footprint of the nickel sulphate is 60% lower than that of corresponding products on average.<sup>173</sup> The company states that the carbon footprint of 1 kg of nickel sulphate the company produces is **1.75 kg CO<sub>2</sub>-eq** (carbon dioxide equivalent), compared to the industry average of **5.4 kg CO<sub>2</sub>-eq**.<sup>174</sup> This result is based on a life cycle assessment (LCA) that is not described in detail nor disclosed, but it is benchmarked with the LCA of the nickel institute, which considered the emissions from i) onsite energy provision, ii) indirect emissions through electricity and iii) process chemicals.<sup>175</sup> From documents analysed, CO<sub>2</sub> release of the post-closure wastewater neutralisation was not considered in the carbon accounting, nor was the potential CO<sub>2</sub> release from the waterways caused by acid mine drainage. As mentioned above, the metal ore in Terrafame is sulphide rich, and it reacts with water and oxygen, sulfuric acid is formed (that is why it has a high acid mine drainage potential):

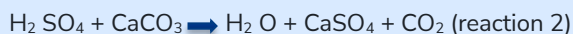
### Box 2

#### Carbon production linked to the neutralisation of sulphide rich ores



(Metal sulphide + water + dissolved oxygen) → (sulfuric acid + X dissolved metal)

To neutralise this sulfuric acid, Terrafame uses limestone (CaCO<sub>3</sub>) with the following overall reaction:



(sulfuric acid + limestone) → (water + gypsum + carbon dioxide)

To illustrate this point, to produce one battery, on average 50 tonnes of waste are created. This amount of waste would form 13.5 tonnes of sulphuric acid. This volume of sulphuric acid would require neutralisation with 13.5 tonnes of limestone, releasing about 6.0 tonnes of CO<sub>2</sub> (based on molar masses).<sup>176</sup> If we recalculate this CO<sub>2</sub> amount as CO<sub>2</sub>-eq in terms of nickel sulphate, the result would be that 1 kg nickel sulphate would create 36 kg CO<sub>2</sub>-eq, not the 1.75 CO<sub>2</sub>-eq that Terrafame

---

<sup>173</sup> [Battery chemicals - Terrafame](#)

<sup>174</sup> Terrafame 2020. »Terrafame's nickel sulphate production offers the lowest carbon footprint in the industry - altogether 60% lower than in existing conventional processes. Available at: <https://www.epressi.com/media/userfiles/132847/1600431338/terrafame-ltd-carbon-footprint-2.pdf>

<sup>175</sup> Nickel institute. 2015. Life cycle data, questions and answers.

<sup>176</sup> The amount of sulphuric acid corresponds to 9% sulphide concentration in the ore and waste rock). Molar masses of the reactants in the equation: M(CaCO<sub>3</sub>) = 100.087 g/mol, M(CO<sub>2</sub>) = 44,009 g/mol

reports.<sup>177</sup> These results would make the Terrafame battery carbon footprint as much as 21 times higher than reported.

However, it should be noted that the post-closure mining wastewater treatment is currently not included in any carbon footprint accounting in the industry as far as the author is concerned.<sup>178</sup> Benchmarking should require an evaluation of the acid mine drainage potential of the mine and if this was the case terrafame would likely be among the worst because of the poor ore grade, open pit mining and high sulphur content in the waste rock and ore. Terrafame contends that it can supply low-carbon footprint nickel sulphate because of its integrated process (mining and nickel sulphate in one site) and its high energy efficiency. However, while reducing the emissions of its production and aiming to achieve carbon neutrality in 2039 are commendable, not accounting for waste in the scheme are half-measures. The waste (both waste rock and tailings) is the biggest issue, not only for the carbon footprint but also for the ecological health of the waterways. Today, most of the attention to CO<sub>2</sub> associated with mining goes to direct emissions from fuel and electricity, where indirect CO<sub>2</sub> emissions from mining are largely ignored. Carbon footprint or LCA do not necessarily assess the most important impacts from mining such as their impacts on biodiversity, which do not have dedicated indicators in these methods. In addition, marine/eco-toxicity inventories do not necessarily address mining tailings in a comprehensive way and are unlikely to consider the risk of disasters. Accurate accounting is needed to evaluate and implement climate mitigation strategies. This accounting should include the whole mining life cycle, including the long-term post-closure treatment of wastewater or the permanent stabilisation or reuse of the waste where possible.<sup>179</sup>

---

<sup>177</sup> The amount of carbon dioxide (CO<sub>2</sub>) per 1 kg of Terrafame nickel sulfate (hexa hydrate salt) calculated from per battery emission.  $6000 \text{ kg CO}_2 / 37 \text{ kg nickel (per battery)} / M(\text{NiSO}_4 \cdot 6 \text{ H}_2\text{O}) 262,85 \text{ g/mol} * M(\text{Ni}) 58.67 \text{ g/mol} = 36,2 \text{ kg CO}_2 / \text{kg (NiSO}_4 \cdot 6 \text{ H}_2\text{O)}$ . Please note that this estimation does not include the CO<sub>2</sub> produced in the limestone production or the energy used in the processes.

<sup>178</sup> Nickel institute. 2020. Life cycle data, questions and answers.

<sup>179</sup> <https://h2020-nemo.eu/>

# Social engineering for lithium extraction?

Lithium stands out as one of the most sought-after materials driving the energy transition. Its pivotal role in advanced energy storage systems, particularly lithium-ion batteries, is paramount. As the global focus shifts towards harnessing renewable energy sources like solar and wind, the need for efficient and dependable energy storage becomes increasingly vital to manage the intermittent nature of these sources. While historically utilised for various purposes, including ceramics, lithium's significance has been steadily shifting towards battery technology. Notably, the demand for lithium-ion batteries, especially for electric vehicles (EVs), has surged. By 2030, nearly 50% of lithium production will be directed towards powering EV batteries. Expected demand in EU, suggests lithium demand will increase by 3,500% by 2050, growing from 23 kt in 2020 to 100-350 kt in 2030 and to 700-860 kt by 2050.<sup>180</sup>

Portugal is known for having one of Europe's largest estimated lithium reserves,<sup>181</sup> ranking 7th in the world according to the United States Geological Survey.<sup>182</sup> In 2019, Portugal had a 1.6% share of the global production,<sup>183</sup> and, according to Mining Watch Portugal, data shows that almost 25% of the country's continental landmass is slated for mining projects.<sup>184</sup> The Barroso region, in north-central Portugal, is recognised as a "Globally Important Agricultural Heritage System" by the Food and Agriculture Organisation of the United Nations (FAO)<sup>185</sup> yet it has become the epicentre of the Portuguese lithium mining rush. The comparably high concentration of lithium reserves present in this region make it particularly "promising" for production and exploitation.<sup>186</sup>

The northern region of Barroso is composed of two municipalities: Montalegre and Boticas. As of the writing of this case study, there are currently eight signed concession contracts for mining exploitation in the region, and seven demands are being analysed by the Directorate-General of Energy and Geology (DGEG). In the past 5 years, 39% of Barroso's geographical area has been targeted for mining projects. The two most significant mining projects are the proposed "Mina do Romano," located in the

---

<sup>180</sup> 1. KU Leuven & EUROMETAUX. Metals for Clean Energy: Pathways to solving Europe's raw materials challenge, p.27. (2022).

<sup>181</sup> Carballo-Cruz F and Cerejeira J. The Mina do Barroso Project: Economic and Development Impacts. Savannah, Available at: [https://www.savannahresources.com/cms/wp-content/uploads/2020/08/The-Mina-do-Barroso-Project-Economic-Development-Impacts\\_UniversityofMinho\\_English\\_Final.pdf](https://www.savannahresources.com/cms/wp-content/uploads/2020/08/The-Mina-do-Barroso-Project-Economic-Development-Impacts_UniversityofMinho_English_Final.pdf)

<sup>182</sup> USGS. (2022) Mineral Commodities Summaries 2022. United States Geological Survey (USGS), Available at: <https://pubs.usgs.gov/periodicals/mcs2022/mcs2022-lithium.pdf>

<sup>183</sup> BGEN. (2021) Portugal to call off lithium project amid EU's scramble for battery materials. Balkan Green Energy News Available at: <https://balkangreenenergynews.com/portugal-to-call-off-lithium-project-amid-eus-scramble-for-battery-materials/>.

<sup>184</sup> MWP. (2022) Mapa do Minério. Mining Watch Portugal, Available at: <https://miningwatch.pt/mapadominerio/index.html>.

<sup>185</sup> FAO. (2020) GIAHS, Globally Important Agricultural Heritage Systems - Barroso Agro-Sylvo-Pastoral System. Food and Agricultural Organization of the United Nations, Available at: <https://www.fao.org/giahs/giahsaroundtheworld/designated-sites/europe-and-central-asia/barroso-agro-sylvo-pastoral-system/detailed-information/en/>.

<sup>186</sup> Chaves et al., 2021

Montalegre municipality, whose concession contract is owned by LusoRecursos Portugal Lithium and the proposed “Mina do Barroso”, located in the Boticas municipality, owned by Savannah Resources Plc. This case study focuses on the existing and anticipated impacts of the Savannah Resources’ project, which would potentially be the largest open pit spodumene lithium mine in Western Europe. The construction of Europe’s first lithium mines serves environmental policy and economic goals, which respond to growing electric vehicle battery and energy storage system (ESS) markets.



Figure 21: Covas do Barroso, the promised mining area starts not far beyond the treeline. Source: Alexander Dunlap, 2022.

## Covas do Barroso: Between Extraction and Communal Land

The potential mining site would cross the villages of Couto de Dornelas, Covas do Barroso, Romainho and Muro in Northern Portugal. If the concession area extension is granted, some houses in Romainho would be located only 100 metres away from the mining site. These are agricultural villages. Animal production is the basis of these towns’ agrarian economies, dominated predominantly by breeding of cattle for beef, namely for the indigenous breed of “vaca barrosã”. The Barroso region is recognised for being an important biodiversity hotspot in Portugal, as it hosts important populations of Iberian



endemic plants and animal species (many of them endangered).<sup>187</sup> Indeed, the region hosts numerous plant and animal species which are extremely important for nature conservation, particularly those considered Priority Species under the European Commission's Birds and Habitats Directives. The Barroso region has been shaped by human activity for a long time, which has helped to maintain different ecological stages and support a variety of plant communities with special flora features. The domestic animals that live there also have an important role in keeping these ecosystems healthy and contributes directly to the control of shrubby and herbaceous vegetation.<sup>188</sup> This also reduces the risk of fires, which can damage the agro-forestry production and the biodiversity of the region.

Additionally, the FAO describes the Barroso people as having a distinctive culture that sets them apart from most other populations in Portugal. Their social organisation, practices and rituals are shaped by their geographic isolation, their harsh conditions, and their limited natural resources. The communities have learned to use and manage their resources in a sustainable way. One of the key values and traditions of the Barroso people is communitarianism, which reflects their rural way of life and their adaptation to the environment.<sup>189</sup> An example of this is the Vezeira, a system of communal grazing where cattle are shared among the community members on a specific territory.<sup>190</sup> Due to the local preservation of ancestral land and herding traditions, Barroso became the first place in Portugal to be classified as a "Globally Important Agricultural Heritage System" (GIAHS) by the FAO and only one of the dozen GIAHSs.<sup>191</sup>

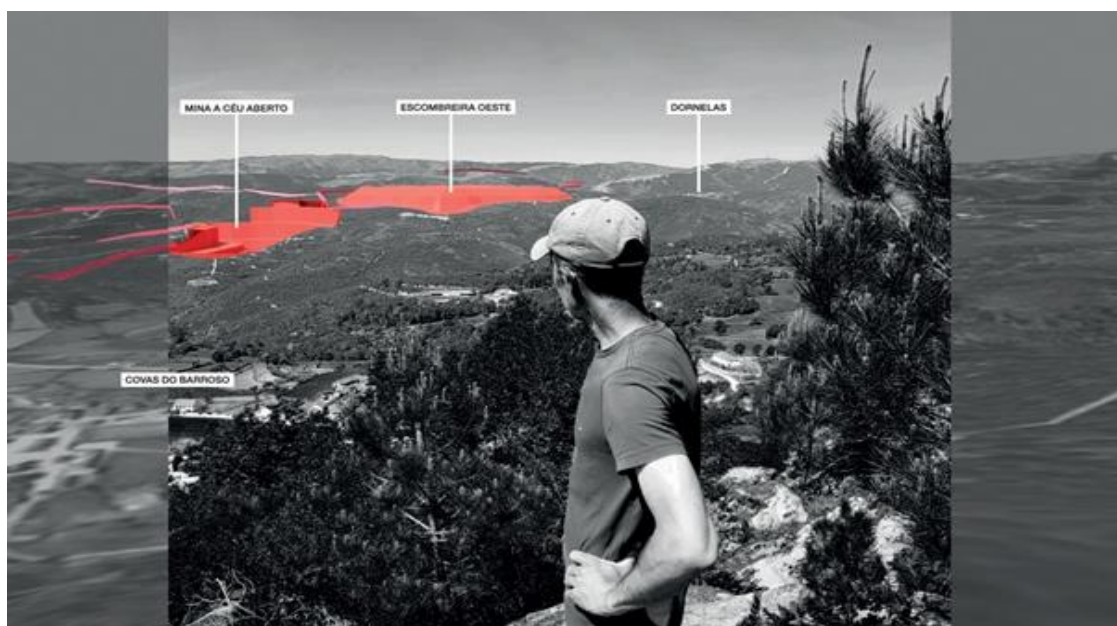


Figure 22: Photo from Covas do Barroso looking west and demonstrating the proximity of the mining projects by Savannah Resources. Source: Images: Godofredo Pereira, Jacob Bolton, Antonio del Giudice, Mingxin Li; Design: Dayana Lucas.

<sup>187</sup> Maravalhas E, Arantes JM, and Maravalhas. 2022. *A Biodiversidade do Barroso*. Boticas: Boticas Parque, Natureza e Biodiversidade.

<sup>188</sup> [Detailed Information | Systèmes Ingénieux du Patrimoine Agricole Mondial \(SIPAM\) | Organisation des Nations Unies pour l'alimentation et l'agriculture | GIAHS | Food and Agriculture Organization of the United Nations \(fao.org\)](#)

<sup>189</sup> [Ibid.](#)

<sup>190</sup> [A Vezeira da Rés - Vezeira](#)

<sup>191</sup> [FAO. \(2020\) GIAHS. Globally Important Agricultural Heritage Systems - Barroso Agro-Sylvo-Pastoral System. Food and Agricultural Organization of the United Nations.](#)

The vast majority of the land in Barroso is “common land”, known as “baldios” or “*terras baldias*”. “Baldios” are a type of property of a specifically communal nature, whose administration and ownership are the sole responsibility of the “*compertes*” or the locals who manage the common lands,<sup>192</sup> that is, all the citizens who reside in the area where the baldios are located. While exact dates can be challenging to pinpoint due to the informal and customary nature of their establishment, it's known that these communal lands have historical roots in pre-modern agricultural and community practices. Baldios emerged as a response to the needs of local communities for shared resources like grazing land, firewood, and agricultural land.<sup>193</sup> In northern Portugal, the tradition likely began centuries ago as rural communities organised themselves to manage and share these resources collectively. During the Salazarist dictatorship in the early 1940s, the baldios were appropriated by the State. It was not until 1976, after the 1974 Revolution, that the common lands were returned to the population's ownership.<sup>194</sup> In Covas alone, according to the estimates of the Directive Board of the Baldios of Covas do Barroso, there is approximately 2000ha of baldios.<sup>195</sup> Common land represents a traditional agrarian regime that is not only recognised by the FAO as an important global heritage to preserve, but also demonstrates responsible sustainable land-use management. Indeed, the baldios have an incredible cultural and political significance, as they are a repository of ancestral experiences of cooperation and democratic self-management of lands, as an alternative to profit oriented, market-based, and state-led management.

This region is also particularly rich in geological deposits and minerals, such as wolframite (e.g. a tungsten ore mineral), niobium, tantalum, and lithium.<sup>196</sup> As such, since the 1990s, geologists have had an interest in mapping and researching mineral deposits in the region, particularly in areas now targeted by Savannah's project. In 2006, a licence for the exploration of feldspar and quartz mineral deposits (used for glass and concrete) in a total concession area of 120ha was issued. The contract — under the name “Mina do Barroso” — was signed between the Portuguese State and mining company Saibraís-Areias e Caulinos, S.A. In 2010, the concession rights were transferred to Imerys Ceramics Portugal, S.A. The following year, in 2011, without any public consultation or notice to local authorities, Imerys updated the Mining Plan to include rights to exploit other areas and minerals.<sup>197</sup> In 2016, the revised Mining Plan was approved by the DGEG, with an addendum to the concession agreement, expanding the concession area to approximately 542ha, close to five times the size of the original concession area and included lithium as a concession substance. In 2017, the concession was transferred to Savannah Lithium, Lda, an Australian company.<sup>198</sup>

Savannah Resource's mining project, while covering some private land, would mostly be located on common land – the baldios.<sup>199</sup> The baldios retain a special legal status protecting them.<sup>200</sup> For Savannah or another company to acquire communal land, they would need to sign a lease agreement

---

<sup>192</sup> (Law n° 75/2017 of 17 August).

<sup>193</sup> Ibid, FAO.

<sup>194</sup> [Hespanha, Pedro \(2017\) “O papel dos baldios na revitalização das comunidades rurais”. Imprensa da Universidade de Coimbra.](#)

<sup>195</sup> Fieldnotes.

<sup>196</sup> Gomes, M.E.P. and Ramos, J. M.F. 2018. Recursos minerais de Trás-os-Montes e Alto Douro. In: Balsa, C., Teixeira, J. S. (eds.) *Recursos geológicos de Trás-os-Montes – Passado, Presente e perspectivas futuras*. Bragança: Instituto Politécnico de Bragança.

<sup>197</sup> [Carballo-Cruz F and Cerejeira J. \*The Mina do Barroso Project: Economic and Development Impacts\*. Savannah.](#)

<sup>198</sup> Ibid., Carballo-Cruz & Cerejeira.

<sup>199</sup> VISA Consultores. (2021) *Environmental Impact Study. Non-technical Resume. Expansion of the Barroso mine.*

<sup>200</sup> Law n° 75/2017 of 17 August.

with the Baldios Council for a 20-year period, renewable for a maximum of 80 years.<sup>201</sup> If no agreement is reached between the company and the board, the State can expropriate the baldios.<sup>202</sup> The company, however, would need to apply for expropriation for “public utility.”<sup>203</sup> If the State grants the “declaration of public utility,” the individuals who make up the baldios, the *compartes*, would thus lose their rights to manage and administer the baldios for a given period.<sup>204</sup> In recent years, noteworthy changes have been made to the legal framework shaping mining projects, notably the amendment of Law No. 54/2015 of 22 June (commonly known as “mining law”) through the May 7 Decree-Law No. 30/2021. Significant is the fact that this law, albeit existing since 2015, was never formally regulated. This recent amendment included a clause on “green mining” stating that mining activities can “*only be developed according to the principles of ‘green mining’, i.e., complying with strict principles of environmental sustainability.*” The amendment has further reinforced the fact that land may be expropriated if no agreements are made between landlords and the companies.

These laws have been regarded by oppositional movements as a form of “bureaucratic land grabbing” carried out by the Government,<sup>205</sup> which have recently advanced with an amendment made to the expropriation regime through the October 12 Law 59/2020. This amendment simplified the expropriation processes, giving priority to the “declaration of public utility,” followed by “administrative possession,” and only then by an agreement with the owners or by a court decision. Such an amendment sets a significant precedent because the primacy is given to the concept of “public utility”, and gives the State a discretionary role, as it is the state itself that assesses the expropriation. This demonstrates the threat facing the agricultural heritage and biodiversity of Barroso by Portuguese and European governing bodies in the name of lithium mining and claims of industrial decarbonisation.

## Socio-Ecological Impacts of Green Mining

Renowned Portuguese Naturalist, Ernestino Maravalhas, affirms that the region is an important biodiversity and climate stabilisation hotspot<sup>206</sup> important for pollinators and insects. The 75% loss of flying insect biomass in Germany, France and other countries,<sup>207</sup> places even greater importance on the Barroso region as a hub for biodiversity. For example, Maravalhas says the Shining Macromia Dragonfly (*Macromia splendens*) is a high-priority species for the EU and is sensitive to river and water table conditions. “*The European Union is investing thousands of euros into protecting the Shining Macromia in several places,*” explains Ernesto, “*and at the same time, they are allowing the destruction of the habitat of such a rare species*” in Barroso. This is because open-pit spodumene lithium mines have extensive environmental impacts, particularly for their use of water as well as

---

<sup>201</sup> Ibid.

<sup>202</sup> Law No. 75/2017, 17 August; Article 41.

<sup>203</sup> Law No. 54/2015, 22 June

<sup>204</sup> Law No. 75/2017 of 17 August.

<sup>205</sup> Dunlap A. (2020) Bureaucratic Land Grabbing for Infrastructural Colonization: Renewable Energy, L'Amassada and Resistance in Southern France. *Human Geography* 13(2): 109-126.

<sup>206</sup> Interview 21, 24-01-2022.

<sup>207</sup> Hallmann CA, Sorg M, Jongejans E, et al. 2017 More than 75 % decline over 27 years in total flying insect biomass in protected areas. *PLoS one* 12(10): e0185809. & Hickel J. 2020 *Less is more: How degrowth will save the world*, London: Random House.

chemicals.<sup>208</sup> The water table, humidity, and air quality are all factors, which the mine is threatening. This, moreover, relates to concerns of “genetic erosion” by eliminating and fragmenting insect habitats, preventing insect species from travelling and, thereby, isolating gene pools and further inviting biodiversity loss.

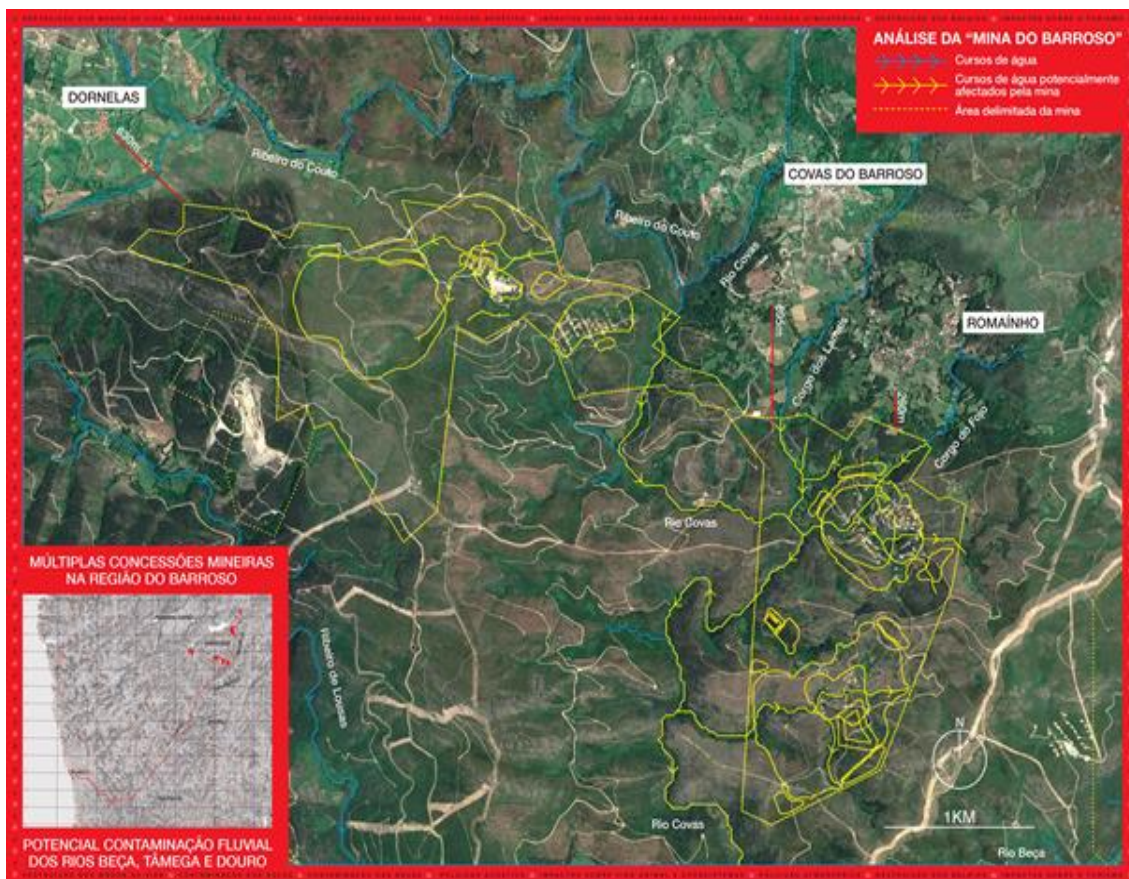


Figure 23. The blue lines show the waterways. The yellow lines show the waterways potentially impacted by the mine. The yellow dotted line is the mining concession area. In red, the distance between the mining area and the neighbouring towns is marked. In the bottom left corner, a zoom-out map shows the potential contaminations of the rivers Beça, Tâmega and Douro. Source: Godofredo Pereira, Jacob Bolton, Antonio del Giudice, Mingxin Li; Design: Dayana Lucas. Used with permission from the authors.

While central and southern Portugal suffer recurrent droughts and wildfires,<sup>209</sup> the Barroso region has generally high annual rainfall, ground, and river water resources connecting across the northwest region (though the region also experienced extreme droughts in 2022, which may become more frequent as an effect of climate change).<sup>210</sup> Savannah “foresees a water need of 0.570hm<sup>3</sup> of water for its first year of operation and 0.510 hm<sup>3</sup> for the remaining years of the mining operation.”<sup>211</sup>

<sup>208</sup> Tabelin CB, Dallas J, Casanova S, et al. 2021 Towards a low-carbon society: A review of lithium resource availability, challenges and innovations in mining, extraction and recycling, and future perspectives. *Minerals Engineering*: 1-23.

<sup>209</sup> Demony C and Pereira M. (2022). Five years on from wildfire tragedy, Portugal again at mercy of heat and drought, *Reuters*. Available at: <https://www.reuters.com/world/europe/five-years-wildfire-tragedy-portugal-again-mercy-heat-drought-2022-07-20/>

<sup>210</sup> Chaves et al., 2021

<sup>211</sup> Savannah. 2021. "Environmental Impact Study: Non-Technical Resume." Savannah Resources, p. 15... Accessed 25-11-2021. <https://www.savannahresources.com/media/crvda0eo/ntr-of-mdb-april-2021.pdf>.



Presenting these figures in cubic hectometres ( $\text{hm}^3$ ),<sup>212</sup> Savannah implicitly conceals the mine's intensive water demand to the public less familiar with this form of measurement.  $0.570\text{hm}^3$ , for example, converts into 570 million litres in the first year and  $0.510\text{hm}^3$  is 510 million litres that is the anticipated water consumption for the remaining eleven years. This translates into 47 million litres a month and 1.5 million litres a day.<sup>213</sup> Savannah's impact study, likewise, is explicit that "in case of water shortage, water [will be] captured directly from the Covas River."<sup>214</sup> Ecosystem disruption and water use makes company mitigation claims appear contradictory.

The mine will undoubtedly have a severe effect on water and the region's political ecology, which most of the Barroso residents recognise and oppose. During interviews, it was shared that many people feel that the mine is going to severely impact local livelihoods.<sup>215</sup> "[The mine] is going to destroy everything that we have," Susan, a local resident explains. The mine, another resident asserts, is "going to be a lot of noise, pollution, and the transformation of the water into... spoilage." As this resident explains, the Barroso mine will "work day and night, twenty-four hours a day, for eleven years or more."<sup>216</sup> This resident concludes: "We are here in our little corner; we don't want it to be changed for the worse." Concerns that the mine will "destroy," "ruin," or "bury" the region are adjectives commonly employed by the majority of the 27 research participants interviewed in the region for this case study. Water and noise pollution are linked to destroying people's cultural identity and sense of place. "I don't think we can co-exist with the mine," the baldios president, Aida Fernandes, contends: "the mine will destroy everything that we possess. It will destroy our identity, it will destroy our land, it will destroy our rivers, our waters. And that is not reversible!"<sup>217</sup>



Figure 24. Savannah's information point in Botica after the blockade, August 16<sup>th</sup> 2022. Source: Mariana Riquito.

<sup>212</sup> 1 cubic hectometre = 1 billion litres

<sup>213</sup> Savannah. (2021) *Environmental Impact Study: Non-Technical Resume*. Savannah Resources, p. 15. Available at: <https://www.savannahresources.com/media/crvda0eo/ntr-of-mdb-april-2021.pdf>.

<sup>214</sup> Ibid.

<sup>215</sup> To learn more about social engineering tactics refer to the article: A. Dunlap, M. Riquito, Social warfare for lithium extraction? Open-pit lithium mining, counterinsurgency tactics and enforcing green extractivism in northern Portugal, *Energy Res. Soc. Sci.* 95 (Jan. 2023), 102912, <https://doi.org/10.1016/j.erss.2022.102912>.

<sup>216</sup> Interview 20, 20-01-2022.

<sup>217</sup> Interview 16,21-01-2022.



Water is not communities' only concern. The potential mining waste created by lithium extraction would pose serious threats to the region. For example, during a committee public hearing at the European Parliament, evaluating the tailing storage facility, Professor Steven H. Emerman, a specialised geologist on mining waste management, evaluated the tailing storage facility of the Savannah Resources mining plans and found that the "experimental" nature of storing lithium tailings, the lack of available technology and unprecedented dam height, among other factors, makes this dam a threat to local inhabitants and waterways.<sup>218</sup> According to Professor Emerman, Savannah's proposed upstream tailing dam "is illegal in four Latin American Countries" (e.g. Brazil, Chile, Ecuador & Peru).<sup>219</sup> This illuminates weak environmental regulations and enforcement issues in the European Union, which, since the 2018 Borba quarry tragedy, remains particularly profound in Portugal. Ensuing studies revealed 191 quarries were at critical risk.<sup>220</sup> By mining, transforming and degrading the landscape, the mine would have severe social, ecological and cultural impacts. Accessing and mining lithium resources will fundamentally destabilise the residents in the Barroso region, especially farmers, beekeepers, environmentalists, and existing and aspiring tourism businesses.

## Social Fragmentation

While the open-pit mines will lead to large-scale ecological devastation, the social impact is already extensive, even prior to their operation. In 2016, the Portuguese government actively concealed the promotion of lithium and critical raw material mining within the country: information about the mines was distributed in English with promotional videos, and people backed by central government ministries were already promoting mining tenders at the Prospectors & Developers Association of Canada (PDAC) Toronto mining convention in 2018.<sup>221</sup> The lack of transparency about these activities, promoting the purchase of mining concessions in a non-local language and lack of public consultation, led to social mobilisation and opposition, which became increasingly more visible by 2019. During this time, about 15 national groups coordinated with existing civil society groups and environmental NGOs to bring mining issues to the forefront of public debate in Portugal. Since 2019, several anti-mining protests were held in major cities (Lisbon, Porto, and Coimbra), which entailed numerous reports of direct action, information sessions organised in urban centres and blockades in prospective mining areas.

The lack of a fair and transparent process is noteworthy: practically no public consultations were organised in the region and often the companies would do selective negotiations with municipalities and/or landowners without notifying local authorities. Meanwhile, residents underestimated the significance of prospecting work, as they were told it was for feldspar and quartz extraction. Subtle entry by the companies, disinformation and underestimating prospecting led to shock, surprise, and outrage when open-pit lithium mining was announced. "*They never talked to the population!*" the Boticas Mayor, Fernando Queiroga, stressing how he asked Savannah Resources to organise a meeting "*to explain to the population what they were doing.*" Mayor Fernando Queiroga and local

---

<sup>218</sup> Emerman SH. (2021) Evaluation of the Tailings Storage Facility for the Proposed Savannah Lithium Barroso Mine, Northern Portugal. United Nations Economic Commission for Europe (UNECE), Available at: [https://unece.org/sites/default/files/2021-10/frCommC186\\_15.10.2021\\_annex1.pdf](https://unece.org/sites/default/files/2021-10/frCommC186_15.10.2021_annex1.pdf).

<sup>219</sup> <https://yestolifenotomining.org/wp-content/uploads/2021/12/Prof-Emerman-Testimony.pdf>

<sup>220</sup> Trigueirão S. (2022) Há apenas 25 funcionários para fiscalizar mais de 2000 pedreiras no país. Público, Available at: <https://www.publico.pt/2022/04/26/sociedade/noticia/dgeg-25-funcionarios-fiscalizar-2000-pedreiras-pais-2003412>.

<sup>221</sup> Photos of authorities promoting lithium exploration at PDAC 2018 can be found here: <https://edm.pt/en/lithium/promotion-in-pdac-2018/>

residents recount that the company only employed technical language during their meeting, which only led to further confusion.

Moreover, the company was explicit in the consultation that they would go as far as expropriating residents. As one local recounts, people asked the Savannah representative: *"If the population were against it, if the population didn't accept the [mining] project, would they stop? And they [the company] said: 'No.'"*<sup>222</sup> This exposed the coercive nature of the company to residents, demonstrating, in the words of an ex-civil servant, *"that our opinion would never count, our opinion would only count if we accepted [the project] with compensation."* This explicit disposition from the company, many believe, was generated by backdoor approval by the DGEG. According to the Boticas mayor, when it comes to mining concessions, several authorities have to be involved and, in this case, they were not even consulted. DGEG's approval gave Savannah the coercive confidence they aired publicly. This generated fear, political organising and resistance that is still in process today.<sup>223</sup>

Once awareness of its negative impacts spread, few residents were in favour of the mine. During field visits, it was noted that only people directly working for Savannah, and segments of their families, supported the prospects of lithium mining in the region. Savannah, like most mining companies, advertised inflated job numbers and social development funds, and spoke of advanced mining technologies and environmental remediation strategies that would promote responsible and "green" mining.<sup>224</sup> These claims have been debunked or remain uncertain, and local people have, and continue to, actively reject the company's proposal. In response to residents' resistance Savannah embarked upon a public relations strategy, including gifting Christmas Cake (*Bolo Rei*) to residents in Covas, establishing an information point, a media campaign (radio, newspapers, billboards, television), public work demonstrations,<sup>225</sup> sponsoring local events, a monthly newsletter and door-to-door land contracting to gain the social licence to operate and convince residents to sell their land.

Savannah has tried to organise support within the village, which has created heated social divisions within families over the proposed lithium mine. During the first half of 2022, there was one person from Covas actively trying to organise land deals for the mine in the region. The land contractor for Savannah, a beekeeper explains, is *"trying to get into people's heads, scaring them. You have to sell the land, if you don't sell it, then they're going to expropriate it. Fearmongering. That is it."*<sup>226</sup> This "fearmongering," another resident explains, is reinforced by going to *"talk to those people that are more malleable."*<sup>227</sup> This means targeting old people, who might remain indifferent about the village's future and are socially alienated or could uncritically accept the (uncertain) promises of the company. At the time of writing, Savannah was offering 2€ per square metre of uncultivated land, 2.5€ for cultivated lands and an additional 2,500€ bonus for water springs and buildings on the land, yet the latter depends on the *"surveyor, and he gives a price,"*<sup>228</sup> according to a Savannah land contractor. While most residents remain in opposition to the mine, others do not. The promise of money, public

---

<sup>222</sup> Interview 15, 21-01-2022.

<sup>223</sup> Interview 20, 21-01-2022

<sup>224</sup> Savannah. (2021) *Environmental Impact Study: Non-technical Resume*. Savannah Resources, Available at: <https://www.savannahresources.com/media/crvda0eo/ntr-of-mdb-april-2021.pdf>.

<sup>225</sup> Dunlap, Alexander, and Mariana Riquito. 2023. "Social warfare for lithium extraction? Open-pit lithium mining, counterinsurgency tactics and enforcing green extractivism in northern Portugal." *Energy Research & Social Science* 95 (1): 1-21.

<sup>226</sup> Interview 5, 19-01-2022.

<sup>227</sup> Interview 4, 19-01-2022.

<sup>228</sup> Interview 19, 23-01-2022.

relations, and the local desires of developmental improvement, real or imagined, are all attempts to slowly chip away at the mining opposition.

Another way of capturing the minds and hearts of the population is through tapping into the modernist consumerist culture, familiar within urban settings. The mining companies in Barroso and Montalegre use symbols of wealth to influence locals and cultivate dreams of “prosperity.” Employees of the company in Barroso are known for their expensive trucks and modern houses, which stand out in sharp contrast in the rural setting. This display of wealth is seen as a tactic to associate working for the company with the ability to afford luxury goods, to move away from rural lifestyle and to adopt a consumerist culture. According to one of the locals, the purpose is to “*create the idea that people are going to get rich, that there will be no shortage of jobs and that everyone is going to drive around in an electric Jaguar,*” meanwhile ignoring the consequences and realities of critical raw material extractivism.



Figure 25. Left: Banner Drop over the freeway in Coimbra: “Mining Is Not Green! No to Mines, Yes to Life!”. Right: “Capitalítio” (Capitalithium) spread at the entrance of the Science and Engineering Department, University of Porto. The Building was covered in “Capitalítio” (Capitalithium) and “Minas Não” (No to Mines) across the building. Below: Banner in Coimbra Portugal: “Against the progress of destruction/ Solidarity between mountains/ In defence of Barroso and Beiras/ Autonomy and Direct Action!” Source: MinasNao2

## Green Mining in Sharp Contrast to Sustainability

The European Commission promotes the proposed “Mina do Barroso” as “green,” “clean” and an expression of “sustainable development.” Residents, however, disagree.

*“We are told that the mines are to protect the environment and fight climate change,” explains Vincent, “When in reality, this is just another pretext to create profits, and benefits for big companies and, as we said earlier, this is not going to save the planet, it is not lithium that is going to save the planet, it’s not electric cars. On the contrary, it will contribute to the destruction of our planet.”*

Another resident goes as far to call lithium a “Trojan horse” that allows companies “to go digging mines and exploit everything that interests them, starting with European subsidies and continuing to the more valuable ores.”<sup>229</sup> Mining lithium, or other critical raw materials, remains absurd to locals.

*“We have grown in a way where the land was always a priority, water, was always a priority and, now, none of that has value,” explains Fernandes, “now it will be destroyed just because of the arguments of the [energy] transition, which they argue will depollute, decarbonize, but they do not make sense to us, because it’s not true. It’s not true. I can’t be trying to refute an argument that for me is already not true.”*

Mining is far from ecologically sustainable, even more so compared to local agriculture, cattle herding and low-impact techniques of managing the landscape.

Numerous Barroso inhabitants reject the idea that we can mine ourselves out of the ecological and climate catastrophe. Considering the agricultural practices, waterways, biodiversity, the existence of dams, wind turbines and standing forests, this “green mining” proposition seems absurd. The Boticas Mayor highlights “green energy” contradiction:

*“The region in the whole country where the cleanest energy is produced, [such as] hydroelectric and wind energy. In fact, three dams are located in this region... [and] [e]very year, the municipality of Boticas emits 9 tons of CO<sub>2</sub>. If the mine is opened, it will produce 92,000 tons of Co<sub>2</sub> per year, for 12 years.”*

Savannah’s Environmental Impact Assessment (EIA) was subject to public consultation between April and July 2021, after having filed two EIAs which were declared “non-compliant” by the Portuguese Environment Agency (APA) in 2020. The final EIA provided by Savannah anticipates the enlargement

---

<sup>229</sup> Interview 20, 24-01-2022.

of the concession area, an additional 50ha from Imery's concession to 594ha. In January 2021, an NGO submitted an environmental information request to the Portuguese environment ministry, but no access was granted. The same request was sent in March to Savannah Resources, but the company also refused. Although the Commission for Access to Administrative Documents (CADA) issued a report stating that the environmental information that had been requested should be made immediately available, the Portuguese authorities decided to ignore the request.<sup>230</sup> Only some documents were made available during the public consultations (and nearly three weeks after the consultations started). This delayed access to information prevented civil society and local communities from being fully informed and deprived them of about three months of time to examine the documents. They had to review more than 6,000 documents in one month. The NGO filed a formal complaint under the Aarhus Convention, which safeguards the right to access environmental information, alleging a deliberate obstruction of information access. As of the writing of this case study, the Portuguese courts and the public prosecutor are still handling the case.<sup>231</sup>

In September 2022, UN special rapporteur on human rights and the environment David Boyd made a visit to Portugal, including Barroso. In a following report from his visit, he states residents raised concerns about *“lack of access to timely and accurate information, inadequate public consultation... and intimidation tactics to silence opposition to the project.”* He further mentioned that while some minerals are needed for the energy transition, *“large resource extraction projects that may violate human rights in the name of the green transition are antithetical to sustainable development.”*<sup>232</sup>

In May 2023, the APA approved the company's EIA.<sup>233</sup> Local resistance to Savannah's lithium plans continues.<sup>234</sup>

---

<sup>230</sup> [Ambiente deve divulgar já o estudo dos impactos da Mina do Barroso | Lítio | PÚBLICO \(publico.pt\)](#)

<sup>231</sup> [Communication\\_Montescula\\_Portugal\\_02-05-2021.pdf \(unece.org\)](#)

<sup>232</sup> [Report of the Special Rapporteur on the issue of human rights obligations relating to the enjoyment of a safe, clean, healthy and sustainable environment, David R. Boyd.](#)

<sup>233</sup> [NotaOCS\\_42-2023\\_AIA\\_MinaBarroso.pdf \(apambiente.pt\)](#)

<sup>234</sup> [United in defence of Barroso: reporting from the ground - META \(eeb.org\)](#)



# Conclusion

To have a chance at limiting global warming to 1.5°C above pre-industrial levels and avoiding ecological collapse, there is no doubt that we need to move away from fossil fuels and that this transition will require a certain level of raw material. However, as UN special rapporteur, David Boyd, mentions, an over reliance on extractivism would exacerbate human rights and environmental impacts and be antithetical to sustainable development. As the case studies show, the consequences of resource extraction are far-reaching, touching upon various dimensions of local life including development, community well-being, social unity, cultural heritage, and much more. Despite industry contending that mining is indispensable for driving the shift to renewable energy, and the EU's endeavours to ensure access to vital raw materials, the mining sector is perpetuating familiar patterns akin to those of fossil fuel extraction. These patterns are veiled under the guise of the green transition and climate change agenda and, consequently, give way to "green extractivism."

What prevails is a great contradiction: low-carbon technologies need materials, but these materials are extracted with severe ecological and social harms, despite their claims of "green mining" or responsible sourcing label. Going further, the energy transition is not the only reason, or arguably the main reason, that certain materials are sought (for example, nickel in the Finland or copper in Sweden). Rather, these materials are being sought mostly for private vehicle use and for industrial sectors that are not related to the energy transition but expanding industry profits. It is much easier to sell a mining project if the material, say indium, nickel or copper are needed for solar PVs, energy storage batteries or wind turbines, instead of advocating nickel and copper mining for drones, aerospace or military industries (see figure 1).

This report underscores the ongoing establishment of 'sacrifice zones' in the name of sustainability, and the potential exacerbation of these issues in Europe and the Global South and how the EU's Critical Raw Material Act will likely exacerbate these issues. The Act's objective to expedite extraction in protected areas, streamline permitting procedures, and enhance public acceptance presents significant challenges. In the cases of Finland, Sweden and Portugal in particular, the Act's creation of a strategic projects' framework will entice companies, particularly junior companies who lack the experience and the funds to carry on mining projects let alone environmental impact assessments to apply to the strategic projects list. This would effectively allow these companies to fast-track their projects, where environmental legislation and social concerns risk being pushed to the side.

The CRMA does not establish any universal standards. These are instead governed by the EU's corporate sustainability due diligence directive (CSDDD), but this is all the more complicated since at the time of writing this report, the CSDDD is still in negotiation. The CSDDD aims to implement robust environmental and social due diligence obligations which already exist specifically for cobalt, graphite, lithium, and nickel in batteries under the newly agreed EU Battery Regulation. The EU's CRMA will rely heavily on the provisions within the CSDDD which is currently not set to cover junior mining companies. Additionally, many lawmakers are increasingly leaning on voluntary audit and certification initiatives to safeguard human rights within mineral supply chains. However, these initiatives are flawed and inadequate in ensuring responsible practices, as they transfer due diligence

responsibility from the state to companies and allow for industry self-regulation.<sup>235</sup> Regrettably, due to the project's limited scope and time constraints, we were unable to explore the crucial topic of industry certification schemes, which can be a tool but are often used to greenwash industrial practices.<sup>236</sup>

While transitioning swiftly away from fossil fuels towards a low-carbon future is paramount, the primary concern lies in the method of resource extraction. There is a systemic lack of transparency and a contradiction in the understanding of sustainability, particularly for low-impact agricultural communities as illustrated by the lithium case in Portugal. This is compounded by a blatant disregard for indigenous populations, their traditions, livelihoods, and their right to self-determination, as seen in Sweden. Issues such as waste mismanagement and long-lasting tailings, as well as risks of water pollution are still prevalent, as evidenced by the situation in Finland. Moreover, while the CRMA suggests that it can generate "value-added" benefits for countries in the global south through materials sourcing, it falls short in adequately addressing the ecological and social repercussions of material extraction in many producing nations. This deficiency is glaringly evident in the case of Bolivia, where the perpetuation of neocolonial models within global raw material value chains remains the prevailing paradigm.

These problems have systemic roots. Our economic system blurs the line between societal needs and wants, operating under the assumption that increased material consumption equates to societal benefits. It presumes that everyone aspires to own a private vehicle, with projections from the IEA assuming a doubling of individual car usage by 2050, from around 1.2 billion vehicles to almost 2 billion. It also assumes a universal desire for the latest consumer electronics, driven by the push for widespread digitalisation, and an expectation that the defence industry must expand in parallel with economic growth.<sup>237</sup> This viewpoint fails to consider the nuanced differences between societal essential needs and fabricated societal wants through public relations and advertising industries.<sup>238</sup> These assumptions are fuelled by demand projection models that predict an annual economic growth rate of 3%, leading to increased material consumption to meet energy and consumer demand that this 3% assumption entails.<sup>239</sup> With six of the nine planetary boundaries already crossed, these assumptions create a self-fulfilling prophecy of never-ending material extraction. These assumptions also allow for the sacrifice of indigenous lands, rivers, old-growth forests, and agrarian lifestyles, as well as the continuation of hidden neocolonial material flows from the Global South to appear acceptable, all to feed the supposed low-carbon infrastructures and digital technologies. These models essentially generate the belief that it becomes acceptable to destroy the planet to save the planet. A greater contradiction can hardly be found.

The objective of the green transition and thereby limiting climate change to 1.5°C cannot be solely about carbon emissions. It also encompasses the need for justice to be an integral part of the process. In the face of these assumptions and their consequences, we are confronted with a stark reality: our

---


<sup>235</sup> [EU's Flawed Reliance on Audits, Certifications for Raw Materials Rules | Human Rights Watch \(hrw.org\)](#)

<sup>236</sup> [SOMO-position-paper-on-Critical-Raw-Materials-Regulation.pdf](#)

<sup>237</sup> [At what cost? - At what cost? \(tni.org\)](#)

<sup>238</sup> Hickel, Jason. 2021. *Less Is More*. London, England: Windmill Books.

<sup>239</sup> [Supply chain analysis and material demand forecast in strategic technologies and sectors in the EU - Publications Office of the EU \(europa.eu\)](#)



current economic structure, driven by unchecked consumption and growth, risks not only the health of our planet but also the integrity of societies worldwide. The sacrifice of our environment and traditional ways of life for the sake of a green and digital transition presents a contradiction that challenges us to rethink our approach to progress. Responsible sourcing, or so-called green mining can never exist without a clear distinction of needs versus wants. What are we mining for, for what kind of transition, to whose benefit? It is a call to action for us to redefine our societal needs and wants, and to strive for an economic system that respects planetary boundaries and values all forms of life.

# Policy Recommendations:

In the context of critical raw materials supply for the green transition, and to address the environmental and social challenges associated with increasing demand, we make the following recommendations:

## General Recommendations for the Critical Raw Materials Act:

### Demand-side Solutions and Circular Economy:

- **Addressing Consumption:** The European Union's consumption of CRMs should be mitigated to achieve an overall reduction of critical raw materials consumption of a minimum of 10% by 2030, compared to 2020 levels. The CRMA should set out a plan in the year following the adoption of the regulation in order to obtain a reduction of the aggregated consumption of CRMs by 2030, compared to 2020 levels.
- **Public Transport:** Most of the demand for CRMs is linked to private vehicle use. Urban development should take into account critical raw material needs and vulnerabilities to create urban plans that support the move away from vehicle use towards cycling, walking, and mass public transport.
- **Circularity:** Increase coherence with the waste hierarchy, favouring prevention, repair and reuse over recycling. Collection of waste containing CRM should be oriented in priority towards reuse and repair. For that, the regulation should devise circular design and lifetime extension requirements, or at least a reusability assessment.
- **Single-use Products:** The EU should phase out single-use products containing CRMs (e.g. portable batteries and disposable single-use vapes).
- **Product Passport:** The Union's introduction of a product passport for permanent magnets assists in providing further information on the consumption of critical raw materials and supports the EU to meet its circular economy and reduction targets.
- **Collection and Separation:** Improve collection and separation of components or products containing CRMs. The Act must define at the EU level collection targets related to the quantities of CRMs placed on the market to ensure proper reporting and avoid fraud.
- **Recycling Targets:** Define recycled contents targets for each CRM in all the products containing CRMs (go beyond batteries and permanent magnets), that could articulate with ESPR, and also propose collection and EOL (end-of-life) recycling rates (not recovery) targets for each CRMs. This plan will ensure that the recycling capacity target won't be fulfilled only by increasing the recycling capacity of the EU for industrial metals such as copper.

## Corporate Due Diligence and Indigenous Rights:

- **Retain and expand specific wording on sustainability criteria and international instruments:** bringing in reference to good faith, meaningful, continuous, and transparent stakeholder consultation, FPIC, and the Right to Say No, while adding – at a minimum – a reference to UNDRIP, ILO Convention 169, Article 27 of the International Covenant on Civil and Political Rights (ICCPR), the Regional Agreement on Access to Information, Public Participation and Justice in Environmental Matters in Latin America and the Caribbean (Escazú Agreement), Article 1 of the International Covenant on Economic, Social and Cultural Rights, the International Convention on the Elimination of All Forms of Racial Discrimination, and the Convention on the Elimination of All Forms of Discrimination against Women.
- **Require that all companies applying to be project promoters demonstrate a substantial track record of respect for human rights, Indigenous rights, the environment, and the rule of law:** When establishing whether a project can be implemented sustainably, the Commission should assess, alongside internationally recognised instruments, the company's respect for due diligence standards set out in the UN Guiding Principles, existing legislation such as the Battery Regulation, and legislation under development such as the Corporate Sustainability Due Diligence Directive, regardless of whether they fall under the scope of such instruments.
- **Prevent companies with a record of poor corporate conduct from becoming project promoters:** This would jeopardise the integrity of public funds, by drawing on and expanding exclusion criteria set out in the Public Procurement Directive and Award of Concessions Contracts Directive, particularly surrounding corruption, to also cover convictions in OECD countries or countries where strategic projects are located and crimes against the environment, human rights, and Indigenous rights.
- **No option to replace EU legislation with industry certification:** The CRM Act should not provide the option for Strategic Projects to be individually certified as part of a recognised certification scheme (or simply with a commitment to obtain certification) as an alternative to complying with EU legislation and international instruments. All Strategic Projects must abide by the corporate obligation to conduct Human Rights and Environmental Due Diligence and abide by EU legislation and international law. Voluntary industry certification should not be a replacement for a broader assessment of human rights and environmental performance. The need for EU regulation of business was recognised by policymakers due to the limitations and weaknesses of corporate self-regulation, making it illogical for an EU law to rely on industry-led initiatives in the manner set out in the CRM Act proposal.

## Permitting and Strategic Projects:

- **Streamlined permitting should not come at the cost of environmental legislation or meaningful community participation:** This means that every project should have an environmental and social impact assessment and provisions regarding tacit approval of permitting procedures. Environmental and social impact assessments must not be restricted by pre-set timelines.
- **Member states need to ensure that their licensing authorities have sufficient financial resources and well-trained staff in order to carefully revise project applications:** Allocate



specific financial resources to Member States to increase staff dealing with permits and make mandatory “pre-permitting” procedures with early involvement of all affected communities.

- **Guarantee public access to and transparency of documents submitted by project promoters and applicants for strategic projects:** both to national authorities and the Critical Raw Materials Board.
- **Strategic projects should not be recognised in cases where:** the available scientific evidence establishes a plausible risk of environmental harm or of disrupting the global carbon cycle, even if the evidence is inconclusive.
- **Removing the possibility for projects being of “overriding public interest”:** The Commission’s proposed CRM Act designates Strategic Projects as having “overriding public interest”, following industry demands. This should be removed, and there should be no exceptions or regulatory breaks to environmental safeguards and regulations.
- To ensure the aforementioned criteria, a subgroup on sustainability and responsible mining within the critical raw materials board should include civil society and Indigenous Peoples representatives.
- **Member states should be obliged to undertake projects which:** 1) ensure the practical implementing of the Extractive Waste Directive, its standardised methods, annexes and application guidelines and the water framework directive, and create national guidance for them 2) examine and demonstrate how permits can be accelerated without compromising the quality of permits and public consultation.

## Case Specific Recommendations:

### Sweden:

- **Indigenous Rights:** Comply with the UN recommendations about Sami Indigenous rights to guarantee, among others, their right to self-determination and to be consulted by the State and companies in matters that affect them. In the same line, Sweden needs to ratify the ILO convention 169 and implement its obligations under the UNDRIP.
- **Mining Reform:** Update its mining permitting process to include Sami FPIC from the onset of the projects and recognise that co-existence of reindeer herding, and other activities is not possible in most cases in the current Swedish situation.
- **Due Diligence:** Guide its mining industry and hold it accountable for respecting Sámi rights and avoiding environmental harm. This can be done through strong due diligence legislation.
- **Nature Protection:** Avoid mining in Natura2000 areas and other protected areas.
- **Permitting:** Include in the mining permitting process, next to Environmental Impact Assessments, the requirement of a social and cultural impact assessment and a cumulative effects assessment. These will provide a complete picture of the impacts of mining projects on the Sámi and other communities.

## Bolivia:

- **Identifying Risks:** Companies should identify and assess potential or actual adverse impacts on human rights and the environment in their operations and value chains. In this case, European companies using indium should identify the risks associated with its extraction in Bolivia, including potential human rights abuses and environmental damage.
- **Preventing and Mitigating Risks:** Once risks are identified, companies should take appropriate action to prevent and mitigate them. This could involve working with Bolivian miners and local traders to improve working conditions and implement environmentally friendly mining practices.
- **Accountability:** Companies should account for how they address their impacts on human rights and the environment. They should provide detailed reports on their supply chains, including the sourcing of indium from Bolivia, and the measures they have taken to address any adverse impacts.
- **Fair Payment:** The CSDDD requires companies to act in a manner that respects human rights. This includes ensuring fair payment for resources. European companies should ensure that Bolivian miners are being fairly compensated for the indium they extract.
- **Due Diligence Processes:** The directive requires directors of EU companies to set up and oversee the implementation of due diligence processes. In this case, this could involve setting up processes to regularly review and improve conditions in the indium supply chain.
- **Tax Justice:** Tax contribution by the companies exporting indium-rich minerals should be reported to and requested by the Bolivian state.
- **Value-added:** The refining process of zinc and indium should be taking place in Bolivia to generate the added value locally and to cover the costs of remediating the environmental damage of the mining activities. It would also avoid the negative effects of the global transport of heavy mineral concentrates.

## Portugal

- **Protect land-rights:** the collective rights of the baldios must be respected.
- **Democratic participation:** Engage in more meaningful and inclusive dialogue with local communities to ensure that their concerns and perspectives are taken into account in decision-making processes. Presentation and discussion of all available science, data gaps (or 'unknowns') and controversial debates as communicated by independent academics and non-industry experts to allow full knowledge before decisions can be made.
- **Sustainable livelihoods:** Invest in the development of post-extractive economies that can provide sustainable livelihoods for local communities, and especially related to promoting agro-ecological practices as well as socioecological conservation and tourism schemes to create alternative and locally appropriate development strategies.
- **Due diligence:** Implement stronger regulations and oversight mechanisms to ensure that mining companies are held accountable for their social and environmental impacts.
- **Alternative technologies:** Support the development of alternative technologies and materials that can reduce the reliance on raw materials that are associated with negative social and environmental impacts.

## Finland

- **Uphold legislation and create national guidance:** To uphold and enhance environmental standards in mining operations, it is crucial to consistently evaluate their impacts on a case-by-case basis. Any automatic departures from the established standards of water frameworks or nature directives should be prohibited. National guidance on the implementation of Extractive Waste Directive, its **standardised methods, annexes and application guidelines, suitable to the Finnish environment**, should be created involving expertise from universities and research institutions.
- **Cost-benefit analysis:** There is a need to establish and enhance the methods for implementing and assessing cost-benefit analyses, along with the creation of relevant tools. It must be explicitly guaranteed that the prohibition of contaminating surface water, groundwater, and soil, as stipulated in the extractive waste directive, remains in effect indefinitely.
- **Use of high standards:** The extractive and battery industries must be obliged to invest in environmental technology so that no contamination is caused. The technology does exist to mitigate environmental and social harms. If mines and the battery industry cannot operate in a sustainable manner, their operations must be suspended or terminated. The EU has an outstanding opportunity to encourage new and sustainable industries.
- **Substitution:** The EU should focus its investments on the development of substitute materials and technologies, environmental technologies and reuse instead of the old-fashioned mining and battery industry.
- **The Environmental Footprint** of raw materials should also include mining waste and the consideration of its long-term effects in the mine design. The carbon footprint should take into account the carbon impact of mining waste after mine closure and the carbon impact of long-term water treatment.

# Annex 1:

For the interviews, unless with consent, the names are anonymized to protect the identity of people within these ongoing environmental conflicts by referring to them by profession, fabricated names, or gender.

The case study on Portugal was done through semi-structured and informal interviews were conducted between December 2021 and June 2022, with most interviews collected within the Barroso region between January and February 2022. Research participants were contacted through existing social networks, which also included employing a snowball interview approach. This includes approaching people for interviews in public spaces and going door-to-door. We have also organized strategic interviews with mayors, company representatives and non-profits. The research is based on 26 recorded semi-structured interviews and over 20 informal interviews. There are 28 different people interviewed within the recorded interviews (as couples and/or friends preferred to do interviews together). Research participants were farmers, mayors, civil servants, company representatives, non-profits and various people opposing the proposed mines in the Barroso region. Secondary and primary resources were collected, such as newspaper articles, company brochures, City and Village Council documents as well as other documents research participants shared with us, to triangulate information in the interviews. While conducting interviews, the researchers have also attended public events and anti-mining demonstrations in the region.

In Bolivia, the prime focus was mining cooperatives. From 45 cooperatives affiliated in the Cooperative Mining Federation of Oruro, around 30 extract the metals that form the object of the original fact-finding mission in May-June 2019 (tin, zinc, silver and lead). The six cooperatives of San José Jallpa Socavón, Poopó, Japo, Santa Fe, Morococala and Machacamarcas were selected for fieldwork as they represent cooperatives operating in a wide range of different internal and external circumstances. A participative observation of the daily work across different stages was performed; while for local mineral traders mainly a non-participatory approach based on external observation, was the only possible method for investigation as access was hindered, or even denied in most cases. From their mining galleries, the extracted minerals were further followed. Most local mineral traders are based on the road to Vinto in the city of Oruro. All seven suppliers that are visually operating in that area were approached, while in only three cases an interview was conceded (COMERMIN, Minexa and Royal Mines Impex). In the cases of Oruro, tin is directly smelted in one of the two smelters (Vinto and OMSA). A visit to the complete installations of Vinto was made with interviews with the different departments (purchases, operations, quality, environment, and sales) performed. No zinc-lead-silver polymetallic ore is smelted in Oruro.

Both semi-structured and unstructured interviews were performed for local stakeholders at their workplaces (miners, cooperatives' members, suppliers, social organisations, public institutions and other actors involved in the supply chain). The existing literature on this supply chain beyond international trade is very limited. Historical, legal, economic, political, social, anthropological, and environmental aspects are qualitatively analysed by using field notes, official documents, statistical data (e.g., Eurostat), critical articles and reports. The fact-finding mission of 2019 was complemented



in 2020 with a case-study in Belgium<sup>240</sup> focused on the indium-rich minerals coming from Oruro. As plant visits were not allowed – in contrast with Bolivia – semi-structured interviews were conducted with the supply chain actors involved in Belgium (Port of Antwerp, SEA-Invest, Umicore and Nyrstar), and the study was complemented with official reports, company information, and statistical data on imports and exports.

In Sweden, the methodology combined literature reviews and expert semi-structured and unstructured interviews of 20 Sámi leaders and community members. The literature review included academic literature, governmental reports, national and European official websites, mining industry reports and websites and media news. The expert interviews were conducted between November 2021 and June 2022. These included leaders and representatives of the Swedish Sámi herding community, local and national Swedish authorities, civil society organisation representatives, environmental defenders, and local inhabitants living close to working or projected mining sites. All information input was then triangulated and merged for the analysis.

For Finland, an extensive literature review was performed. The material for the review included permits, environmental impact assessments, scientific publications, official reports, company reports and press releases, and media news. On the other hand, this study contains information from semi-structured and unstructured interviews with locals, environmental defenders, mine workers, scientists, and local and national authorities conducted in a 10-year period, starting from the Talvivaara spill in 2012 up to August 2022. The waste and wastewater analysis were done in accredited laboratories. All mathematical calculations and chemical balances used in this report were performed based on information found in reports of the Terrafame company and general chemical principles and information applied to mining processes.

---

<sup>240</sup> [Linking the Bolivian minerals to the European Industry - CATAPA vzw](#)





**EEB**  
European  
Environmental  
Bureau

[eeb.org](http://eeb.org)



A better future where people and nature thrive together