



Recovery of Tungsten, Niobium and Tantalum occurring as by-products in mining and processing waste streams

(TARANTULA)

D6.5 Guidelines for safeguarding social and environmental sustainability in future commercial upscaling

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Abbreviations and acronyms

CA	Consortium Agreement
CC	Conference Call
DoA	Description of the Action
EAB	External Advisory Board
EC	European Commission
EC-GA	Grant Agreement with the EC
FM	Final Meeting
FR	Final Report
GB	Governing Board
IPR	Intellectual Property Rights
PR	Periodic Report
PO	Project Officer
QAP	Quality Assurance Plan
TL	Task Leader
ToC	Table of Content
WP	Work Package
WPL	Work Package Leader



Executive summary

This document aims at providing guidelines and recommendations for safeguarding social and environmental sustainability when upscaling TARANTULA technologies.

The document includes at first a brief analysis of the European context from the environmental point of view. The environmental justification of the project and its alignment with European sustainable financial aspects, the identification of main environmental impacts associated to the technology to recover critical raw materials, the regulation applicable to this technology and a proposal of environmental indicators to be monitored in order to ensure the environmental benefit and the proper progress of the activity.

As regards to the social aspects, this document presents a list of positive and negative potential social impacts related to the critical raw material recovery activity. Some factors that can affect the social acceptance of the technology upscaling are assessed.

From the identification of potential social impacts that can be expected, an assessment of their contribution to the Sustainable Development Goals (SDGs) has been carried out. Also, a list of general measures is included which aim at mitigating the negative potential impacts, identified as related risks.

Considering the context and previous tasks, an evaluation of GRI standards have been carried out, as a result a list of indicators is proposed.

Finally, several recommendations and guideline are described, that form the basis of an action plan to be followed when upscaling the TARANTULA technology, involving different aspects such as stakeholders identification, communication protocol, measures to mitigate the potential impacts and guidelines for indicators monitoring.



1. Introduction

TARANTULA's overarching objective is to develop a suite of cost-off effective, scalable, ecofriendly, efficient and flexible metallurgical technologies with high selectivity and recovery rates with respect to W, Nb and Ta.

The aim is to provide guidelines and recommendations for safeguarding social and environmental sustainability when upscaling TARANTULA technologies, considering:

- At prototype level, issues may arise with regard to environmental aspects, because no social significance is foreseen. Therefore, guidelines and recommendations along these lines will be provided to the consortium partners.
- At future large-scale operation at selected mining sites, guidelines and recommendation will be based both on sustainability assessment in previous tasks in this WP, as well as work carried out in WP8 related to civil society and stakeholder engagement.

As the social acceptance and environment evolves over time (due to project and community evolution, as well as possible incidents), the guidelines will not only include recommendations for the development of projects, but also proposed indicators to be monitored and track the evolution of the public acceptance and environment after the activity starts.



2. Tasks description

The TARANTULA project is an ambitious initiative aimed at developing advanced, environmentally friendly, and cost-effective technologies that exhibit high selectivity and a high recovery rate for the following Critical Raw Materials of interest: W, Ta, and Nb.

This project represents a significant advancement in the research and innovation of technologies for the sustainable production of Critical Raw Materials using waste and by-products from the mining and metallurgical industry. Therefore, its success could have a significant impact on the sustainable development of the mining industry globally.

2.1. Prototype scale: environmental aspects

For the development of this identification of environmental aspect for the prototype scale, the following topics will be followed:

1. Environmental justification of the Tarantula project and alignment of the project with European sustainable finance environmental objectives
2. Environmental implications of the Tarantula project and recommendations
3. European environmental regulations applicable to project Tarantula
4. Environmental indicators

2.1.1. Environmental justification of Tarantula Project and alignment with European sustainable finance environmental objectives

The primary objective of any waste policy should be to minimize the negative effects of waste generation and management on human health and the environment. Additionally, in line with the principles of the circular economy, such a policy should also aim to efficiently use resources and promote the practical application of the waste hierarchy, as established in Article 4 of Directive 2008/98/EC of the European Parliament and of the Council of 19 November 2008 on waste (Waste Framework Directive).

This hierarchy sets the order of priority regarding legislation and waste prevention and management policy:

- Prevention.
- Preparation for reuse.
- Recycling.
- Other types of recovery, such as energy recovery.
- Disposal.



In relation to these principles, various regulations, plans, and actions have been developed at the European level.

In the European context, Directive 2018/851 of the European Parliament and of the Council of 30 May 2018 amending Directive 2008/98/EC on waste is noteworthy. It is also worth mentioning that on 11 March 2020, the European Commission published a Communication to the European Parliament, the Council, the European Economic and Social Committee, and the Committee of the Regions on the New Circular Economy Action Plan for a Cleaner and More Competitive Europe.

On another note, it is of interest to mention that the "European Green Deal" establishes a roadmap with actions to promote the efficient use of resources within a clean and circular economy, biodiversity restoration, and pollution reduction. In this regard, this document outlines the necessary investments and available financing instruments to make the EU climate-neutral by 2050, with a tight schedule for 2020-2021.

This policy places decarbonization of the economy and industry as one of its main paradigms, aiming for significant progress by 2030 and a commitment to activities that address climate change mitigation and adaptation, sustainable use and protection of water and marine resources, a transition to a circular economy model, prevention and control of pollution, and, of course, the protection of healthy ecosystems.

These environmental objectives for sustainable finance are outlined in Regulation (EU) 2020/852 of the European Parliament and of the Council of 18 June 2020 establishing a framework to facilitate sustainable investments and amending Regulation (EU) 2019/2088, which establishes them as:

1. Mitigation of climate change.
2. Adaptation to climate change.
3. Sustainable use and protection of water and marine resources.
4. Transition to a circular economy, waste prevention, and recycling.
5. Prevention and control of pollution (IPPC/MTD).
6. Protection of healthy ecosystems.

To achieve the mentioned objectives, the Regulation on sustainable finance establishes four compliance criteria, which are as follows:

- a) Substantially contribute to one or more of the established environmental objectives.
- b) Cause no significant harm to any of the environmental objectives.
- c) Be carried out with the minimum guarantees associated with the principles and rights of the International Labour Organization Declaration (freedom of association, equality, non-discrimination, child labour, negotiation, etc.). Social and governance criteria.



d) Comply with the technical selection criteria (taxonomy) established by the Commission.

Considering the criteria of freedom of association, equality, non-discrimination, absence of child labour, and negotiation currently developed by the operation and governance of the present Project, and regardless of the detailed taxonomy analysis (which is not the subject of this document), it can be established that the TARANTULA Project aligns comprehensively with European environmental objectives for sustainable finance, as reflected in Table 1.

Table 1. Compliance with European environmental objectives for sustainable finance

Environmental Objectives	Alignment with Sustainable Finance Objectives	Observations
<i>Mitigation of climate change</i>	Yes (without harm to objectives)	The Project includes measures to address atmospheric emissions from the process; therefore, it is considered not to entail significant greenhouse gas emissions.
<i>Adaptation to climate change</i>	Yes (without harm to objectives)	The Project is not only aligned with the goal of mitigating climate change but also enables the developed activity to position itself favourably in a future scenario with reduced availability of raw materials, through the promotion of recycling.
<i>Sustainable use and protection of water and marine resources</i>	Yes (without harm to objectives)	The Project will incorporate measures against excessive consumption of water resources, thus not implying a significant impact on the local water resources.
<i>Transition to a circular economy, waste prevention, and recycling</i>	Yes (substantial contribution)	The Project's purpose is the recovery of critical raw materials from mining waste materials, contributing to increased product recyclability, as well as the recyclability of various materials contained in those products. It promotes the use of secondary raw materials and their quality, particularly through high-quality waste recycling, and the development of waste management infrastructure necessary for prevention, preparation, reuse, and recycling, while ensuring that the resulting recovered materials are recycled as high-quality secondary raw materials in production, thus avoiding the degradation cycle. Consequently, it promotes the circular economy and efficient resource use, contributing to achieving reuse and recycling goals in accordance with the New Circular Economy Action Plan for a Cleaner and More Competitive Europe.
<i>Prevention and Control of Pollution</i>	Yes (without harm to objectives)	The Project will adhere to the best available techniques applicable to it, thus not resulting in significant emissions of pollutants into the environment.
<i>Protection Ecosystems</i>	Yes (without harm to objectives)	The Project will incorporate preventive and corrective measures in the process to avoid any impact on the ecosystems surrounding the facility.



2.1.2. Environmental implications of the Tarantula Project

The recovery of critical raw materials such as tungsten (W), niobium (Nb), and tantalum (Ta) from industrial waste and mining by-products in Europe can offer economic and strategic benefits, but it can also pose environmental challenges and issues.

In this section, we will identify the main impacts associated with the Project. To do so, we will identify the primary vectors of impact, which can have effects on different aspects of the environment. This identification will be carried out for two stages: the construction phase and the operational phase.

Environmental impacts arise from the interaction of the Project's actions (impact vectors) with various environmental factors and subfactors. Figure 1 schematically illustrates the resulting impacts, represented by a cross in the corresponding boxes where the impact vectors intersect with the environmental factors affected by them.



Table 2. Project impacts identification matrix

IMPACTS VECTORS		CONSTRUCTION					OPERATION									
		LAND SUITABILITY	TRANSPORT OF MATERIALS AND EQUIPMENT (TRAFFIC)	CONSTRUCTION NOISE	EMPLOYMENT AND RENT	WASTE	ATMOSPHERIC EMISSIONS	EFFLUENTS	WASTE	NOISE	INFRASTRUCTURE	RESOURCE CONSUMPTION	TRANSPORT OF MATERIALS AND EQUIPMENT (TRAFFIC)	EMPLOYMENT AND RENT	CIRCULAR ECONOMY	
FACTORS AFFECTED																
PHYSICAL ENVIRONMENT	GEOMORPHOLOGY	X														
	GEOLOGY	X														
	EDAPHOLOGY	X														
	HIDROLOGY	SURFACE WATER						X								
		GROUND WATER	X				X	X	X							
	ATMOSPHERE	AIR QUALITY	X	X				X					X			
ACOUSTIC QUALITY				X						X						
BIOTIC ENVIRONMENT	FLORA	X					X									
	WILDLIFE			X						X						
SOCIAL AND CULTURAL ENVIRONMENT	LANDSCAPE										X					
	SOCIOECONOMICS	SOCIAL ACCEPTANCE		X	X	X	X	X		X		X	X	X	X	
		ECONOMIC WELL-BEING		X		X	X			X			X	X		



The recovery of critical metals from waste can have various environmental impacts, both positive and negative. These impacts depend on a range of factors, including the techniques used for recovery, waste management, the quantity and quality of waste, and local environmental conditions. Below are descriptions of some of the most common environmental impacts associated with the recovery of critical metals from waste:

- **Positive Environmental Impacts:**

1. **Conservation of Natural Resources and Resource Recovery:** Reduction of the need to extract valuable minerals and metals from natural deposits, helping conserve non-renewable resources and reducing pressure on fragile ecosystems. Additionally, the recovery of critical raw materials contributes to their availability for use in clean technologies and renewable energy.
2. **Reduction in Open-Pit Mining:** Obtaining critical materials from waste reduces the extraction of primary minerals, resulting in reduced destruction of natural habitats and landscapes through open-pit mining, thereby protecting biodiversity and reducing soil erosion.
3. **Carbon Footprint Reduction:** Recovering critical metals from waste involves lower energy consumption and greenhouse gas emissions compared to primary mineral mining, contributing to climate change mitigation (note that while emissions are lower in this case, raw material recovery processes also involve pollutant emissions).
4. **Decreased Landfill Demand:** Recovering critical raw materials from waste reduces the amount of waste sent to landfills. This extends the lifespan of existing landfills and reduces the release of hazardous chemicals into the environment, thus protecting human health and ecosystems.
5. **Promotion of Recycling:** Recovering critical raw materials from waste promotes a culture of recycling and product reuse, which can lead to more sustainable waste management overall.
6. **Diversification of Supply Sources:** Obtaining critical raw materials through recovery reduces dependence on geographically concentrated sources of critical metals (mainly in China), reducing the risk of supply interruptions.
7. **Pollution Reduction:** The raw material recovery process results in less release of toxic heavy metals into the environment than extraction processes, reducing exposure of biodiversity and humans to these hazardous pollutants. Additionally, it reduces the release of acid mine drainage from the mining industry, which can help mitigate soil and water acidification, benefiting local flora and fauna.



8. **Reduced Pressure on Vulnerable Ecosystems:** By reducing the demand for primary minerals, pressure on local communities in mineral extraction areas is reduced, where conflicts and social issues are often associated.

- **Negative Environmental Impacts:**

1. **Secondary Waste Management:** Critical metal recovery processes can generate secondary waste such as sludges and chemical effluents that may contain toxic chemicals. Proper management of these waste products is necessary to prevent soil and water contamination.

2. **Chemical Pollution:** The use of hazardous chemicals like acids and solvents in recovery processes can result in environmental contamination, posing risks to human health and biodiversity.

3. **Local Impacts:** Depending on the location of the recovery facilities, there can be local impacts on the surrounding environment due to the use of local water resources, generation of noise, and emission of air pollutants.

4. **Acid Mine Drainage:** When mining waste comes into contact with air and water, it can generate acid mine drainage (AMD). This creates a highly acidic environment that can harm aquatic life and negatively affect nearby water bodies.

5. **Efficiency Issues:** Some recovery methods may not be as efficient as desired, potentially requiring higher energy and resource consumption to achieve the desired results. This potential increase in energy consumption can raise the carbon footprint and demand for natural resources like oil and gas.

6. **Resource Competition:** Recovering critical raw materials from industrial waste may lead to increased demand for suitable waste for critical metal recovery, creating competition for these materials, which could raise prices and increase waste management costs.

7. **Transportation and Logistics:** Critical metal recovery involves the transport of waste and materials, which can contribute to the carbon footprint and other environmental impacts associated with transportation, as well as the release of dust and particles during waste handling and transportation.

8. **Air Quality Impacts:** Critical raw material recovery processes generate emissions of air pollutants that can negatively affect air quality in the surrounding areas.

9. **Water Quality Impacts:** There is a potential for contamination of groundwater and surface water due to accidents or improper waste and chemical management.



10. Accident Risks: There is a risk of accidents at recovery facilities, such as spills of hazardous chemicals or unintended emissions, which can have severe consequences for the environment and public safety.

As a clarification, the main environmental impacts arising from the recovery of critical raw materials from mining waste are represented below, distinguishing between potential positive and negative consequences associated with each impact.

Table 3. Summary of environmental impacts arising from the recovery of critical raw material

Impact Category	Positive Impacts	Negative Impacts
Natural Resources	<ul style="list-style-type: none"> - Efficient and responsible use of scarce natural resources, reducing pressure on natural sources. -Minimization of the impact on the extraction of new resources, contributing to biodiversity conservation and ecosystem integrity 	<ul style="list-style-type: none"> - Possible depletion of non-renewable resources if their use is not properly managed. - Competition for resources with other industries and local communities. - Alteration of ecosystems for raw material extraction.
Energy and Emissions	<ul style="list-style-type: none"> - Reduction of greenhouse gas emissions and use of cleaner technologies. - Contribution to climate change mitigation through more sustainable production practices. 	<ul style="list-style-type: none"> - High energy consumption for the recovery process, contributing to emissions. - Greenhouse gas emissions during the process. - Possible dependence on non-renewable energy sources.
Waste	<ul style="list-style-type: none"> - Focus on recycling and waste reduction, reducing the burden on landfills and environmental contamination. - Use of safe and efficient waste treatment technologies. 	<ul style="list-style-type: none"> - Generation of toxic and hazardous waste during the recovery process. - Possible soil and water contamination due to improper waste management. - Risk of releasing harmful substances into the environment.
Biodiversity	<ul style="list-style-type: none"> - Protection of fragile ecosystems and valuable habitats through mitigation and conservation measures. - Avoidance of degradation and loss of biodiversity in sensitive areas. 	<ul style="list-style-type: none"> - Habitat disturbance and disruption of local biodiversity due to project activity. - Possible habitat fragmentation and impact on threatened species. - Impact on aquatic and terrestrial ecosystems.
Water	<ul style="list-style-type: none"> - Sustainable use of water through recycling, reuse, and responsible management technologies. - Minimization of the impact on freshwater sources and underground aquifers. 	<ul style="list-style-type: none"> - Possible contamination of water sources and depletion of water resources due to the recovery process. - Risk of impact on aquatic ecosystems and aquatic life. - Competition for water resources with communities and other industries.
Climate Change	<ul style="list-style-type: none"> - Contribution to climate change mitigation by reducing the need for the extraction of new raw materials. - Reduction of the carbon footprint through more efficient processes. 	<ul style="list-style-type: none"> - Greenhouse gas emissions during raw material extraction and recovery. - Possible dependence on processes using fossil fuels and generating emissions.



To counteract these negative environmental impacts, it is important to adopt sustainable and ethical practices in various areas aligned with the United Nations Sustainable Development Goals (SDGs) and the Global Reporting Initiative (GRI) indicators. Below are some general measures that can be taken to mitigate these negative environmental impacts arising from the recovery of critical raw materials from waste:

Table 4. Measures to mitigate negative impacts from the recovery of critical raw materials

IMPACT	MEASURES
REDUCTION OF GREENHOUSE GAS EMISSIONS (SDG 13 - CLIMATE ACTION)	<ul style="list-style-type: none"> • Implement clean and efficient technologies in waste processing and transportation. • Set emission reduction targets and follow an action plan to achieve them. • Monitor greenhouse gas emissions and other air pollutants (GRI 305) and implement carbon capture technologies to reduce these emissions. • Promote sustainable mobility and reduce unnecessary travel.
WATER CONSERVATION (SDG 6 - CLEAN WATER AND SANITATION):	<ul style="list-style-type: none"> • Monitor and reduce water consumption in operations and processes. • Implement water reuse and recycling systems, as well as optimize cooling systems (GRI 303). • Participate in local watershed restoration and conservation projects.
RESPONSIBLE WASTE MANAGEMENT (SDG 12 - RESPONSIBLE PRODUCTION AND CONSUMPTION)	<ul style="list-style-type: none"> • Design a waste management system that prioritizes source reduction, reuse, and recycling of materials. Avoid improper disposal of hazardous chemicals and waste. • Establish recycling and composting programs in the workplace. • Assess and reduce the generation of hazardous waste (GRI 306).
BIODIVERSITY PROTECTION (SDG 15 - LIFE ON LAND)	<ul style="list-style-type: none"> • Conduct environmental impact assessments and mitigation measures before starting projects that affect biodiversity. • Conduct a biodiversity study to identify critical areas and take measures for the conservation of local fauna and flora (GRI 413). • Participate in local ecosystem conservation and restoration programs. • Avoid deforestation and forest degradation (GRI 304).
PROMOTION OF CLEAN AND RENEWABLE ENERGY (SDG 7 - AFFORDABLE AND CLEAN ENERGY)	<ul style="list-style-type: none"> • Transition to renewable energy sources for operations and processes. Use efficient equipment and technologies to reduce energy consumption. • Adopt technologies and processes that improve energy efficiency and reduce greenhouse gas emissions (GRI 302).
INVESTMENT IN SUSTAINABLE RESEARCH AND DEVELOPMENT (SDG 9 - INDUSTRY, INNOVATION, AND INFRASTRUCTURE)	<ul style="list-style-type: none"> • Allocate resources to research and development of sustainable technologies. • Promote innovation in more sustainable products and services (GRI 103).
COMPLIANCE WITH ENVIRONMENTAL REGULATIONS (SDG 12 - RESPONSIBLE PRODUCTION AND CONSUMPTION)	<ul style="list-style-type: none"> • Ensure compliance with all European and local environmental laws and regulations (GRI 307). • Conduct a comprehensive Environmental Impact Assessment (EIA) before starting the project to identify and evaluate potential environmental impacts. • Perform periodic environmental audits to ensure compliance (GRI 307).
PROMOTION OF TRANSPARENCY AND ACCOUNTABILITY (GRI 102 - GENERAL DISCLOSURES)	<ul style="list-style-type: none"> • Transparently report key environmental indicators. • Participate in disclosure and sustainability initiatives (GRI 103).



2.1.3. European environmental regulations applicable to Tarantula Project

In Table 5, European environmental regulations applicable to the project are listed.

Table 5. European regulations applicable to the project

IMPACT	REGULATION
ATMOSPHERIC EMISSIONS	<p>Directive 2008/50/EC of the European Parliament and of the Council of May 21, 2008, on ambient air quality and cleaner air for Europe. The purpose of the mentioned legislation is the prevention, monitoring, and correction of situations of atmospheric pollution that occur, regardless of their causes.</p> <p>In this context, it is also worth mentioning Directive 2010/75/EU of the European Parliament and of the Council of November 24, 2010, on industrial emissions (integrated pollution prevention and control).</p> <p>The emission limit values applicable to the Project are included in Commission Implementing Decision (EU) 2018/1147 of the Commission of August 10, 2018, establishing best available techniques (BAT) conclusions on waste treatment, in accordance with Directive 2010/75/EU of the European Parliament and of the Council, specifically in BAT 25.</p>
EFFLUENTS	<p>Those BATs applicable to direct discharges to the receiving water body included in Commission Implementing Decision (EU) 2018/1147 of the Commission of August 10, 2018, establishing best available techniques (BAT) conclusions on waste treatment, in accordance with Directive 2010/75/EU of the European Parliament and of the Council.</p>
WASTE	<p>Commission Implementing Decision (EU) 2018/1147 of the Commission of August 10, 2018, establishing best available techniques (BAT) conclusions on waste treatment, in accordance with Directive 2010/75/EU of the European Parliament and of the Council.</p> <p>Additionally, note Directive 2008/98/EC of the European Parliament and of the Council of November 19, 2008, on waste, as amended by Directive 2018/851 of the European Parliament and of the Council of May 30, 2018, as well as the following provisions directly applicable to Member States:</p> <ul style="list-style-type: none"> • Commission Regulation 1357/2014 of May 30, 2014, replacing Annex III to Directive 2008/98/EC of the European Parliament and of the Council on waste. • Commission Decision 2014/955/EU of December 18, 2014, amending Commission Decision 2000/532/EC on the list of waste.

It is necessary to consider that, in addition to the mentioned regulations, compliance with national and local regulations in the Project's location area will also be required.



2.1.4. Environmental indicators

Sustainable Management of Critical Raw Materials Recovery Projects (such as tungsten, niobium, and tantalum) can align with the United Nations Sustainable Development Goals (SDGs) and the Global Reporting Initiative (GRI) indicators. Below is a list of indicators to assess the environmental impacts derived from the project and to support the implementation of future process improvements.

Table 6. Proposed indicators to assess the environmental impacts

INDICATOR	DESCRIPTION	SDG	GRI
Energy Consumption	Measure the total energy consumption during the process and its source (e.g., electricity, gas, fuel), and compare it to energy efficiency targets.	7	302
Greenhouse Gas (GHG) Emissions	Record GHG emissions, such as carbon dioxide (CO ₂), methane (CH ₄), and nitrous oxide (N ₂ O), and calculate CO ₂ equivalent emissions.	13	305
Water Consumption	Quantify the amount of water used in the process and compare it to reduction goals and reuse/recycling targets.	6	303
Waste Generation	Measure the quantity and type of generated waste, including hazardous and non-hazardous waste, and assess recycling and disposal rates.	12	306
Water Quality	Monitor effluent and discharge quality to ensure compliance with local and national environmental standards.	6	303
Raw Material Consumption	Evaluate the use of natural resources such as minerals, metals, wood, or other materials, and look for opportunities for reduction or the use of more sustainable materials.	12	301
Biodiversity Impact	Conduct environmental impact assessments to identify potential effects on local biodiversity and take appropriate mitigation measures.	14 and 15	304
Use of Hazardous Substances	Monitor and control the use of chemicals and hazardous substances in the process, ensuring safe storage and management.	12	306



INDICATOR	DESCRIPTION	SDG	GRI
Ecological Footprint	Calculate the total ecological footprint of the process, considering natural resource use, energy, and GHG emissions.	12 and 13	--
Transport and Logistics Efficiency	Assess the efficiency of raw material and finished product transportation, considering transportation emissions and route optimization.	9	301
Air Quality Impact	Measure emissions of air pollutants, such as suspended particles, nitrogen oxides (NOx), and sulphur oxides (SOx).	11 and 13	30
Fossil Fuel Consumption	Evaluate the use of fossil fuels and its ratio compared to green energy use. Annually assess the transition to cleaner and renewable energy sources.	7	302
Human Health:	Evaluate the potential impact on the health of workers and surrounding communities due to exposure to contaminants or hazardous chemicals .	3	201 and 413
Life Cycle Assessment (LCA)	Conduct a life cycle assessment to evaluate environmental impacts from material recovery to final product disposal.	12	--
Regulatory Compliance	Evaluate compliance with local, national, and international environmental regulations and take corrective actions when necessary	16	307

2.2. Social impacts arising from the recovery of critical raw materials from waste

The establishment of a critical raw materials recovery plant from waste can have various social impacts, both positive and negative. Below a list of the main social impacts is presented:

Positive impacts

1. Job Generation: The processes involved in treating mining waste often create employment opportunities in the surrounding areas, which can improve the standard of living for the local population. However, these jobs may be temporary and seasonal, leading to job instability.



2. **Skills Development:** Implementing the project can provide training and skills development for the local workforce, enhancing residents' employability.
3. **Technology Transfer:** The adoption of advanced technologies in mining waste treatment can lead to the transfer of knowledge and technical skills to the community.
4. **Infrastructure Development:** Revenues generated by the project can be used to improve local infrastructure, such as roads, hospitals, and schools, benefiting the overall community. These benefits can enhance the quality of life in some areas but may also depend on mineral price stability.
5. **Investment in Education and Healthcare:** Companies sometimes invest in educational and healthcare programs for local communities, improving access to education and healthcare services.
6. **Revenue Generation for Local Governments:** Taxes and royalties paid by industries can increase the income of local governments, which can be used to fund public services.

Negative Impacts

1. **Health Risks:** Exposure to toxic chemicals in mining waste can pose health risks to workers and surrounding communities.
2. **Water and Soil Contamination:** If not managed properly, mining waste can contaminate groundwater and surface water, as well as soil, negatively affecting water quality and people's ability to use the land for agriculture or other purposes, impacting not only agriculture but also the health of local residents.
3. **Community Displacement:** The establishment of waste treatment facilities can lead to the displacement of local communities, which can have serious social impacts, including the loss of homes, agricultural lands, and cultural connections.
4. **Cultural Impact:** The presence of industrial operations, such as critical raw materials recovery, can change the social and cultural dynamics of local communities. This may include changes in traditional practices, worker migration, and other effects on community life.
5. **Insufficient Participation and Consultation:** The lack of public participation and consultation in decision-making about project planning and management can lead to conflicts with local communities and result in social tensions.
6. **Economic Dependency:** Communities heavily reliant on the mining industry can become vulnerable to mineral price fluctuations, leading to economic instability.



Next, it is shown a more visual representation in table format of the most common social impacts arising from these types of industrial projects.



Table 7. Social impacts from recovery of critical raw materials

Impact Category	Positive Impacts	Negative Impacts
Employment	<ul style="list-style-type: none"> - Generation of local employment, improving the economy and reducing unemployment rates - Creation of job opportunities for individuals with different levels of education and experience - Increased income and improved quality of life for workers. 	<ul style="list-style-type: none"> - Possible precarious working conditions such as low wages and long working hours. - Risk of informal or unregistered work. - Gender pay inequalities and hiring discrimination - Lack of adequate training and professional development.
Local Communities	<ul style="list-style-type: none"> - Investment in infrastructure and community services, improving the local quality of life. - Boost to the local economy through employee spending and investment in the community. - Promotion of business opportunities and development of local suppliers. 	<ul style="list-style-type: none"> - Possible displacement of communities due to project expansion - Changes in the social and cultural fabric of the community. - Increased living costs for local residents due to increased demand for housing and services.
Health and Safety	<ul style="list-style-type: none"> - Implementation of occupational safety standards to prevent accidents and injuries. - Promotion of safe and healthy working environments for employees. - Use of safe technologies and practices to minimize risks. 	<ul style="list-style-type: none"> - Possible health risks for workers due to exposure to toxic or hazardous substances. - Working conditions that may lead to occupational diseases and exhaustion
Gender Equality	<ul style="list-style-type: none"> - Equal employment and promotion opportunities for people of all genders. - Encouragement of women's participation in technical and leadership roles. 	<ul style="list-style-type: none"> - Depending on the project location, possible gender discrimination in hiring, promotion, and pay.
Education and Training	<ul style="list-style-type: none"> - Offers of training and professional development programs for workers. - Improvement of employees' technical skills, enhancing their employability. 	<ul style="list-style-type: none"> - Inequality in learning and professional development opportunities for workers. - Training gaps that can affect long-term employability.
Community Participation	<ul style="list-style-type: none"> - Active community involvement in decision-making and project design. - Spaces for expressing concerns and expectations, fostering trust. 	<ul style="list-style-type: none"> - Lack of transparency in project communication and decision-making. - Distrust in information provided by the company. - Possible lack of representation and voice of local communities in project decisions.



Additionally, there are other factors that can affect the social acceptance of the project, including:

1. Location

The plat location can also have an impact on the different social impacts of industrial projects. For example, industrial plants located in remote areas or in developing countries may have a different impact compared to industrial plants located in urban areas or in developed countries.

In remote areas, industrial plants can be an important source of employment and local development, but they can also have a negative impact on local communities and the environment due to the lack of infrastructure and basic services. In addition, local communities in remote areas often have less access to information and participation in decision-making, which can limit their ability to protect their rights and well-being.

On the other hand, industrial plants located in urban areas or in developed countries may face greater scrutiny and regulation, which can limit negative social impacts. However, they may also have a greater impact on the health and quality of life of local communities due to environmental pollution and increased traffic and economic activity.

2. Fair compensation and participation in decision-making

The right to fair compensation and participation in decision-making are fundamental to ensuring that negative social impacts of critical raw material recovery projects are mitigated and that local communities are treated fairly and equitably.

Fair compensation should be an integral part of any project. This means that industrial companies should adequately compensate local communities for any negative social impact, such as environmental degradation or human rights violations. Compensation should be fair and equitable, considering the real and potential impact of the project on people's lives and the environment.

Participation in decision-making is also fundamental to ensuring that negative social impacts of critical raw material recovery project are mitigated and that local communities are treated fairly and equitably. This means that local communities should have an active and meaningful role in decision-making related to the project, including planning, design, and implementation.

In addition, participation in decision-making should be meaningful and effective, which means that local communities should have access to relevant and timely information and should have the capacity and resources to participate meaningfully in the decision-making process.



2.3. Analyses of the potential impacts on SDGs

The Sustainable Development Goals (SDGs) are a set of 17 targets established by the United Nations to address the social, economic, and environmental challenges facing the world. These goals aim to guide global efforts towards sustainable, equitable, and environmentally respectful development by the year 2030.

The importance of the SDGs in the sector lies in the fact that industrial activities have a significant impact on multiple social, economic, and environmental aspects. The SDGs provide a roadmap for companies to address these impacts and contribute positively to sustainable development.

The present project can play a crucial role in achieving the SDGs. For example, responsible recovery of critical minerals can support the transition to a low-carbon economy (SDG 13) by providing the materials needed for clean technologies and renewable energy production (SDG 7).

Furthermore, the industrial sector has the potential to generate decent employment and economic growth (SDG 8) in local communities, thereby contributing to poverty reduction (SDG 1) and the reduction of inequalities (SDG 10). However, it is essential that industrial activities be carried out responsibly, respecting human rights, protecting the health and well-being of workers (SDG 3), and promoting gender equality (SDG 5) at all stages of the process.

Industry must also ensure responsible water management (SDG 6) and the protection of terrestrial and marine ecosystems (SDGs 15 and 14), minimizing negative impacts on biodiversity and the environment. Additionally, it should promote responsible production and consumption (SDG 12) by adopting sustainable practices in the extraction, recovery, processing, and trade of mineral resources.





Figure 1. Contribution to SDGs





Figure 2. Major issue areas for mining and the SDGs



Next, an analysis of the impact that this project could have on all the SDGs is presented, also providing general measures for the mitigation of those possible negative impacts. Since the recovery of CRM activity will be located near to mines, in order to reduce transport, the analyses also considers that relationship with mining activity.

1) **NO POVERTY:** Industrial projects can generate employment and contribute to the economic growth of the region, which can help reduce poverty and improve the living conditions of local communities. However, it can also have negative impacts on local communities, such as the displacement of communities from their lands and homes, which can increase poverty and vulnerability. Some measures to mitigate the impact are:

- **Social impact assessment:** Prior to the implementation of the project, a comprehensive assessment of the potential social and economic impacts of the project on local communities should be conducted, including an analysis of existing livelihoods, poverty, and vulnerability.
- **Local economic benefits:** Ensuring that local communities benefit economically from the project through local employment creation, capacity development, and promotion of local businesses and suppliers, thereby fostering sustainable economic growth in local communities.
- **Infrastructure and service development:** Investing in the development of infrastructure and basic services in local communities, such as access to clean water, sanitation, education, healthcare, and transportation, to improve their quality of life and reduce vulnerability.
- **Adequate compensation and relocation:** In cases where community relocation is necessary, ensuring fair and adequate compensation, as well as planned relocation that prevents the affected individuals from falling into further poverty or vulnerability.

2) **ZERO HUNGER:** Industrial activity can have an indirect impact on eradicating hunger as it can contribute to improving access to food and nutrition by driving economic development. However, it can also have negative impacts on food production by competing for land and resources with agriculture and livestock farming.

To prevent or reduce potential negative impacts, corporate social responsibility programs can be implemented to support local agricultural initiatives and strengthen food security in communities affected by the project:

- **Protection of agricultural lands:** Establish exclusion zones or protection measures around high-quality agricultural lands, avoiding industrial activity in these areas to preserve food production.



- **Water control and management:** Implement water management measures that prevent contamination of water bodies used for agricultural irrigation, ensuring wastewater treatment systems meet environmental and water quality standards.
- **Soil restoration:** Develop soil restoration plans after the completion of the project, including rehabilitation and reforestation techniques to recover fertility and quality of affected soil.
- **Soil quality monitoring:** Conduct continuous monitoring of soil quality in areas near the project, assessing contaminant levels and taking corrective actions in case of detecting negative impacts.
- **Support for local agriculture:** Provide support to local farmers, facilitating access to sustainable agricultural technologies to strengthen food production and ensure food security in the region.
- **Dialogue and cooperation with farmers:** Establish open and transparent dialogue with farmers and local agricultural organizations, involving them in the planning and decision-making of the mining project, taking into account their concerns and needs.
- **Food risk assessment:** Conduct food risk assessments in communities near the project, identifying potential impacts on the food supply chain and taking preventive measures to mitigate them.
- **Compensation and support for affected farmers :** In cases where farmers are directly affected by the project, offer fair compensation and support for their relocation or agricultural conversion, ensuring the continuity of their livelihoods.

3) **GOOD HEALTH AND WELL-BEING:** All industrial activity can have significant negative impacts on human health due to workers' exposure to toxic chemicals and heavy metals, as well as increased risk of accidents and occupational diseases. It can also have negative impacts on the health of local communities due to air, water, and soil pollution, and affect the mental health and well-being of local communities due to noise, dust, and vibrations.

To minimize negative health impacts resulting from the recovery activity, the effective implementation of the following measures is proposed:

- **Risk assessment:** Conduct comprehensive health and safety risk assessments at all stages of the project, identifying potential hazards and associated risks.
- **Risk management plans:** Develop risk management plans that include preventive and mitigation measures to minimize health and safety risks to workers and local communities.



- **Training and awareness:** Provide adequate training to workers on specific occupational risks associated with the project, as well as proper use of personal protective equipment (PPE) and safety procedures.
- **Personal protective equipment (PPE):** Supply and ensure appropriate use of PPE such as helmets, safety goggles, respirator masks, and protective clothing, according to the specific needs of each task.
- **Health monitoring:** Implement health monitoring programs for workers exposed to specific risks, such as chemical exposure or airborne particles, and conduct regular medical examinations.
- **Emissions and contaminant control:** Adopt technologies and practices that minimize emissions of contaminants into the air, water, and soil, and comply with applicable environmental standards and regulations.
- **Participation and consultation:** Involve workers and local communities in identifying risks and making decisions related to occupational health and safety, promoting active participation and open communication.
- **Emergency response:** Establish emergency response plans to quickly address any incidents that may impact the health and safety of workers and local communities, including evacuation and first aid training.
- **Supervision and compliance:** Conduct regular audits and checks to ensure compliance with health and safety policies and procedures, as well as applicable regulations and standards.
- **Continuous improvement:** Foster a culture of continuous improvement in occupational health and safety, encouraging worker feedback, periodic review of policies and procedures, and implementation of best practices.

4) **QUALITY EDUCATION:** On one hand, by contributing to the economic development of the region, industry can indirectly provide resources to improve educational infrastructure and access to education. On the other hand, in situations where competition for resources leads to the displacement of communities from their lands and homes, it can disrupt education due to community relocation. To mitigate this impact and promote access to quality education, the following measures are proposed:

- **Access to educational institutions:** Ensure access to educational institutions near the new locations of displaced communities, ensuring that there are sufficient schools and colleges that offer quality education and are equipped with necessary resources.



- Scholarship programs and financial support: Establish scholarship programs and financial support to enable students from affected communities to access higher education and vocational training programs, facilitating their academic and professional development.
- Recovery and reconstruction of educational infrastructure: Make investments for the recovery and reconstruction of educational infrastructure in the affected areas, ensuring that schools and colleges are rebuilt in suitable new locations with the necessary resources to provide quality education.

5) **GENDER EQUALITY:** Industry is predominantly male-dominated and can perpetuate gender discrimination and inequality. It is important for the industry to promote gender equality and empower women both within the industry and in local communities. To promote gender equality in the mining industry, measures can be taken such as:

- Gender equality policies: Establish clear and committed gender equality policies at all stages of the project, from planning to operation and closure, ensuring equitable participation of men and women in all areas and levels of the industry.
- Promotion of diversity: Foster gender diversity and inclusion in hiring and promotion practices, implementing measures to ensure equal opportunities and equitable access to leadership positions and decision-making roles.
- Prevention of gender-based violence: Establish clear policies and procedures to prevent and address gender-based violence in the workplace, providing a safe and discrimination-free environment for all employees and promoting an inclusive and respectful culture.
- Elimination of gender pay gaps: Ensure equal pay for men and women performing the same functions and tasks, eliminating any form of gender-based wage discrimination.
- Women's participation in key decisions: Promote active participation of women in decision-making processes related to the mining project, both at the corporate level and in affected local communities, ensuring their representation in committees, boards, and consultation processes.

6) **CLEAN WATER AND SANITATION:** Industry process can have significant impacts on water quality and quantity due to pollution and water needs. This can affect water availability for the population and agriculture, as well as the quality of water for human consumption and wildlife. Based on this, appropriate water management measures should be implemented during the development of the project to prevent contamination and ensure access to clean water and sanitation for local communities. Some suggestions to consider are:



- **Water monitoring:** Regularly monitor the water quality in sources near the project, including rivers, streams, lakes, and aquifers, to detect any signs of contamination.
- **Wastewater treatment:** Implement efficient wastewater treatment systems to minimize the release of contaminants and toxic substances into water bodies.
- **Acid mine drainage management:** Implement techniques and measures to prevent and control acid mine drainage, such as the construction of containment systems and neutralization of acidic waters.
- **Water conservation:** Promote the efficient use of water in mining operations through the implementation of conservation technologies and practices, such as water reuse and recirculation in mining processes.
- **Education and training:** Provide education and training to workers and local communities about the importance of water management, promoting responsible practices and the conservation of water resources.
- **Regulatory compliance:** Comply with local and international standards and regulations related to water quality, ensuring that best practices in water management are followed.
- **Contingency plans:** Develop contingency plans to address potential spills or incidents that may affect water quality, establishing clear response and recovery protocols.
- **Restoration and rehabilitation:** Implement programs for the restoration and rehabilitation of areas affected by industrial activities, including the recovery of water bodies and improvement of water quality.

7) **AFFORDABLE AND CLEAN ENERGY:** The current project can contribute to the production of clean technologies and renewable energies by providing critical materials needed. However, mining activities also consume significant amounts of energy and can have negative impacts on the environment. It is important for the industry to adopt sustainable and responsible practices to minimize its carbon footprint and promote the production and consumption of affordable and clean energy. Some of these sustainable practices include:

- **Energy efficiency:** Adopting technologies and practices that optimize energy consumption in all stages of the mining project, from extraction to processing and transportation of minerals, thereby reducing greenhouse gas emissions.
- **Renewable energy:** Integrating renewable energy sources such as solar, wind, or hydroelectric power in mining operations to reduce dependence on fossil fuels and decrease associated carbon emissions.



- Carbon offsetting: Establishing carbon offset programs to mitigate the emissions generated by the mining project through the implementation of reforestation projects, forest conservation, or other actions that absorb or reduce carbon in the atmosphere.
- Research and technological development: Investing in research and development of cleaner and more efficient technologies that enable more sustainable mining and a significant reduction in carbon emissions, driving innovation and the adoption of best practices in the sector.

8) **DECENT WORK AND ECONOMIC GROWTH:** Industrial activities can generate employment and contribute to regional economic growth. However, it is important to ensure that mining workers have safe working conditions, fair wages, and adequate labour rights, avoiding labor exploitation and precariousness. To achieve this, it is important to consider the following measures:

- Labour legislation and labor rights: Establish and enforce robust labour legislation that guarantees the protection of basic labour rights, such as fair wages, appropriate working hours, breaks, and safe and healthy working conditions.
- Inspections and supervision: Strengthen labour supervision and inspections to ensure compliance with labour standards and prevent labour exploitation and precariousness in mining projects, including effective penalties for those who violate labour laws.
- Fair hiring practices: Promote fair and transparent hiring practices, avoiding the hiring of workers under abusive subcontracting conditions and ensuring that employees are directly hired by the responsible companies in charge of the project.
- Protection of migrant workers: Establish specific protection mechanisms for migrant workers employed in mining projects, ensuring that their labour rights are respected and that they are protected against exploitation and abuse.

9) **INDUSTRY, INNOVATION AND INFRASTRUCTURE:** The current project has a positive impact on the industry as it promotes innovation and sustainable infrastructure to minimize its environmental and social impact, which can drive productivity and industrial capacity in the region. It is important to promote investment in research and development to improve extraction and raw material recovery technologies, minimizing environmental impacts and maximizing efficiency.

10) **REDUCED INEQUALITIES:** The industry can potentially have a negative impact on reducing inequalities due to the concentration of wealth and resources in a few hands. The project must ensure that economic and social benefits are distributed fairly and equitably among local communities, avoiding the exacerbation of existing inequalities.



- Establish benefit redistribution programs that ensure local communities receive fair compensation for extracted resources and promote equity in the distribution of generated wealth.

11) **SUSTAINABLE CITIES AND COMMUNITIES:** These activities can have a negative impact on the sustainability of cities and communities due to pollution, environmental degradation, and the expropriation of lands from local communities. It can also affect urban planning and land use by competing with agriculture, livestock farming, and other land uses. Therefore, the mining project must minimize negative impacts on local communities, such as forced relocation and environmental degradation. Additionally, it should promote community participation in decision-making and sustainable development planning.

- **Pollution management:** Implement environmental management plans that minimize negative impacts on local communities, such as pollution and land loss.
- **Community participation:** Involve local communities in decision-making processes related to urban development and mining projects through public consultations, dialogue processes, and mechanisms of citizen participation that promote inclusivity and diverse voices.
- **Preservation of cultural and natural heritage:** Protect and preserve the cultural and natural heritage of areas affected by mining projects, promoting the conservation of historical sites, fragile ecosystems, and biodiversity as integral parts of sustainable urban development.
- **Disaster resilience and climate change:** Adopt measures for climate change adaptation and mitigation, as well as risk management and disaster resilience strategies, to ensure the safety and protection of local communities and their urban environment.

12) **RESPONSIBLE CONSUMPTION AND PRODUCTION:** Industrial activities are essential to produce many products and services, but they can also have a negative impact on responsible consumption due to the extraction and intensive use of natural resources. Additionally, industry can generate toxic and polluting waste that can affect human health and the environment. It is the responsibility of the mining company to promote efficient resource utilization and encourage responsible consumption practices throughout the supply chain.

- **Resource efficiency:** Adopt technologies and processes that optimize the use of natural resources such as water, energy, and materials, thus minimizing waste generation and resource depletion.



- **Recycling and reuse:** Implement recycling and reuse programs for materials and by-products in the mining process, reducing the need for extraction of new resources and minimizing waste generation.
- **Responsible waste management:** Establish efficient waste management systems, ensuring proper segregation, treatment, and disposal of waste generated during mining operations, with the aim of minimizing its environmental impact.
- **Education and training:** Provide education and training programs for workers in the mining sector to promote awareness of the importance of efficient resource utilization, responsible consumption practices, and the proper use of sustainable technologies and processes.

13) **CLIMATE ACTION:** The recovery of critical raw materials can contribute to the transition to a low-carbon economy by being used for the development of clean technologies and renewable energies. Additionally, the TARANTULA project promotes innovation and sustainable infrastructure to minimize its impact on the environment. However, it is important to implement measures during the project development to minimize greenhouse gas emissions and reduce its carbon footprint.

- **Use of renewable energy:** Promote the use of renewable energy sources in mining operations to reduce dependence on fossil fuels and associated greenhouse gas emissions.
- **Energy efficiency:** Implement energy efficiency measures at all stages of the mining process, such as the use of efficient equipment and machinery, energy-efficient lighting and HVAC systems, and energy management systems to optimize consumption and reduce emissions.
- **Sustainable transportation:** Promote the use of sustainable and low-impact transportation methods and encourage route optimization and the reduction of unnecessary travel in mining operations.
- **Carbon capture and storage:** Explore carbon capture and storage options to reduce greenhouse gas emissions derived from mining activity by capturing and storing the emitted carbon dioxide during the process.
- **Responsible waste and waste management:** Implement waste management systems that minimize the generation of greenhouse gases, such as capturing and utilizing methane in coal mining operations, and promote waste reduction, reuse, and recycling in the mining process.



- Land restoration and reforestation: Prioritize the restoration of areas affected by mining activity, including reforestation and land rehabilitation, with the goal of absorbing atmospheric carbon and mitigating environmental impacts.

14) **LIFE BELOW WATER:** Industrial activities can have a negative impact on marine life due to pollution and environmental degradation. It is important for the industry to adopt appropriate management measures to prevent water pollution and degradation of marine ecosystems, especially if the mining operation is located near bodies of water.

- Continuous water monitoring: Establish regular water monitoring programs at all stages of the mining project, including the assessment of water quality, sediments, and surrounding marine ecosystems, in order to detect any contaminants or negative impacts and take timely corrective actions.
- Wastewater treatment: Implement efficient and proper wastewater treatment systems, using advanced technologies to remove contaminants before releasing the water back into the environment, ensuring it meets established quality standards.
- Protection of sensitive areas: Identify and protect sensitive marine areas and fragile ecosystems near the mining project, establishing exclusion zones or activity restrictions to avoid irreversible damage.
- Spill control and prevention: Establish contingency plans and rapid response protocols for potential spills or leaks of contaminating substances, including the availability of containment and cleanup equipment, to minimize impacts on marine ecosystems.
- Restoration of marine ecosystems: Develop programs for the restoration and rehabilitation of marine ecosystems affected by mining activity.
- Audits and monitoring: Conduct regular environmental audits and assess the effectiveness of implemented management measures to ensure compliance with water and marine ecosystem protection objectives.

15) **LIFE ON LAND:** This type of project can have a negative impact on the life of terrestrial ecosystems due to environmental degradation, deforestation, and pollution. Mineral extraction can destroy natural habitats and affect the biodiversity and productivity of terrestrial ecosystems. It is essential for the project to minimize soil degradation and biodiversity loss through rehabilitation practices in impacted areas and the implementation of measures for the conservation of terrestrial ecosystems.

- Strategic Environmental Assessment: Conduct a comprehensive strategic environmental assessment before initiating the project, identifying sensitive terrestrial ecosystems and endangered species, and developing appropriate mitigation plans.



- **Restoration of Affected Areas:** Implement programs for the restoration of areas affected by mining activity, including revegetation, reintroduction of native species, and recovery of key habitats, with the goal of recovering biodiversity and functionality of terrestrial ecosystems.
- **Proper Waste Management:** Establish adequate waste management systems for the waste generated by mining activity, ensuring proper disposal, and minimizing negative impacts on terrestrial ecosystems.
- **Biodiversity Conservation:** Implement biodiversity conservation programs, including the identification and protection of endangered species, conservation of critical habitats, and creation of ecological corridors to facilitate the movement of fauna and flora to protected areas.

16) **PEACE, JUSTICE AND STRONG INSTITUTIONS:** The project must respect human rights, including the rights of local communities and workers, and ensure transparency and accountability in its operations. It should also establish a relationship of dialogue and collaboration with local authorities and relevant institutions.

17) **PARTNERSHIPS FOR THE GOALS:** Mining activity should foster partnerships and collaborations among companies, governments, and civil society organizations to address social, economic, and environmental challenges related to mining activity. The present project promotes these partnerships by collaborating with different stakeholders from various sectors and countries to achieve the proposed goals.





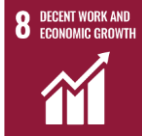

In summary, the impact of a critical raw materials recovery and extraction mining project in Europe on all SDGs can be both positive and negative. It is essential for the project to adopt responsible and sustainable practices in social, environmental, and economic terms, and promote equity, transparency, and the participation of local communities. In this way, the benefits can be maximized, and negative impacts on sustainable development and the achievement of the SDGs can be minimized.

2.4. Analysis of GRI standards for mining sector and proposal of indicators









For the present project, an analysis of the document "GRI Sector Standards " has been conducted. The Table below presents connections between the likely material topics for the recovery activity and the SDGs. These links were identified based on an assessment of the impacts described in each likely material topic, the targets associated with each SDG, and existing mapping undertaken for the sector. Based on the analysis conducted, a series of factors to consider for each of the most important standards in the sector are provided below.













Table 8. Mapping GRI topics and SDGs. Additional recommendations

Likely material topics	Recommendations	Corresponding Sustainable Development Goals
<p>Topic 14.1 GHG emissions (GRI 305-1 & 305-2.)</p>	<ul style="list-style-type: none"> Measures the total amount of greenhouse gas emissions emitted by the project during a specific period, usually in metric tons of carbon dioxide equivalent (tCO₂e). This includes both direct emissions (generated by the project's activities) and indirect emissions (emissions associated with purchased electricity, transportation, etc.). Also include land use change emissions and market-based energy indirect GHG emissions. Calculate the GHG emissions per unit of production or activity, such as metric tons of carbon dioxide equivalent per ton of recovered material. This indicator helps assess the energy efficiency and emissions management of the project. Evaluate the actions taken by the project to reduce GHG emissions. This may include the implementation of cleaner technologies, improving energy efficiency, using renewable energy, among other measures. Verify if the project has implemented carbon offset programs. This could involve investments in renewable energy projects, reforestation, or other activities that reduce GHG emissions outside the direct scope of the project. Evaluate if the project complies with legal requirements related to GHG emissions. Analyse the trend of GHG emissions from the project over different time periods. This helps assess the effectiveness of implemented emission reduction measures and whether improvements have been achieved over time. 	 
<p>Topic 14.2 Climate adaptation and resilience</p>	<ul style="list-style-type: none"> Verify if the project has a formal climate adaptation plan that identifies specific measures to address the identified risks (stakeholders could be engaged in the plan's development). This may include strategies to protect facilities and infrastructure, diversify water supply sources, improve energy efficiency... Examine if the project has made significant investments in technologies and practices that enhance its resilience to climate change. This may include the use of renewable energy, climate-adapted water management systems, climate-smart waste management, among others. Evaluate the percentage of energy consumed in the project that comes from renewable sources. Also evaluate energy efficiency in recovery operations and related facilities. Evaluate if the project conducts regular monitoring and reporting of indicators related to climate change, such as precipitation variability, extreme temperatures, water level fluctuations, and air quality. This demonstrates a commitment to transparency and accountability regarding climate change. 	   









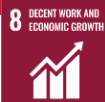





Likely material topics	Recommendations	Corresponding Sustainable Development Goals
	<ul style="list-style-type: none"> Verify if the project has committed to local, national, or international climate initiatives and commitments. This may include adherence to emissions reduction targets, participation in climate certification programs, or collaboration with other organizations on climate adaptation projects. Analyse if the recovery project conducts periodic assessments of its performance in climate adaptation and resilience, and if it uses the results to identify areas for improvement and establish long-term goals. 	
<p>Topic 14.3 Air emissions (GRI 305)</p>	<ul style="list-style-type: none"> Monitoring the total amount of pollutants emitted by the project into the air, such as suspended particles, nitrogen oxides (NOx), sulphur oxides (SOx), volatile organic compounds (VOCs), among others. This can be expressed in tons or kilograms and recording emission limit exceedances. Evaluates if the project complies with the limits and regulations established by the competent authorities regarding atmospheric emissions. Recording the cases in which the emission limits are exceeded. Analyse the different sources of atmospheric emissions, such as combustion of fossil fuels, emissions from machinery and equipment, material handling, among others. Also verify if the recovery project has implemented emission control technologies to reduce pollutants released into the air. This may include the use of filters, selective catalytic reduction (SCR) systems, dust capture systems, among others. 	  
<p>Topic 14.4 Biodiversity (GRI 304)</p>	<ul style="list-style-type: none"> Evaluate if the project has conducted a comprehensive assessment of potential impacts on biodiversity and local ecosystems. This includes identifying areas of high biological diversity, threatened species, and sensitive habitats that could be affected by the project. Verify if there are a formal biodiversity management plan that establishes specific measures to minimize and mitigate the identified biodiversity impacts. This may include implementing conservation measures, restoring degraded habitats, and protecting threatened species. Analyse if the project actively collaborates with key stakeholders such as conservation organizations, local authorities, and biodiversity experts. This demonstrates a participatory management approach and seeks to leverage specialized knowledge in biodiversity protection and conservation. This may include collaborating with biodiversity certification programs, investing in ecological restoration projects, or participating in biodiversity offset schemes. 	   











Likely material topics	Recommendations	Corresponding Sustainable Development Goals
<p>Topic 14.5 Waste (GRI 306)</p>	<ul style="list-style-type: none"> Evaluate the amount of waste that is recycled, reused, or recovered in the project. Monitor how waste that cannot be recycled or recovered is managed. This may include its disposal in authorized landfills, controlled incineration, or other forms of treatment and final disposal. Verifies if it is implemented measures to reduce waste generation at the source. This can include adopting cleaner production practices, process optimization, and resource consumption reduction. Evaluates if the project complies with applicable legal requirements and regulations regarding waste management. 	   
<p>Topic 14.6 Tailings</p>	<ul style="list-style-type: none"> Analyse the physical and chemical characteristics of the tailings, such as particle size distribution, metal content, acidity, presence of toxic substances, or other contaminants. This helps assess the potential risk to the environment and human health. Evaluate the design and management of tailings storage facilities. This includes aspects such as the stability of the deposits, lining and impermeability system, water management in the tailings facilities, and monitoring protocols. Verifies if the recovery project has detailed closure plans for the tailing's facilities upon the completion of operations. This includes measures to ensure long-term stability of the tailings deposits, as well as restoration and rehabilitation of affected areas. Analyses the measures taken by the project to identify, assess, and manage the risks associated with tailings facilities. This may include the implementation of monitoring and early warning systems, emergency response plans, and staff training in tailings facility safety. 	  
<p>Topic 14.7 Water and effluents (GRI 303)</p>	<ul style="list-style-type: none"> Measure the overall amount of water used by the project in its operations and its sources. This helps assess the impact on local water resources and the dependence on critical water sources. Evaluate the efficiency of water use by the recovery project. This involves analysing the relationship between water used and mineral production, identifying opportunities to reduce and optimize water consumption in operations. Verifies if the project has measures in place to manage stormwater. This includes implementing appropriate drainage systems, preventing pollution of surface water and groundwater, and managing flood risks. 	  






Likely material topics	Recommendations	Corresponding Sustainable Development Goals
	<ul style="list-style-type: none"> Evaluates if the project has implemented water conservation programs, such as water reuse and recycling, rainwater harvesting and storage, and the adoption of more water-efficient technologies. Measure percentage of water used in mining operations that is recycled and reused. 	
<p>Topic 14.8 Closure and rehabilitation</p>	<ul style="list-style-type: none"> Evaluate whether the project has a detailed closure plan that establishes the necessary actions to safely and environmentally responsibly close operations. Evaluates if the project has made adequate financial provision to cover the costs associated with closure and rehabilitation. This includes estimating future costs and implementing appropriate financial mechanisms such as bonds or environmental liability insurance. Analyse the measures taken by the project to rehabilitate and restore areas affected by recovery operations. This may include remediation of contaminated soil, re-vegetation of degraded areas, and restoration of natural ecosystems. Verify if the project has engaged relevant stakeholders such as local communities, authorities, and environmental organizations in the closure and rehabilitation process. Active stakeholder participation helps ensure that their concerns and expectations are considered in closure-related decisions. Evaluates if the project has established a long-term monitoring program to assess the effectiveness of closure and rehabilitation measures. This involves tracking key environmental indicators and periodically reviewing the results to ensure long-term environmental protection. 	    
<p>Topic 14.9 Economic impacts (GRI 201)</p>	<ul style="list-style-type: none"> Evaluate the number of direct and indirect jobs generated by the project in the local community. This includes employment in the recovery operation itself, as well as in local suppliers and other related activities. Analyse the investments made by the project in the local community and the surrounding region. This may include investments in infrastructure, community development programs, education and training, and other initiatives that contribute to local economic growth. Evaluate the number and total spend of education and skills programs deployed for workers who are not employees and the extent to which the programs have been effective. 	     


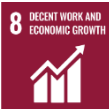


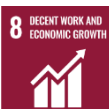





Likely material topics	Recommendations	Corresponding Sustainable Development Goals
<p>Topic 14.10 Local communities (GRI 413)</p>	<ul style="list-style-type: none"> Evaluates the level of participation and consultation of local communities in decisions related to the project. This includes identifying and considering community concerns and expectations, as well as promoting open and transparent dialogue. Analyses local vulnerable groups and the impact of the project on their quality of life. Percentage of the local population affected by the project with access to basic services such as housing, transportation, and public utilities. Analyse the actions taken to contribute to the social and economic development of local communities. This may include training and employment programs, investments in infrastructure, support for education and health, and promotion of sustainable economic activities. Level of conservation and protection of cultural and natural heritage in the project's influence areas. Analyses the direct and indirect economic benefits generated by the project for local communities. This may include job creation, boosting the local economy, supporting local businesses, and generating tax revenues for community development. 	    
<p>Topic 14.11 Rights of Indigenous Peoples</p>	<p>Due to location of the project (European Union) it has not been considered as a material topic of interest.</p>	
<p>Topic 14.12 Land and resource rights</p>	<ul style="list-style-type: none"> Analyses the measures taken by the project to protect sensitive areas, such as nature reserves, or ecologically important zones. This involves adopting environmentally and socially responsible management practices that minimize impacts on these spaces. Evaluates whether the project utilizes natural resources responsibly and sustainably. This includes implementing environmental management practices that minimize resource depletion and promote long-term conservation. Verifies whether the project has established effective mechanisms for consultation and participation of local communities in decisions related to land use and natural resources. This involves including community voices in decision-making and considering their concerns and expectations. Evaluates whether the project has implemented appropriate resettlement and compensation measures in case of community displacement due to 	  



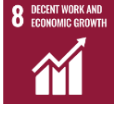






Likely material topics	Recommendations	Corresponding Sustainable Development Goals
	<p>mining operations. This includes identifying fair and equitable solutions to ensure the well-being of affected communities.</p>	
<p>Topic 14.13 Artisanal and small-scale mining (ASM)</p>	<p>Due to location of the project (European Union) it has not been considered as a material topic of interest.</p>	
<p>Topic 14.14 Security practices</p>	<ul style="list-style-type: none"> • Verify if the project has adequate and up-to-date security plans, including measures to prevent and mitigate identified risks. These plans should address aspects such as physical security, crisis management, data protection, and incident prevention. • Evaluates whether the project provides adequate security training to its employees and contractors. This includes training in security practices, handling of security and emergency equipment, and promoting a culture of safety in the workplace. • Evaluate the number of social conflicts related to the project and their peaceful resolution. • Verifies if the project has policies and security measures in place to protect confidential information and data of its employees, contractors, and other stakeholders. 	
<p>Topic 14.15 Critical incident management</p>	<ul style="list-style-type: none"> • Evaluates if the project has an incident management plan that includes clear and specific procedures to address different types of emergency situations. This may include fires, major accidents, spills of hazardous substances, extreme weather events, among others. • Evaluates if therecovery project provides regular training to its staff regarding the management of critical incidents. This includes conducting drills and emergency response exercises to improve preparedness and assess the effectiveness of plans and procedures. • Verifies if the project has a crisis communication plan to inform internal and external stakeholders about critical incidents and the measures taken to address them. This includes transparency in information disclosure, consideration of stakeholder concerns, and coordination with relevant authorities 	 







Likely material topics	Recommendations	Corresponding Sustainable Development Goals
<p>Topic 14.16 Occupational health and safety (GRI 403)</p>	<ul style="list-style-type: none"> Evaluates the rate of occupational accidents in the project, such as work-related injuries and illnesses. This can be measured using indicators such as the accident frequency rate, accident severity rate, or lost-time injury rate. Evaluates if the project has established occupational safety programs and policies that include risk identification and assessment, implementation of preventive measures, and a safety culture in the workplace. Verifies if the project provides adequate occupational safety training to its employees and contractors. This includes training in safe work practices, handling of equipment and hazardous substances, and awareness of risks and protective measures. Evaluates if the project encourages active employee participation in the identification and mitigation of occupational hazards. This may include the establishment of safety committees, conducting joint safety inspections, and promoting open communication channels to report concerns and suggestions. 	 
<p>Topic 14.17 Employment practices (GRI 401)</p>	<ul style="list-style-type: none"> Evaluates the percentage of local employees hired in the project compared to the total workforce. This demonstrates the company's commitment to hiring and developing local workforce. Verifies if the company offers fair and competitive salaries and benefits to its employees, in line with labour standards and regulations in the European Union. Evaluates if the project offers development and training opportunities to its employees to enhance their skills and promote their professional growth. Analyses if the project fosters active employee participation in decision-making and continuous improvement. This can include creating open communication channels, conducting employee satisfaction surveys, and promoting participation in committees or employee groups. 	   
<p>Topic 14.18 Child labour</p>	<p>Due to location of the project (European Union) it has not been considered as a material topic of interest.</p>	
<p>Topic 14.19 Forced labour and modern slavery</p>	<p>Due to location of the project (European Union) it has not been considered as a material topic of interest.</p>	
<p>Topic 14.20 Freedom of association and collective bargaining (GRI 407-1)</p>	<ul style="list-style-type: none"> Verifies if the project has current collective agreements and if they are respected and implemented in practice. These agreements may cover areas such as wages, working hours, benefits, occupational safety and health, among other labour aspects. Evaluates if the project consults and seeks worker participation in decisions that affect their working conditions and rights. This may include participation 	 



Likely material topics	Recommendations	Corresponding Sustainable Development Goals
	<p>in works councils, conducting employee satisfaction surveys, and considering workers' opinions and concerns.</p>	
<p>Topic 14.21 Non-discrimination and equal opportunity (GRI 406)</p>	<ul style="list-style-type: none"> Evaluates if the project has clear policies and procedures that prohibit employment discrimination based on protected characteristics such as race, gender, age, religion, sexual orientation, disability, or other categories protected by labour laws. Verifies if the project promotes diversity and gender equity in its workforce. This can be assessed by evaluating the proportion of employees from different genders in different levels and areas of the organization, as well as the initiatives and programs implemented to promote equal opportunities for men and women. Evaluates if the project ensures equal pay for work of equal value, regardless of gender, race, or other protected characteristics. This can involve analysing disaggregated salary data by gender and race to identify potential disparities and taking corrective measures if necessary. Verify if the project makes efforts to ensure accessibility and reasonable accommodations for employees with disabilities. This can include removing physical barriers, implementing accessible technologies, and providing reasonable workplace adjustments. Evaluate if the project provides equal opportunities for professional development and training for all employees, regardless of their ethnic origin, gender, or other protected characteristics. This includes equitable access to training programs, internal promotion, and career development opportunities. Analyse if the project promotes an inclusive and discrimination-free organizational culture where all employees feel valued and respected. This may involve promoting diversity, celebrating multiculturalism, and implementing inclusive work practices. 	    
<p>Topic 14.22 Anti-corruption (GRI 205)</p>	<ul style="list-style-type: none"> Evaluates if the project has clear and explicit policies against corruption. These policies should establish ethical principles and standards of conduct that employees must adhere to, as well as the consequences for violating these policies. Evaluates if there are clear and accessible procedures for employees and other stakeholders to report cases of corruption confidentially and without 	 



Likely material topics	Recommendations	Corresponding Sustainable Development Goals
	<p>fear of retaliation. These procedures should ensure proper investigation of reports and the implementation of corrective actions.</p> <ul style="list-style-type: none"> • Verifies if the project conducts due diligence in the selection and management of its suppliers and contractors to ensure they are not involved in corrupt practices. This may include risk assessments, background checks, and anti-corruption clauses in contracts. • Evaluates if the project maintains clear and accurate financial records and complies with financial reporting standards. 	
<p>Topic 14.23 Payments to governments</p>	<ul style="list-style-type: none"> • Evaluates the payments made by the project as taxes to national and local governments. This includes income taxes, profit taxes, property taxes, sales taxes, or other specific taxes applicable to the mining sector. • Verifies if the project makes other payments or fiscal benefits, such as payments for public services, contributions to local development funds, or fiscal benefits granted by governments. • Evaluates if the project transparently and clearly discloses the payments made to governments, both in internal and public reports. This includes breaking down the payments by category and disaggregating them by country and specific project. 	  
<p>Topic 14.24 Public policy (GRI 415)</p>	<ul style="list-style-type: none"> • Evaluates if the project actively participates in public consultation processes related to the formulation of public policies relevant to the mining industry. This may include participation in public hearings, meetings with government authorities, and contributions to consultations and policy reviews. • Verifies if the project collaborates with different stakeholders, such as community organizations, environmental groups, and public policy experts, to address challenges and opportunities in the industrial sector. This may include participation in dialogue platforms, collaborative initiatives, and joint research programs. • Evaluates the impact of the project on sustainable development and its alignment with related public policies. This includes aspects such as contributing to local economic growth, job creation, environmental protection, and promoting corporate social responsibility. • Verifies if the project complies with all regulations and legal requirements related to the industry in the European Union. This includes compliance with environmental, health and safety standards, as well as any other specific requirements set by regulatory authorities 	



Likely material topics	Recommendations	Corresponding Sustainable Development Goals
Topic 14.25 Conflict-affected and high-risk areas	Due to location of the project (European Union) it has not been considered as a material topic of interest.	

Based on the analysis conducted and the recommendations provided earlier, a series of indicators are proposed below to assess and safeguard the social sustainability of the CRM recovery project. It is important to mention that the proposal of environmental indicators to be evaluated can be found in the next table.



Table 9. Proposed indicators to assess the social impacts

INDICATOR	DESCRIPTION	SDG	GRI
Employment and Working Conditions	<ul style="list-style-type: none"> Number of direct jobs created by the project. Number of indirect jobs generated in the value chain. Proportion of local employees compared to external employees. Average wages and benefits for workers. Employee turnover rate. Percentage of employees receiving training and professional development. 	3, 5, 8, 10	401
Local Community Development	<ul style="list-style-type: none"> Investments in infrastructure and community service projects. Level of community participation in project decision-making. Measures to improve the local quality of life (e.g., access to clean water, electricity, transportation). Contributions to local sustainable development programs. 	1, 3, 5, 6, 16	413
Health and Safety	<ul style="list-style-type: none"> Rates of workplace accidents and occupational illnesses. Compliance with occupational health and safety regulations. Employee access to healthcare services and health insurance. Implementation of measures to prevent negative impacts on the health of workers and local communities. 	3, 8, 11	403, 410
Gender Equality and Diversity	<ul style="list-style-type: none"> Proportion of employees of different genders in the project. Initiatives to promote gender equality and diversity. Participation of women in leadership roles and decision-making. Measures to ensure an inclusive and discrimination-free work environment. 	4, 5, 8, 10, 16	406
Education and Training	<ul style="list-style-type: none"> Investment in training and education programs for employees and local communities. Number of individuals trained and their skill development. Measures to enhance the long-term employability of workers. 	1, 5, 8, 10	401
Stakeholder Engagement	<ul style="list-style-type: none"> Level of collaboration with community organizations and interest groups. Frequency and quality of communication with external stakeholders. 	16, 17	407, 413
Human Rights	<ul style="list-style-type: none"> Implementation of policies and practices to ensure the human rights of workers and local communities. Evaluation of compliance with fundamental labor rights, such as child labor and forced labor. 	1, 4, 8, 16	412



INDICATOR	DESCRIPTION	SDG	GRI
Economic Development	<ul style="list-style-type: none"> Contribution to local and regional gross domestic product (GDP). Promotion of economic growth and diversification of the local economy. Income generation for local workers and suppliers. 	1, 4, 5, 8, 9, 10	201
Resilience and Adaptation Capacity	<ul style="list-style-type: none"> Measures implemented to increase the resilience of local communities to economic and environmental changes. Plans to address project closure and its impact on the community. 	1, 7, 8, 9, 13	--
Access to Basic Resources	<ul style="list-style-type: none"> Access of the local community to basic resources such as water, food, and housing. Measures to mitigate potential negative impacts on local basic resources. 	1, 3, 4, 6, 11, 12, 16	413
Participation and Public Consultation	<ul style="list-style-type: none"> Level of stakeholder participation in the design and execution of the project. Use of public consultations to gather community opinions and adapt the project to local needs. 	16, 17	407, 413, 415
Culture and Heritage	<ul style="list-style-type: none"> Measures to protect and preserve the culture and heritage of local communities. Collaboration with community leaders to ensure cultural values are respected. 	16, 17	407, 413, 415

2.5. Recommendations to safeguarding social acceptance

Following an in-depth analysis conducted is presented, recommendations are provided below as a guide to safeguarding the social acceptance of the project, the proposed steps to ensure the social and environmental sustainability are:

1. Stakeholders identification
2. Communication protocol definition and establishment
3. Definition of most relevant measures to mitigate risks
4. Definition of indicators and monitoring

These stages are described in next sections.



2.5.1. Stakeholder identification

Identifying stakeholders is a fundamental process in any project or initiative, as it allows to identify individuals, groups, or organizations that may be affected by the project or may influence its success. Some of the most common stakeholders in a project are:

Table 10. Main stakeholders preliminary identification

Stakeholder category	Description
Local community	The residents of a city or town near the mining site, who may be concerned about environmental impacts, air and water pollution, traffic congestion, and noise.
Regulators and authorities	Government agencies that have jurisdiction over mining, such as the European Environment Agency and national mining authorities.
Environmental groups	Non-profit organizations working on environmental protection that can monitor and campaign against the project.
Staff	Employees who work on the mining project, such as machinery operators, geologists, and engineers.
Suppliers	Companies that supply goods, services, and equipment for the mining project, such as machinery manufacturers, transport companies, and catering service providers.
Shareholders	Investors who hold a financial stake in the project.
Customers	Companies that purchase the mining products of the project, such as construction companies, energy companies, and electronics companies.
Financial institutions	Banks, international financial organizations, and investors who finance the project.
Human rights advocacy groups	Organizations that work to protect the human rights of people affected by mining.



2.5.2. Communication plan

Below are some activities that can be carried out in a public participation plan for an industrial activity in Europe, associated with each of the stakeholders mentioned above:

Table 11. Activities to engage main stakeholders

Stakeholder category	Description
Local community	<ul style="list-style-type: none"> • Public meetings to inform the community about the project and its impacts. • Site visits to allow the community to see the project first-hand. • Surveys and interviews to collect feedback and concerns from the community. • Regular communication through newsletters and updates on the project website.
Regulators and authorities	<ul style="list-style-type: none"> • Presentations and meetings with government agencies to discuss the project and its impacts. • Environmental and social impact assessments and reports to meet regulatory requirements. • Regular communication on project progress and compliance with regulations.
Environmental groups	<ul style="list-style-type: none"> • Meetings and presentations to discuss the project's environmental concerns. • Independent project reports and analyses to evaluate its environmental impacts. • Surveys and interviews to collect feedback and concerns from the community. • Regular communication on project progress and efforts to minimize environmental impacts.
Staff	<ul style="list-style-type: none"> • Information sessions for employees about the project and its objectives. • Occupational health and safety training. • Feedback and suggestion sessions to improve the work environment and the project.
Suppliers	<ul style="list-style-type: none"> • Meetings and presentations to discuss project collaboration and requirements. • Regular communication on project progress and supplier requirements. • Supplier evaluations to ensure compliance with environmental and social standards.
Shareholders	<ul style="list-style-type: none"> • Informational meetings and presentations about the project and its performance. • Surveys and interviews to collect feedback and concerns from shareholders.



Stakeholder category	Description
	<ul style="list-style-type: none"> • Regular reports on project progress and profitability.
Customers	<ul style="list-style-type: none"> • Meetings and presentations to discuss customer requirements and product deliveries. • Product quality evaluations and customer satisfaction. • Regular communication on project progress and compliance with customer requirements.
Financial institutions	<ul style="list-style-type: none"> • Informational meetings and presentations about the project and its financing. • Regular reports on project progress and profitability. • Discussion on financial requirements and compliance with environmental and social criteria.
Human rights advocacy groups	<ul style="list-style-type: none"> • Meetings and presentations to discuss human rights concerns. • Surveys and interviews to collect feedback and concerns from human rights groups. • Independent assessments of human rights and living conditions at the mining site. • Regular communication on project progress and efforts to protect human rights.

2.5.3. Measures to mitigate potential negative social impacts

To mitigate the potential negative social impacts that the Project may entail, compensatory measures must be taken. The following measures are identified to contribute to relevant aspects related to the activity.

2.5.3.1 COMMUNITY PARTICIPATION:

- **Engaging with local communities:** This means that the mining company should establish open and accessible communication channels so that the community can voice their concerns and expectations from the outset.
- **Consultation and dialogue mechanisms:** Regular meetings should be organized where the community and the company can discuss relevant issues. These meetings should be inclusive and transparent.



2.5.3.2 SOCIAL IMPACT ASSESSMENT:

- Comprehensive assessments: Hiring independent experts to conduct detailed studies that analyse how the project will affect the community in areas such as health, the economy, and quality of life.
- Use of independent data and studies: The results of these assessments should be based on objective data and not influenced by the company to ensure credibility.

2.5.3.3 ECONOMIC COMPENSATION:

- Establishment of compensation funds: The company should create a specific fund to compensate the community for any negative impact on its economy. This could include direct payments or investment in local economic projects.
- Employment and training programs: The company can generate employment in the community and provide training so that local residents have access to new job opportunities.

2.5.3.4 ENVIRONMENTAL REHABILITATION:

- Restoration planning: The project should include detailed plans to restore areas affected by the project. This may involve reforestation, wastewater management, and other actions to restore the natural environment.
- Financial guarantees: Funds or financial guarantees should be established to ensure that resources are available for environmental rehabilitation even if the company faces financial difficulties.

Access to Information:

- Transparent information: The company should provide clear and accessible information about all project-related activities, from environmental impact reports to monitoring data.
- Informational meetings: Hold regular meetings with the community to explain the project's progress and address questions and concerns.

2.5.3.5 SUSTAINABLE DEVELOPMENT:

- Economic diversification: The company should support economic diversification in the region, helping the community develop alternative sources of income apart from the current industrial project.
- Training and education: Offer training and education programs so that community members acquire skills that enable them to participate in other industries.



2.5.3.6 HUMAN RIGHTS PROTECTION:

- Respect human rights: Ensure that the fundamental rights of the community are respected at all times, including the right to a healthy and safe environment.
- Conflict resolution mechanisms: Establish effective processes for addressing complaints and conflicts fairly and promptly.

2.5.3.7 CORPORATE RESPONSIBILITY:

- Clear commitments: The company should set specific policies and goals in its corporate social responsibility strategy and be accountable to the community and other stakeholders.
- Transparency in resource management: There must be transparency in the management of resources and economic benefits generated by the project.

2.5.3.8 MONITORING AND ONGOING EVALUATION:

- Long-term monitoring: Implement a monitoring system that remains active throughout the project's entire lifespan and beyond, to ensure that promises and commitments are upheld.
- Periodic reviews: Conduct regular reviews involving the community and independent experts to assess progress and make adjustments when necessary.

2.5.3.9 LEGAL COMPLIANCE:

- Rigorous compliance: The company must adhere to all local, national, and international laws and regulations related to the industry, the environment, and social rights.
- Collaboration with regulators: Collaborate closely with local authorities and regulators to ensure that the project operates within legal limits and adheres to established standards.

2.5.4. Guidelines for indicators monitoring

In this section a general guide for evaluating the proposed indicators. It is important to note that this guide is a tool for developing a specific monitoring plan based on the project's location, as each indicator must be assessed in the context of the activity and its environment to ensure that the actions taken are effective and meaningful.

1. Definition of Metrics and Data:

- For each indicator, clearly define the specific metrics that will be used to measure the impact. For example, for the indicator "Number of direct jobs created by the project," establish how direct jobs will be counted and recorded.



- Identify the necessary data sources to gather relevant information, such as employment records, workplace accident reports, community surveys, etc.

2. Data collection:

- Collect relevant data from reliable and up-to-date sources. This may require collaboration with the project team, local partners, and other stakeholders.
- Ensure clear procedures to ensure the accuracy and consistency of the collected data.

3. Comparative analysis

- Compare the collected data with the previously set objectives or targets for each indicator.
- Conduct comparative analysis over time, if possible, to identify trends and changes in social impact.

4. Interpretation and evaluation:

- Evaluate the results critically and in context. For example, if the number of created jobs is lower than anticipated, investigate the reasons behind this outcome.

5. Identification of improvement areas:

- Identify areas where results do not meet objectives or fall below expectations.
- Identify the reasons behind the identified challenges and consider how they can be addressed

6. Corrective action plans:

- Develop specific action plans to address identified areas for improvement. These plans should be realistic and focused on continuous improvement.

7. Transparent Communication:

- Communicate the results transparently to stakeholders. This may include sustainability reports, presentations, press releases, and other means.

8. Continuous Monitoring:

- Establish a continuous monitoring system to track and assess social impact over time.
- Adjust indicators and evaluation methods as needed as the project progresses.



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